निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, डेन्टिष्ट्री समूह, डेन्टल हाइजिन उपसमूह, डेन्टल हाइजेनिष्ट पद, चौंथो तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

SHISIR K ADHIKARI
2022
HEALTH LOKSEWA
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प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Health Service System**
   - 1.1 History of the development of dental health services in Nepal
   - 1.2 Purpose and characteristics of a dental health care system
   - 1.3 Code of conduct for Dental Hygienist and its purpose
   - 1.4 General Knowledge of Health/Dental Hygienist service in Nepal
   - 1.5 General knowledge about Civil Service Hospital and its Bylaws

2. **Dental Theory and Terminology**
   - 2.1 Dental and oral anatomy, tooth numbering system
   - 2.2 Instrument nomenclature and identification for all aspects of general dentistry
   - 2.3 Dental Terminology.
   - 2.4 Equipment operation, chair positioning, assistant equipment use age

3. **Four- handed Dental Assisting :**
   - 3.1 Instrument transfer techniques, chair side assisting and suctioning
   - 3.2 Chair-side doctor-patient- assistant positioning
   - 3.3 Tube and Tray system.
   - 3.4 Use of instruments and materials in assisting for :
     - 3.4.1 Operative dentistry
     - 3.4.2 Oral surgery
     - 3.4.3 Prosthodontics (crown and bridge)
     - 3.4.4 Endodontic
     - 3.4.5 Periodontics
     - 3.4.6 Pedodontics
     - 3.4.7 Orthodontics
   - 3.5 Hand piece care and maintenance

Civil Service Hospital

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Section (B): 50 % Marks

4. **Oral Medicine and Radiology**
   - 4.1 Oral medicine - definition, scope and clinical application
   - 4.2 Case history and components; physical examination methodologies (general-extra oral, intra oral)
   - 4.3 Concepts of provisional diagnosis and differential diagnosis
   - 4.4 X-ray theory and technique, use of Ring Holders and their method
   - 4.5 Intra oral, bitewing, panoramic and endodontic exposure methods
   - 4.6 Developing X–rays
   - 4.7 X-ray safety and precautions

5. **Impressions and Model Trimming :**
   - 5.1 Impression materials and practice in their use, alginate, and rubber base
   - 5.2 Wax bites, counter impressions
   - 5.3 Model pouring and trimming

6. **Oral Pathology and Microbiology**
   - 6.1 Concept, causes and types of inflammation and abscess
   - 6.2 Definition of facial space and enumerate spaces of oro-facial region
   - 6.3 Oral microbiology and normal oral flora of human being from birth to old age
   - 6.4 Introduction to micro-organisms (bacteria, virus, fungi, protozoa, amoeba)
   - 6.5 Source, types, clinical features and sequelae of infection

7. **Sterilization Techniques**
   - 7.1 Sterilization theory and terminology, autoclave operation
   - 7.2 Instrument and equipment sterilization disinfection
   - 7.3 Treatment room disinfection and asepsis techniques

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, ईञ्जिनियरिङ एण्ड मेन्टेनेन्स समूह, ईलेक्ट्रिसिकल उपसमूह, ईलेक्ट्रिसिकल सबओभरसियर पद, चौंथो तहको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– (क) प्रयोगात्मक परीक्षा पूर्णाङ्क :– ५०

(ख) अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

SHISIR K ADHIKARI HEALTH LOKSEWA 2022 www.shisirkadhikari.com

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली	समय
प्रयोगात्मक परीक्षा	५०	२५	प्रयोगात्मक	१ घण्टा
अन्तर्वार्ता	३०	-	मौखिक	

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व. २०७९/०८०

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निजामती कर्मचारी अस्पताल

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Paper I and II: Technical subject

Section (A): 50 % Marks

१. विद्युतीय सिद्धान्त

१.१ विद्युतका स्रोतहरु, करेन्ट (Current) : परिभाषा, संकेत र एकाइ, Alternating Current र Direct Current

१.२ भोल्टेज : परिभाषा, संकेत, एकाइ, प्रकार र उच्च भोल्टेज एवं कम भोल्टेज

१.३ फ्रिक्वेन्सी: परिभाषा, संकेत र एकाइ

१.४ विद्युतीय शक्ति तथा उर्जा: परिभाषा, संकेत, एकाइ र सामान्य समीकरण (Simple Equation)

१.५ रेसिष्टर (Resistor), क्यापासिटर (Capacitor) र इन्डकटर (Inductor): परिभाषा, संकेत र एकाइ

१.६ करेन्ट, भोल्टेज, अवरोध तथा तिनको सम्बन्ध - ओहमको सिद्धान्त (Ohm's law)

१.७ Single phase and poly phase सिष्टम : परिभाषा, फेज नामाकरण र थ्री फेज प्रणालीमा हुने कनेक्सनहरु (वाइ र डेल्टा)

१.८ Phase Voltage, Line voltage तथा Phase current, Line current

२ विद्युतीय सुचालक तथा कुचालक (Electrical Conductor and Insulator)

२.१ सुचालकको परिभाषा र सुचालकको लागि प्रयोग गरिने धातुहरु तामा र एलुमिनियमका गुणहरु, ACSR conductors : बनावट, प्रकार र प्रयोग

२.२ विद्युत केबुल (Electric cable)

- २.२.१ हाउस वायरिङ्ग तथा इन्डष्ट्रियल वायरिङ्ग गर्नको लागि प्रयोग हुने केबुलहरुका प्रकार
- २.२.२ केबुलको बनावट र कलर कोड (Color Code)
- २.२.३ केबुलको विद्युतीय करेन्ट वहन गर्न सक्ने क्षमता

२.३ कुचालकको परिभाषा र केबुल कुचालक गर्ने पदार्थको प्रकार र गुणहरुको जानकारी

३ विद्युतीय सुरक्षाका उपकरणहरु:

३.१ फ्यूज (Fuse): परिभाषा, विभिन्न साइजका फ्यूज वायरहरु तथा फ्यूजिङ्ग करेनट बारे जानकारी

३.२ एच.आर.सी.फ्यूज (High Rupturing Capacity Fuse): परिभाषा र प्रयोग

३.३ एम.सी.बी. (Miniature Circuit Breaker): परिभाषा, प्रकार र प्रयोग

३.४ अर्थ लिकेज सर्किट ब्रेकर (Earth Leakage Circuit Breaker): परिभाषा र प्रयोग

३.५ एम.सी.सी.बी. (Moulded Case circuit Breaker): परिभाषा र प्रयोग

३.६ लाइटनिङ्ग एरेस्टर (Lightning arrestor): परिभाषा र प्रयोग

३.७ डिष्ट्रिव्यूसन बोर्ड

३.८ प्यानल बोर्ड

४ विद्युतीय सामग्री तथा बत्तीहरु (Electrical accessories and Lamps)

४.१ विद्युतीय स्वीचः परिभाषा, प्रकार तथा जडान गर्ने तरिका, संकेत र प्रयोग

४.२ विद्युतीय वायरिङ्ग वाइरिङ्ग गर्ने तरिका र प्रयोग हुने विभिन्न सामग्रीहरुको प्रकार, संकेत र प्रयोग

- ४.२.१ होल्डर
- ४.२.२ सिलिङ्ग रोज (Celing rose)
- ४.२.३ सकेट (Socket)
- ४.२.४ प्लग (Plug)
- ४.२.५ जंक्सन वक्स
- ४.२.६ कन्डयूट (Conduit)

४.३ विद्युतीय बत्तीहरु (Electrical Lamps)

- ४.३.१ इंक्यान्डेसेन्स बत्ती (Incandescence lamp) : प्रकार, बनावट र प्रयोग
- ४.३.२ डिस्चार्ज बत्तीहरु, फ्ल्यूरोसेन्ट टयूव, सोडियम भ्यापर बत्ती, मर्करी भ्यापर बत्ती र हयालोजन (Halogen) बत्तीको प्रयोग
- ४.३.३ इनर्जी सेभिङ्ग ल्याम्प (Energy Saving Lamps) : बनावट, प्रकार र प्रयोग

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Section (B): 50 % Marks

५ विद्युतीय घरेलु उपकरणहरुको संचालन र सामान्य मर्मतको जानकारी

५.१ हिटर
५.२ रेफ्रीजरेटर
५.३ ओभेन
५.४ गिजर
५.५ विद्युतीय केटल (Electric Kettle)
५.६ पंखा (Fan)
५.७ एयर कन्डीसन

६ विद्युतीय मेसीनहरु (Electric Machines)

६.१ Single Phase तथा Three Phase Transformers: सिद्धान्त, बनावट, प्रयोग तथा Rewinding विधि
६.२ घरेलु सिङ्गल फेज ए.सी.मोटरहरुको संचालन प्रक्रिया (Operational Process), रेटिङ्ग (Rating) प्रयोग र सामान्य मर्मतको जानकारी
६.३ घरेलु थ्री फेज (Three Phase) इन्डक्सन (Induction) मोटरको संचालन प्रक्रिया, रेटिङ्ग र प्रयोगको जानकारी
६.४ घरेलु सिङ्गल फेज डिजेल जेनेरेटरको संचालन प्रक्रिया, रेटिङ्ग र प्रयोगको जानकारी
६.५ घरेलु थ्री फेज डिजेल जेनेरेटरको संचालन प्रक्रिया, रेटिङ्ग र प्रयोगको जानकारी

७ विद्युतीय औजारहरुको प्रकार र प्रयोग गर्ने तरिका

७.१ स्क्रयू ड्राइभर (Screw Driver)
७.२ लाइन टेस्टर (Line Tester)
७.३ प्लायर (Plier)
७.४ वायर कटर (Wire cutter)
७.५ एमिटर (Ammeter) र भोल्टमिटर (Voltmeter)
७.६ मल्टीमिटर (Multimeter)
७.७ मेगर (Megger)
७.८ विद्युतीय ड्रिल मेसिन र विट

८ अर्थिङ्ग: परिभाषा, अर्थिङ्ग गर्नु पर्ने आवश्यकता, अर्थ रेजिस्टेन्सलाई प्रभाव पार्ने तत्वहरु र यसको मान, अर्थिङ्ग गर्ने तरिकाहरु र अर्थिङ्ग गर्दा चाहिने सामग्रीहरु

९ विद्युत प्रसारण तथा वितरण प्रणाली

९.१ नेपालमा विद्यमान प्रसारण प्रणाली सम्बन्धी बारे सामान्य जानकारी
९.२ नेपालमा गरिने विद्युत वितरण प्रणाली : आउटडोर सबस्टेशन, डिस्ट्रीव्यूटर, सर्भिस लाइन बारे सामान्य जानकारी

१० विद्युतीय सुरक्षा सम्बन्धी अवधारणा

१०.१ विद्यतीय झट्का, यसका असरहरु, विद्युत खतराबाट बच्ने उपायहरु
१०.२ विद्युत झट्का लागेको खण्डमा गरिने प्राथमिक उपचारको विधि
१०.३ विद्युतीय कार्यहरु गर्दा अपनाउनु पर्ने सुरक्षाका नियमहरु
१०.४ विद्युतीय कार्य गर्दा ईलेक्ट्रिसियनले प्रयोग गर्नुपर्ने विभिन्न सुरक्षा साधन तथा उपकरणहरु
१०.५ विद्युतीय उपकरण सम्बन्धी सुरक्षाका नियमहरु
१०.६ इलेक्ट्रिकल डिभाइसहरु मर्मत सम्भार गर्दा अपनाउनु पर्ने सुरक्षाहरु

११ निजामती कर्मचारी अस्पताल र यसको कर्मचारी सेवाका शर्त र सुविधा सम्वन्धी विनियमावली

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प्रयोगात्मक परीक्षाको पाठ्यक्रम

१. विद्युतीय नक्शा :

१.१ विद्युतीय सर्किट डायग्रामको ज्ञान
१.२ विद्युत वायरिंङ्ग डायग्रामको ज्ञान
१.३ विद्युत नक्शामा प्रयोग हुने चिन्हरुको ज्ञान

२. विद्युत वायरिंङ्ग र जडानः

२.१ विद्युतीय औजार र उपकरणहरु चयन (Select) गर्ने
२.२ विद्युतीय सामग्रीहरु चयन गर्ने
२.३ विद्युतीय सुरक्षात्मक उपकरण चयन गर्ने
२.४ तल उल्लिखित विद्युत वायरिंङ्ग गर्न सक्ने
२.४.१ वन वे स्वीच सहित लाईट सर्किट
२.४.२ पुस बटन स्वीच सहित कलबेल सर्किट
२.४.३ सकेट वाइटलेट सर्किट
२.४.४ मेन स्वीच तथा डिस्ट्रीव्यूसन बोर्ड

३. विद्युत वायरिंङ्ग प्रणालीको मर्मत संभारः

३.१ विद्युतीय जडानमा भएका विद्युत सामग्रीहरु जस्तै स्वीच, कन्डयूट, वत्तीका सेटहरु (Electrical Fixture) आदिको जाँच गर्ने
३.२ वायरिंङ्ग प्रणालीमा उत्पन्न फल्टको पहिचान गर्ने
३.३ फल्टलाई मर्मत गर्ने

४. घरेलु उपकरणहरुको मर्मत सम्भारः

४.१ बिग्रिएको घरेलु उपकरणहरु खोल्ने (Dismantle)
४.२ उपकरणहरुको विभिन्न पार्ट्सहरुको पहिचान
४.३ पार्ट्सको जाँच गर्ने
४.४ फल्ट पत्ता लगाउने
४.५ बिग्रिएको पार्टको मर्मत गर्ने
४.६ साधारण प्रक्रियाबाट बनाउन नसकिने पार्टलाई ठूला Workshop मा बनाउन सिफारिश गर्ने

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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Paper I and II: Technical subject
Section (A): 50 % Marks

1. **Haematology**
   - 1.1 Cleaning of glasswares and safety precaution in the laboratory
   - 1.2 Collection and preservation of different samples for the labortary
   - 1.3 Preparation of chemicals and different stains for the Hematolagical tests
   - 1.4 Principle and clinical procedure for :
     - 1.5.1 Hemoglobin estimation and il's standard curve calibration
     - 1.5.2 Total count of W.B.C, R.B.C, Platelets and reticulocytes
     - 1.5.3 E.S.R, B.T., C.T., and reticulocytes
     - 1.5.4 Coomb's tests
     - 1.5.5 Blood banking and Transfusion
     - 1.5.6 Coagulation profile (mechanism, disorders and investigation)
     - 1.5.7 Le cell preparation
     - 1.5.8 Tissue parasite
     - 1.5.9 Absolutes cell count

2. **Microbiology**
   - 2.1 Bacteriology
     - 2.1.1 Classification of medically important bacteria
     - 2.1.2 Different methods of sterilization and disinfection
     - 2.1.3 Preparation of different media ingredients uses and interpretation
     - 2.1.4 Preparation of chemicals and stains
     - 2.1.5 The universal precaution in microbiology laboratory and safe west disposal of infected materials
   - 2.2 Parasitology
     - 2.2.1 Classification of medically important
       - 2.2.1.1 Protozoal parasite
       - 2.2.1.2 Helminthic parasites
       - 2.2.1.3 blood parasites
     - 2.2.2 Method of identification of different parasites from stool samples by :
       - 2.2.2.1 Wet preparation
       - 2.2.2.2 Concentration methods
       - 2.2.2.3 Cultural methods
     - 2.2.3 Routine Examination and special test in Urine

Section (B): 50 % Marks

3. **Biochemistry**
   - 3.1 Define of mol. wt and eq. wt
   - 3.2 Preparation of normal and molar solution
   - 3.3 Colorimeter/ spectrophotometer

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3.4 Principle and procedure of different methods for the estimation of biochemical tests
- 3.4.1 Sugar, Urea, Creatinine, Uric Acid, LFT Amylase
- 3.4.2 Cavity fluids examination
- 3.4.3 C.S.F. examination
- 3.4.4 24 hours Urine protein

4. **Anatomy and Physiology**
- 4.1 Important anatomical terminologies
- 4.2 Composition and function of blood
- 4.3 The Structure and function of digestive system, circulatory system, urinary system & respiratory system

5. **Histology/Cytology**
- 5.1 Different types of fixatives and their uses

6. **General knowledge about Civil Service Hospital and its Bylaws**

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निजामती कर्मचारी अस्पताल

प्रशासन सेवा, प्रशासन समूह, आर्थिक प्रशासन उपसमूह, लेखा उपसहायक पद, चौंथो तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता पूर्णाङ्क :– ३०

परीक्षा योजना (Examination Scheme)

१. प्रथम चरण : लिखित परीक्षा (Written Examination) पूर्णाङ्क :- २००

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या X अङ्क	समय
प्रथम	संस्थागत ज्ञान र समसामयिक विषय	१००	४०	वस्तुगत बहुवैकल्पिक प्रश्न (MCQ)	२५ प्रश्न X २ अङ्क	२ घण्टा
				विषयगत	१० प्रश्न X ५ अङ्क	
द्वितीय	सेवा सम्बन्धी	१००	४०	विषयगत	१२ प्रश्न X ५अङ्क ४ प्रश्न X १० अङ्क	३ घण्टा

२. द्वितीय चरण : अन्तर्वार्ता (Interview) पूर्णाङ्क :- ३०

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

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द्रष्टव्य :

१. यो पाठ्यक्रमको योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई भागमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

४. लिखित परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।

५. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

६. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a,b,c,d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

७. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :- आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्रशासन सेवा, प्रशासन समूह, आर्थिक प्रशासन उपसमूह, लेखा उपसहायक पद, चौंथो तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

प्रथम पत्रः– संस्थागत ज्ञान र समसामयिक विषय

१. संस्थागत ज्ञान

१.१ निजामती कर्मचारी अस्पतालको स्थापनाको उद्देश्य, विकासक्रम, काम कर्तव्य र अधिकार

१.२ अस्पतालको विद्यमान अवस्था, चुनौती, समस्या, सुधारका उपाय र भावी दिनमा गर्नुपर्ने कार्यहरु

१.३ अस्पतालको सम्बन्धित मन्त्रालय र विभिन्न गैरसरकारी संस्थासँगको अन्तर सम्बन्ध

१.४ अस्पतालको प्रशासन बाट सम्पादन हुने कार्यहरु, केन्द्रमा रहेका विभाग, इकाइ, युनिट र तिनको प्रशासनसँग सम्बन्ध

१.५ अस्पतालकासुरक्षा र सम्पति संरक्षणका लागि गरिएका प्रवन्ध

१.६ अस्पतालको संचालनको कोषको अवस्था र आर्थिक कार्यभार

१.७ अस्पतालको सामाजिक सेवा इकाइबाट सम्पादित कार्यहरु

१.८ अस्पतालमा मानव स्रोत व्यवस्थापनको अवस्था र भावी रणनीति

१.९ अस्पतालकमा सरसफाई व्यवस्थापनका सम्बन्धमा गरिएका प्रवन्ध

१.१० अस्पतालको लेखा, लेखा परीक्षण र बेरुजूको अवस्था

१.११ अस्पतालको सार्वजनिक सेवा प्रवाहको अवस्था, सार्वजनिक सुनुवाई, नागरिक वडापत्र, गुनाशो व्यवस्थापन, हेल्थ डेस्क सम्बन्धी जानकारी

१.१२ अस्पतालमा विद्युतीय शासनको उपयोग र भावी रणनीति

१.१३ निजामती कर्मचारी अस्पतालको विनियमावली सम्बन्धी जानकारी

१.१४ भम्रण खर्च नियमावली, २०६४

१.१५ सार्वजनिक खरिद ऐन, २०६३ : विधि र खरिद प्रक्रिया

१.१६ चालु आवधिक योजना : उद्देश्य, रणनीति र स्वास्थ्य सम्बन्धमा भएको व्यवस्था

१.१७ सरकारी बजेट सम्बन्धी जानकारी

२. समसामयिक र कानूनी विषय

२.१ कानूनको अर्थ र महत्व, कानूनका स्रोतहरु

२.२ कानूनको शासन, लोकतन्त्र, लोकतान्त्रिक मूल्य र मान्यता

२.३ नागरिकका दायित्व र कर्तव्य, मानवीय मूल्य र मान्यताहरु

२.४ सामाजिक विवाद र द्वन्द तथा द्वन्द व्यवस्थापन

२.५ विद्युतीय सुशासन, ईन्टरनेट र सामाजिक संजालको उत्तरदायी प्रयोग-साईवर नैतिकता र सुरक्षित प्रयोगका उपायहरु

२.६ नेपालको वर्तमान संविधान (मौलिक हक, राज्यका निर्देशक सिद्धान्त र संवैधानिक अंग)

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प्रशासन सेवा, प्रशासन समूह, आर्थिक प्रशासन उपसमूह, लेखा उपसहायक पद, चौंथो तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र - सेवा सम्बन्धी

खण्ड (क) – ५० अङ्क (६ प्रश्न × ५अंक, २ प्रश्न × १०अंक)

१. कार्यालय व्यवस्थापन

१.१ कार्यालय र कार्यालय व्यवस्थापन

१.१.१ कार्यालय : परिचय, महत्व, कार्य र प्रकार

१.१.२ कार्यालय सहायकका कार्य र गुणहरु

१.१.३ कार्यालय व्यवस्थापनको अवधारणा र महत्व

१.१.४ कार्यालयमा संचारको महत्व, प्रकार, माध्यम

१.१.५ कार्यालयमा व्यवस्थापन सूचना प्रणालीको आवश्यकता

१.२ कार्यालय कार्यविधि

१.२.१ दर्ता, चलानी, फाइलिङ र पत्र व्यवहार

१.२.२ टिप्पणी लेखन र टिप्पणी तयार पार्दा ध्यान दिनुपर्ने कुराहरु

१.२.३ प्रस्ताव र प्रतिवेदन लेखन

१.३ अभिलेख व्यवस्थापनको परिचय, उद्देश्य, आवश्यकता र महत्व

१.४ कार्यालयमा जनसम्पर्क व्यवस्थापन

१.५ मासिक प्रगति/वार्षिक प्रगति सम्बन्धी व्यवस्थापन

१.६ कार्यालय निरिक्षण र अनुगमन

१.७ बैठक व्यवस्थापन र निर्णय लेखन

१.८ संगठनात्मक मान्यता र मर्यादा प्रणाली

१.९ कार्यालयमा निर्णयको आवश्यकता र निर्णय लिने प्रकृया

१.१० प्रशासकीय कार्य फछ्र्यौट सम्बन्धी व्यवस्था

१.११ गुनासो व्यवस्थापन र तनाव व्यवस्थापन

१.१२ प्रशासन सहायकको योग्यता, काम, र गुणहरु

१.१३ कार्यालय संसाधनको परिचय, आवश्यकता र किसिम

१.१४ माग फारम, खरिद आदेश, दाखिला रिर्पोट र जिन्सी खाता सम्बन्धी जानकारी

खण्ड (ख) – ५० अङ्क (६ प्रश्न × ५अंक, २ प्रश्न × १०अंक)

२. आर्थिक प्रशासन, लेखा र लेखा प्रणाली

२.१ आर्थिक प्रशासनको अर्थ, क्षेत्र, प्रमुख कार्यहरु र महत्व

२.२ बजेटका सिद्धान्त, महत्व, नेपालको सरकारी वजेट प्रणालीको विकास, बजेट तर्जुमाको वर्तमान व्यवस्था, कार्यान्वयन, मूल्याङ्कन प्रक्रिया र वजेट चक्र

२.३ लेखाको अवधारणा, आधारभूत तत्व, उद्देश्य र महत्व

२.४ वित्तिय एवं व्यवस्थापकिय लेखाको महत्व र उपादेयता

२.५ सरकारी लेखा प्रणलीको सिद्धान्तहरु र नेपालमा यसको प्रयोग

२.६ नेपाल सरकारको वर्तमान लेखा प्रणाली

२.७ लेखामा त्रुटी पहिचान तरिकाहरु

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२.८ नेपाल लेखा मापदण्ड (Nepal Accounting Standard)

२.९ लेखापरीक्षणको अवधारण तथा आधारभूत सिद्धान्त, प्रकार, महत्व एवं उपादेयता

२.१० सार्वजनिक जवाफदेहीको अवधारणा र त्यसको प्रयोग

२.११ बेरुजु र बेरुजु फछ्यौर्ट सम्वन्धी व्यवस्था

२.१२ सार्वजनिक कोषको सदुपयोग, सदाचार र नैतिकता

२.१३ सार्वजनिक व्यवस्थापनमा नैतिकता, सदाचार, अनुशासन, सुशासन, पारदर्शिता, उत्तरदायित्व र व्यवसायिकता सम्बन्धी अवधारणा र सो को अभ्यास

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प्राविधिक सेवा, नर्सिङ्ग समूह, ओ.पि.डी. उपसमूह, ओ.पि.डी. सहायक पद, चौंथो तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

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प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, ओ.पि.डी. उपसमूह, ओ.पि.डी. सहायक पद, चौंथो तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Anatomy and Physiology**
   - 1.1 Names, types and functions of the different Organs of following system
     - 1.1.1 Skeletal System
     - 1.1.2 Muscular System
     - 1.1.3 Digestive System
     - 1.1.4 Circulatory System
     - 1.1.5 Urinary System
     - 1.1.6 Nervous System
     - 1.1.7 Respiratory System
     - 1.1.8 Endocrine System
     - 1.1.9 Sensory Organs
   - 1.2 Mechanism of the different system
     - 1.2.1 Mechanism of digestion of food
     - 1.2.2 Mechanism of respiration
     - 1.2.3 Mechanism of Menstrual cycle
     - 1.2.4 Mechanism of urinary system

2. **Basic Medical Procedures and First Aid Treatment**
   - 2.1 First aid
     - 2.1.1 Shock, Bleeding, burn/scalds fracture, Ear, Throat, Nose and Eye injuries, Poisoning, Snake bite, Insect bite and Animal bite & Frost bite, Shock
     - 2.1.2 First aid treatment of electrical injury
     - 2.1.3 Drowning, Choking, High fever fit and convulsion
     - 2.1.4 Basic life Support
   - 2.2 Basic Medical Procedures
     - 2.2.1 Vital signs, Wound dressings
     - 2.2.2 Investigation process and Importance of urine, Stool, Blood, Sputum pus and throat swab collection
     - 2.2.3 Bandage (Importance, types & application)
     - 2.2.4 Technique of giving injection
     - 2.2.5 Sterilization process, importance, type and methods

3. **Infection Prevention**
   - 3.1 Infection
   - 3.2 Medical asepsis/ surgical asepsis
   - 3.3 Infection control in health care facilities
     - 3.3.1 Hand hygiene
     - 3.3.2 Sterilization
     - 3.3.3 Cleaning
     - 3.3.4 Disinfection
     - 3.3.5 Personal protective equipments
     - 3.3.6 Antimicrobial
   - 3.4 Nosocomial infection
   - 3.5 Standard precaution

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Section (B): 50 % Marks

4. **Fundamentals of Nursing**
   - 4.1 ICN code for nursing
   - 4.2 Nursing ethics
   - 4.3 Professional and clients' right
   - 4.4 Basic needs of clients
   - 4.5 The nursing process
   - 4.6 Common nursing procedures used in the hospital
   - 4.7 Stress and coping mechanism
   - 4.8 Administration of drugs

5. **Medical/Surgical Nursing**
   - 5.1 Developmental tasks, Application of nursing process, Common diagnostic procedures
   - 5.2 Nursing management of common disease conditions including pre and post operative care. Accidents, Injuries, Head Injuries, Spinal cord injury, Meningitis, Encephalitis, Tetanus, Epilepsy, Bronchitis, Asthma, Pulmonary TB, Pleurisy, Common Cold, Rhinitis, Atelectasis, Peptic Ulcer, Intestinal Obstruction, Appendicitis, Peritonitis, Cirrhosis of liver, Haemorrhoids, Cholecystitis, Hepatitis, Hernias, Hydrocele, Bladder stones, Pyelonephritis, Urinary Tract Infection (UTI), Renal stone, Acute and Chronic Renal failure, Uremia
   - 5.3 Congestive Heart Failure (CHF), Angina, Cardiac Arrest, Anaemia, Leukaemia, Myocardial infarction, Gangrene, Diabetes mellitus, Diabetes incipides, Hypertension, Fracture, Dislocation, Osteomylitis
   - 5.4 Care of patient with common sensory disorders and nursing management

6. **Midwifery**
   - 6.1 Anatomy and Physiology of male and female reproductive systems
   - 6.2 Antenatal, natal and post natal care of a mother
   - 6.3 Management of high risk mothers
   - 6.4 Management of minor and major disorders of pregnancy
   - 6.5 Diseases associated with pregnancy
   - 6.6 Care of new born baby with observation and assessment
   - 6.7 Breast care and management

7. **General knowledge about Civil Service Hospital and its Bylaws**

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निजामती कर्मचारी अस्पताल

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता पूर्णाङ्क :– ३०

परीक्षा योजना (Examination Scheme)

१. प्रथम चरण : लिखित परीक्षा (Written Examination) **पूर्णाङ्क :- २००**

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या X अङ्क	समय
प्रथम	संस्थागत ज्ञान र समसामयिक विषय	१००	४०	वस्तुगत बहुवैकल्पिक प्रश्न (MCQ)	२५ प्रश्न X २ अङ्क	२ घण्टा
				विषयगत	१० प्रश्न X ५ अङ्क	
द्वितीय	सेवा सम्बन्धी	१००	४०	विषयगत	१२ प्रश्न X ५अङ्क ४ प्रश्न X १० अङ्क	३ घण्टा

२. द्वितीय चरण : अन्तर्वार्ता (Interview) **पूर्णाङ्क :- ३०**

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो पाठ्यक्रमको योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई भागमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

४. लिखित परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।

५. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

६. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a,b,c,d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

७. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :- आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्रशासन सेवा, प्रशासन समूह, सामान्य प्रशासन उपसमूह, प्रशासन उपसहायक पद, चौथो तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

प्रथम पत्रः– संस्थागत ज्ञान र समसामयिक विषय

१. संस्थागत ज्ञान

१.१ निजामती कर्मचारी अस्पतालको स्थापनाको उद्देश्य, विकासक्रम, काम कर्तव्य र अधिकार

१.२ अस्पतालको विद्यमान अवस्था, चुनौती, समस्या, सुधारका उपाय र भावी दिनमा गर्नुपर्ने कार्यहरु

१.३ अस्पतालको सम्बन्धित मन्त्रालय र विभिन्न गैरसरकारी संस्थासँगको अन्तर सम्बन्ध

१.४ अस्पतालको प्रशासन बाट सम्पादन हुने कार्यहरु, केन्द्रमा रहेका विभाग, इकाइ, युनिट र तिनको प्रशासनसँग सम्बन्ध

१.५ अस्पतालकासुरक्षा र सम्पति संरक्षणका लागि गरिएका प्रवन्ध

१.६ अस्पतालको संचालनको कोषको अवस्था र आर्थिक कार्यभार

१.७ अस्पतालको सामाजिक सेवा इकाइबाट सम्पादित कार्यहरु

१.८ अस्पतालमा मानव स्रोत व्यवस्थापनको अवस्था र भावी रणनीति

१.९ अस्पतालकमा सरसफाई व्यवस्थापनका सम्बन्धमा गरिएका प्रवन्ध

१.१० अस्पतालको लेखा, लेखा परीक्षण र बेरुजूको अवस्था

१.११ अस्पतालको सार्वजनिक सेवा प्रवाहको अवस्था, सार्वजनिक सुनुवाई, नागरिक वडापत्र, गुनाशो व्यवस्थापन, हेल्थ डेस्क सम्बन्धी जानकारी

१.१२ अस्पतालमा विद्युतीय शासनको उपयोग र भावी रणनीति

१.१३ निजामती कर्मचारी अस्पतालको विनियमावली सम्बन्धी जानकारी

१.१४ भम्रण खर्च नियमावली, २०६४

१.१५ सार्वजनिक खरिद ऐन, २०६३ : विधि र खरिद प्रक्रिया

१.१६ चालु आवधिक योजना : उद्देश्य, रणनीति र स्वास्थ्य सम्बन्धमा भएको व्यवस्था

१.१७ सरकारी बजेट सम्बन्धी जानकारी

२. समसामयिक र कानूनी विषय

२.१ कानूनको अर्थ र महत्व, कानूनका स्रोतहरु

२.२ कानूनको शासन, लोकतन्त्र, लोकतान्त्रिक मूल्य र मान्यता

२.३ नागरिकका दायित्व र कर्तव्य, मानवीय मूल्य र मान्यताहरु

२.४ सामाजिक विवाद र द्वन्द तथा द्वन्द व्यवस्थापन

२.५ विद्युतीय सुशासन, ईन्टरनेट र सामाजिक संजालको उत्तरदायी प्रयोग-साईवर नैतिकता र सुरक्षित प्रयोगका उपायहरु

२.६ नेपालको वर्तमान संविधान (मौलिक हक, राज्यका निर्देशक सिद्धान्त र संवैधानिक अंग)

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निजामती कर्मचारी अस्पताल

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र - सेवा सम्बन्धी

खण्ड (क) – ५० अङ्क (६ प्रश्न × ५अंक, २ प्रश्न × १०अंक)

१. कार्यालय व्यवस्थापन

१.१ कार्यालय र कार्यालय व्यवस्थापन

१.१.१ कार्यालय : परिचय, महत्व, कार्य र प्रकार

१.१.२ कार्यालय सहायकका कार्य र गुणहरु

१.१.३ कार्यालय व्यवस्थापनको अवधारणा र महत्व

१.१.४ कार्यालयमा संचारको महत्व, प्रकार, माध्यम

१.१.५ कार्यालयमा व्यवस्थापन सूचना प्रणालीको आवश्यकता

१.२ कार्यालय कार्यविधि

१.२.१ दर्ता, चलानी, फाइलिङ र पत्र व्यवहार

१.२.२ टिप्पणी लेखन र टिप्पणी तयार पार्दा ध्यान दिनुपर्ने कुराहरु

१.२.३ प्रस्ताव र प्रतिवेदन लेखन

१.३ अभिलेख व्यवस्थापनको परिचय, उद्देश्य, आवश्यकता र महत्व

१.४ कार्यालयमा जनसम्पर्क व्यवस्थापन

१.५ मासिक प्रगति/वार्षिक प्रगति सम्बन्धी व्यवस्थापन

१.६ कार्यालय निरिक्षण र अनुगमन

१.७ बैठक व्यवस्थापन र निर्णय लेखन

१.८ संगठनात्मक मान्यता र मर्यादा प्रणाली

१.९ कार्यालयमा निर्णयको आवश्यकता र निर्णय लिने प्रकृया

१.१० प्रशासकीय कार्य फछ्र्यौट सम्बन्धी व्यवस्था

१.११ गुनासो व्यवस्थापन र तनाव व्यवस्थापन

१.१२ प्रशासन सहायकको योग्यता, काम, र गुणहरु

१.१३ कार्यालय संसाधनको परिचय, आवश्यकता र किसिम

१.१४ माग फारम, खरिद आदेश, दाखिला रिर्पोट र जिन्सी खाता सम्बन्धी जानकारी

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खण्ड (ख) – ५० अङ्क (६ प्रश्न × ५अंक, २ प्रश्न × १०अंक)

२. सार्वजनिक व्यवस्थापन

२.१ सार्वजनिक प्रशासनको परिचय, उद्देश्य र कार्यहरु

२.२ व्यवस्थापनको अवधारणा र आधारभूत सिद्धान्तहरु

२.३ कार्य विवरण, अधिकार प्रत्यायोजन, निर्देशन, नियन्त्रण, समन्वय, उत्प्रेरणा र नेतृत्व सम्बन्धी सामान्य जानकारी

२.४ आर्थिक प्रशासन सम्बन्धी सामान्य जानकारी

२.५ संगठनको परिचय, उद्देश्य ,स्वरुप र संगठनका आधारहरु

२.६ नागरिक वडापत्र (Citizen Charter) : अवधारणा, उद्देश्य र महत्व

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२.७ सार्वजनिक सेवा प्रवाह अर्थ र महत्व, सार्वजनिक सेवा प्रवाह गर्ने निकाय, तरिकाहरु/माध्यम, सार्वजनिक सेवा प्रवाहमा सेवा प्रदायकको भूमिका र सेवाग्राहीको अधिकार तथा दायित्व

२.८ सार्वजनिक सेवा प्रवाहका चुनौती तथा प्रभावकारी सेवा प्रवाहका उपायहरु

२.९ सार्वजनिक व्यवस्थापनमा नैतिकता, सदाचार, अनुशासन, सुशासन, पारदर्शिता, उत्तरदायित्व र व्यवसायिकता सम्बन्धी अवधारणा र सो को अभ्यास

२.१० सुशासन (व्यवस्थापन तथा सञ्चालन) ऐन, २०६४ को परिच्छेद २,४,५

२.११ भ्रष्टाचार निवारण ऐन, २०५९ को भाग २ कसुर र सजाय

२.१२ सूचनाको हक सम्बन्धी ऐन, २०६४ परिच्छेद २,४,५

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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Paper I and II: Technical subject
Section (A): 50 % Marks

1. **Human Physiology and Biomedical Instrumentation**
   - 1.1 Introduction to Basic Physiology : nervous system, respiratory system, circulatory system, digestive system and excretory system
   - 1.2 Physiological Signals Monitoring : ECG, EMG, EEG, Pulse Oxymeter, Temperature Meter and Blood Pressure Meter
   - 1.3 Labour and Delivery : foetal heart monitoring, infant warmer and phototherapy
   - 1.4 Dental Clinic and Laboratory : suction pressure unit, suction machine and dental chair
   - 1.5 Dialysis: General introduction and working principle
   - 1.6 Basic Laboratory Equipments: introduction and working principle (water bath, hot air oven and autoclave)
   - 1.7 OT Light

2. **Biomedical Chemistry**
   - 2.1 Electrochemistry
     - 2.1.1 Introduction and range of electrochemical techniques
     - 2.1.2 Classification of electrochemical techniques: Potemetry and Voltmetry
   - 2.2 Carbohydrates, Proteins and Lipids : definition, classification and properties
   - 2.3 Instrumental methods for analysis of biologically important substance : Electrophoresis, Chromatographic, Mass spectrometric, Centrifugation, Filtration and Colorimetric techniques
   - 2.4 Acid-Base Chemistry
     - 2.4.1 pH, buffer and buffer systems
     - 2.4.2 Electrolysis and water dissociation

3. **Electronic Principles and Practices**
   - 3.1 Circuit Parameters: introduction
   - 3.2 AC and DC circuits: introduction and analysis
   - 3.3 Transistors: introduction and classification (BJT, JFET, MOSFET)
   - 3.4 Power Supplies, Voltage Regulators and IC Regulators
     - 3.4.1 Introduction and characteristics
     - 3.4.2 Rectifiers, filters, voltage regulation and switching regulation
   - 3.5 Amplifiers
     - 3.5.1 Introduction, characteristics, ideal amplifier and differential amplifier
     - 3.5.2 Operational Amplifier: introduction, characteristics and application
   - 3.6 OptoElectronic Components
     - 3.6.1 General introduction
     - 3.6.2 Photoconductive cells, Photodiodes, Phototransistors, Solar cells, Light activated SCR, Light Emitted Diodes (LEDs), Optocouplers and Liquid Crystal Displays (LCD)

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Section (B): 50 % Marks

4. **Digital Electronics and Microprocessors**
   - 4.1 Fundamental of Digital Electronics
     - 4.1.1 Transistor: application as switch and relay
     - 4.1.2 Logic Gates: truth tables and Boolean expressions
     - 4.1.3 Universal gates and gate conversion
     - 4.1.4 DeMorgan's theorem
   - 4.2 Combinational Logic Devices
     - 4.2.1 Encoder and Decoder
     - 4.2.2 Multiplexer and Demultiplexer
     - 4.2.3 Half and Full: Adder and Subtractor
   - 4.3 Sequential Logic Devices
     - 4.3.1 Counters: types and characteristics
     - 4.3.2 Registers: SISO, SIPO, PISO, PIPO
     - 4.3.3 Digital clocks and frequency counter
   - 4.4 Introduction and characteristics of analog to digital or digital to analog conversion
   - 4.5 Fundamentals of microprocessor, introduction and architecture of 8085 microprocessor

5. **Computer Skills**
   - 5.1 Introduction to computer
   - 5.2 Input, output and memory devices
   - 5.3 Internet and information resources
   - 5.4 Networking concepts

6. **Record keeping and Technical Writing**
   - 6.1 Introduction to record keeping and technical writing
   - 6.2 Creating forms, memos, letters and daily reports
   - 6.3 Computerized inventory and maintenance report

7. **Patient and Hospital Environment**
   - 7.1 Procurement procedures
   - 7.2 Biomedical waste management

8. **Maintenance and Repair for Biomedical Devices**
   - 8.1 Working Tools and Testing Equipments: General Handling Tools, Oscilloscopes and Multimeters
   - 8.2 Electrical Safety Inspections
   - 8.3 General Equipment Maintenance : Blood pressure machine, Suction machine, Stethoscope Syringe and Infusion pump

9. **General knowledge about Civil Service Hospital and its Bylaws**

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– (क) प्रयोगात्मक परीक्षा पूर्णाङ्क :– ५०

(ख) अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली	समय
प्रयोगात्मक परीक्षा	५०	२५	प्रयोगात्मक	१ घण्टा
अन्तर्वार्ता	३०	-	मौखिक	

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द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, ईञ्जिनियरिङ एण्ड मेन्टेनेन्स समूह, कम्प्यूटर उपसमूह, कम्प्यूटर टेक्निसियन पद, पाँचौं तहको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject
Section (A): 50 % Marks

1. **Computer Fundamentals**
   - 1.1. Introduction, Characteristics, Types and Applications of Computer
   - 1.2. Overview of a computer system:-
     - 1.2.1. Hardware: Input Unit, CPU and Output Unit, and Storage devices
     - 1.2.2. Software:- Definition and types of Software
   - 1.3. Introduction to ASCII, Unicode standards and font types
   - 1.4. Basic electronics and communication
     - 1.4.1.Difference between vacuum tube and semiconductor
     - 1.4.2.Basic concept of integrated circuits and its use
     - 1.4.3. Communication System: definition, types, and elements of communication system
   - 1.5. Smart phone, tablets and computing devices

2. **Hardware Maintenance and Troubleshooting**
   - 2.1. Hardware Maintenance
     - 2.1.1.Configure and apply BIOS settings
     - 2.1.2.Motherboard components, their properties and purposes (RAM slots, Chipsets, Jumpers, CPU sockets, etc.)
     - 2.1.3.Installing and configuring expansion cards (Sound cards, Network cards, Graphics cards, etc.)
     - 2.1.4.Installing and configuring storage devices
     - 2.1.5.Types and features of display devices (CRT, LCD, LED, Plasma)
     - 2.1.6.Connector types (BNC, RJ45, HDMI, DVI) and associated cables
     - 2.1.7.Installing and configuring various peripheral devices (Mouse, Keyboard, Scanner, Printer, Speaker)
     - 2.1.8.Setting UPS and Power Backup
   - 2.2. Troubleshooting
     - 2.2.1.Troubleshooting of computer and its peripherals (keyboard, mouse, printer, scanner, speaker)
     - 2.2.2.Troubleshooting of connectivity (cables, network, etc.)
     - 2.2.3.Troubleshooting of memory, processor, storage, display
     - 2.2.4.Troubleshooting of operating system and application software
   - 2.3. Data Backup and recovery: Concepts and Methods

3. **Operating System**
   - 3.1. Introduction, types and functions of operating systems
   - 3.2. Basic components of the operating systems
   - 3.3. Concept of file, folder, shortcut, desktop, etc.
   - 3.4. Introduction to the Windows family of products and Unix family of products
   - 3.5. Installation, backup, recovery and optimization of operating system
   - 3.6. Managing information storage, disks and partitions
   - 3.7. Managing Directory Service, Users, Groups and Permissions
   - 3.8. Sharing file, folder, printer, application, etc.
   - 3.9. Installation and configuration of device drivers, applications, fonts
   - 3.10. Installation of Operating System in Server Setup

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Civil Service Hospital

4. **Networking**
   - 4.1. Basic Networking: definition, types, and topologies
   - 4.2. Client server and peer to peer network
   - 4.3. Connectivity and media: Network cables and connectors
   - 4.4. OSI Reference model
   - 4.5. Common TCP and UDP ports, protocols, and their purpose (e.g. HTTP, FTP, etc.)
   - 4.6. Network devices, their functions, features and configuration (Switch, Router, Access point, Modem, Firewall etc.)
   - 4.7. Application of Network utilities (e.g. IPCONFIG, PING, TRACERT, NSLOOKUP)
   - 4.8. Network cabling and cable testing
   - 4.9. Familiarity with IP Addressing, subnet mask, gateway, DNS, static and dynamic address assignment
   - 4.10. Concept of Cloud based services (Drop box, Google Cloud, iCloud, etc.)

5. **Computer Architecture**
   - 5.1. Basic Structures: sequential circuits, design procedure, state table and state diagram, Von Neumann / Harvard architecture, RISC/CISC architecture
   - 5.2. Addressing methods and programs, representation of data, arithmetic operations, basic operational concepts, bus structures, instruction, cycle and excitation cycle
   - 5.3. Processing Unit: instruction formats, arithmetic and logical instruction
   - 5.4. Addressing modes
   - 5.5. Input Output Organization : I/O programming , memory mapped I/O, basic interrupt system, DMA
   - 5.6. Memory Systems

6. **Database Management System**
   - 6.1. Introduction to Database and Database Management System
   - 6.2. Database design and Normalization
   - 6.3. Basic concept of Tables, Fields, Records, Relationships and Indexing
   - 6.4. Introduction to database applications
   - 6.5. Common data types
   - 6.6. Familiarity with Structured Query Language statements for manipulating database objects and information from database
   - 6.7. Creating, modifying and deleting forms/reports
   - 6.8. Basics of MySQL and PostGres Database

Section (B): 50 % Marks

7. **Application Package**
   - 7.1. Word Processing
     - 7.1.1. Concept of Word Processing
     - 7.1.2. Creating, Saving and Opening the documents
     - 7.1.3. Editing and formatting document: copying, moving, deleting, finding and replacing text; Bullets and Numbering; Tables, Borders and Shadings; Indentation and Tab Setting; Columns, Header, Footer, Page Numbers; References, Footnotes, and Endnotes; Page break and Section break; Graphics, Pictures, Charts, Word Art, Symbols &Organization Chart
     - 7.1.4. AutoCorrect, Spelling and Grammar Checking, and Thesaurus
     - 7.1.5. Mail Merge

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7.1.6. Document security
7.1.7. Document previewing and printing

7.2. Spreadsheet
7.2.1. Concept of Electronic Spreadsheet
7.2.2. Creating, Opening and Saving Work Book
7.2.3. Editing, Copying, Moving, Deleting Cells/Rows/Columns/Range/Worksheets
7.2.4. Formatting (Cells, Rows, Columns, Worksheets, etc.)
7.2.5. Using Formula with Relative Cell and Absolute Cell Reference
7.2.6. Using Functions
7.2.7. Creating and editing Charts
7.2.8. Inserting Header and Footer, Page Setting, Previewing and Printing

7.3. Presentation System
7.3.1. Introduction to presentation applications
7.3.2. Creating, Opening & Saving presentation
7.3.3. Formatting Slides
7.3.4. Slide Show and animation
7.3.5. Inserting Built-in picture, Table, Chart, Graphs, and Organization Chart etc.
7.3.6. Exporting and printing slides

8. **Programming Concept and Data Structure**
8.1. Concept of Procedural Programming, Declarative Programming, Structural Programming and Object-Oriented Programming
8.2. Concept of Algorithm, Flowchart and Pseudo code
8.3. Concept of C programming, C++ Programming, JAVA Programming
8.4. Basic Concept of control, loop, array and function
8.5. Introduction of Data structure and Abstract data Type
8.6. Linear data structures, Lists, Linked Lists, Stacks, Queues
8.7. Recursive Algorithms
8.8. Sorting Algorithms

9. **Web Technology, Social Media and Video Conference**
9.1. Introduction to Web Page and Content Management System
9.2. Introduction to HTML
9.3. HTML document
9.3.1. HTML Tags
9.3.2. Working with Text, Hyperlinks, Images, Lists, Forms, Tables, Frames, etc.
9.4. Familiarity with Cascading Style Sheet, Rich Site Summary and social networking
9.5. Concept of Web server and Proxy server
9.6. Use of Social Media in governance
9.6.1. Introduction to Social Media
9.6.2. Social Media Platforms
9.6.3. Applications in government organizations
9.6.4. Operating and Managing Social Media
9.7. Use of Video Conference tools (Zoom, Meet, Team, etc.)

10. **Cyber Security**
10.1. Introduction to Cyber Security
10.2. Common security threats: Social engineering; Distributed Denial of Services; Malwares: Phishing, Spyware, Viruses, Worms, Trojans, etc.

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10.3. Identity and Access Management
10.4. Security Engineering: Firewalls, Router/switch security, IDS and IPS, Email Filtering, Vulnerability Scanning, Host based Security tools (use of antivirus software)
10.5. Cryptography: Encryption and decryption; Hashing; Digital Signature
10.6. Application Security
10.7. Business Continuity Planning
10.8. Introduction to Security Standards: ISO 27001

11. **Software Engineering**
11.1. Software Development Life Cycle; Software Process Model: Waterfall model, Prototyping model, Incremental model, Spiral model, Agile model, RAD model
11.2. Software Project management: Relationship to lifecycle, project planning, project control, project organization, risk management, cost models, configuration management, version control, quality assurance, metrics
11.3. Software requirements: Requirements analysis, analysis tools, requirements definition, requirements specification, static and dynamic specifications, requirements review
11.4. Software design: Design for reuse, design for change, design evaluation and validation
11.5. Implementation: Programming standards and procedures; modularity; Testing: unit testing, integration testing, regression testing, tools for testing
11.6. Maintenance: The maintenance problem, the nature of maintenance, planning for maintenance

12. **Relevant Legislations and Institutions**
12.1. ICT Policy, 2072
12.2. Electronic Transaction Act, 2063
12.3. Information Technology Emergency Response Team (ITERT) Operation and Management Directive, 2075
12.4. Government Website Development and Management Directive, 2078
12.5. Roles of related Institutions:
12.5.1. Ministry of Communication and Information Technology
12.5.2. Department of Information technology
12.5.3. National Information Technology Center / Government Integrated Data Center
12.5.4. Security Operation/Monitoring Center
12.6. General knowledge about Civil Service Hospital and its Bylaws

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, ईञ्जिनियरिङ एण्ड मेन्टेनेन्स समूह, कम्प्यूटर उपसमूह, कम्प्यूटर टेक्निसियन पद, पाँचौं तहको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

प्रयोगात्मक परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरु सोधिनेछ ।

S. No.	Topics	No. of Questions	Marks	Time (Minutes)
1	Devnagari Typing	1	5	5
2	English Typing	1	5	5
3	Hardware maintenance and troubleshooting	1	10	15
4	Operating System	1	5	35
5	Networking	1	5	
6	Word processing	1	5	
7	Electronic Spreadsheet	1	5	
8	Web Technology	1	5	
9	Database Management System	1	5	
	Total	9	50	60

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, ईञ्जिनियरिङ एण्ड मेन्टेनेन्स समूह, ईलेक्ट्रिसिकल उपसमूह, ईलेक्ट्रिसिकल सबओभरसियर पद, पाँचौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, ईञ्जिनियरिङ एण्ड मेन्टेनेन्स समूह, ईलेक्ट्रिसिकल उपसमूह, ईलेक्ट्रिसिकल सबओभरसियर पद,

पाँचौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, ईञ्जिनियरिङ एण्ड मेन्टेनेन्स समूह, ईलेक्ट्रिसिकल उपसमूह, ईलेक्ट्रिसिकल सबओभरसियर पद, पाँचौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Electric Circuit** : Definition, Unit, Explanation and applications of Ohm's Law and Kirchhoff's Law, Connection of resistors in series, parallel and series parallel Combination

2. **Electromagnetism and Electrostatics** : Definition and formation of hysteretic loop, force on a current carrying conductor placed in magnetic field, Self Inductance, Factors affecting the inductance of coil, Capacitor, Factors affecting the capacitance of capacitor, Time Constant (T=RC)

3. **A.C. Fundamentals** : Comparison between A.C. & D.C. Voltage and current, Generation of A. C. emf, Frequency, Angular velocity, phase & phase difference, A. C. Circuit with R. L. C. use of J-operator in circuit analysis

4. Fundamental principles of Star and Delta connection of Three phase Windings, Effect of unbalanced load in three phase system, Voltage drop, Principles and applications of Super Position Theorem, Thevenis's theorem and Norton's theorem

5. Objective of earthling of Power system, Causes of Over voltages and its protection, Neutral earthling, Body earthling, Lightning Arrestors- Types, Ratings and Characteristics, applications & locations

6. **Principles of A. C. Transformer** : Operating principle, connecting load, No load operation, Reactance, Losses and Efficiency, Cooling, Parallel operation of Single phase and Three phase transformer, Tap changing, Noises and Temperature Rise

7. **D. C. Generator** : Introduction and Principle of operation, constructional details, types, Losses and efficiency, Parallel operation of d. c. generators

8. **Ammeters and voltmeters** : Principle of operation, Power factor meter, General concept of measurement of Power, Energy, Frequency

9. Operating Principle, characteristics, construction features of Current Transformer and Potential Transformer and their application

10. General concept of load factor, maximum demand, diversity factor, system and line losses, power factor corrections, measurement of resistance, inductance and capacitance

Section (B): 50 % Marks

11. **Generation of Electrical Energy** : Types of generating plants, Diesel and Hydro (Working principle, equipments, Bus bars and Reactors, Automatic Voltage Regulator, Circuit Breakers, CTs, PTs, Relays etc.)

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12. Lay out concept of Sub-stations and Power-stations (Cabling, auxiliary plants-such as batteries etc., Fire protection and grounding system)

13. **Transmission Lines** : Introduction-Overhead lines and Underground cables, Types of cables, Selection of cables & Selection criteria, Mechanical and electrical design of Overhead lines, Sag, Tension, Earthling, Corona, Skin effect, Connection Schemes of distribution system

14. Principle of operation of D. C. Motor-Types, Torque, Losses and efficiency, speed control, speed-torque characteristics

15. Introduction and types or single phase A. C. Motor (Motors and their characteristics for particular service-Domestic use.)

16. Introduction, Types, Constructional details and principle of operation of Synchronous Generator (Alternator) and Synchronous Motor, Parallel operation and Synchronizing of Alternator

17. Principles of Illumination (Primary and Secondary illumination, street lighting)

18. **Fundamentals of Protection systems:** Fuses, MCB Isolators, Contactors, Circuit Breakers - Classification, Construction Operating principle

19. Importance of Communication in power system

20. Principles of cost estimate for distribution system for domestic

21. **Three phase induction motor** : Construction, Principle of operation, torque speed characteristics, stand still and running condition, method of starting

22. **Basic Electronics** : Characteristics of diode, transistor and thyristor, Rectifier and filter, inverter, speed control of DC and AC motor by using thyristor

23. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फार्मेसी समूह, फार्मेसी उपसमूह, फार्मेसी सहायक पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फार्मेसी समूह, फार्मेसी उपसमूह, फार्मेसी सहायक पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Dispensing and Hospital Pharmacy**
   - 1.1 Prescription, Proper handling of prescription and dispensing of medicines.
   - 1.2 Adverse drug reactions and drug interaction
   - 1.3 Pharmaceutical dosage forms, Dispensing of pharmaceutical preparations.
   - 1.4 Pharmaceutical additives.
   - 1.5 Roles of Pharmacist in hospital and community, Patient counseling
   - 1.6 National Formulary and Hospital Formulary, Standard Treatment Schedule
   - 1.7 Role of Drug & Therapeutic Committee in hospital
   - 1.8 Rational use of drugs.
   - 1.9 Good Pharmacy Practice Guideline

2. **Emergency and Pharmaceutical Care**
   - 2.1 Basic knowledge of first aid; Various medical conditions requiring first aid
   - 2.2 Principle and strategy of Primary Health Care in context to National Health Policy
   - 2.3 Maternal and Child Health Care

3. **Pharmacognosy**
   - 3.1 Drying, storage, and quality control of herbal drugs
   - 3.2 Extraction process and isolation of active ingredients

4. **Pharmaceutical Analysis**
   - 4.1 Fundamental titrametric analysis, acid-base titration
   - 4.2 Basic principle of spectroscopic methods of analysis, visible and ultra-violet spectroscopy
   - 4.3 Separation techniques, column, paper, thin layer chromatography
   - 4.4 Principles of microbiological assay of antibiotics and vitamins
   - 4.5 Sampling technique and use of statistics

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फार्मेसी समूह, फार्मेसी उपसमूह, फार्मेसी सहायक पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Section (B): 50 % Marks

5. **Pharmacology and Microbiology**
   - 5.1 Mechanism and action of drugs, their safety, uses and mode of administration.
   - 5.2 Basic knowledge of Pharmacokinetics and pharmacodynamics
   - 5.3 Basic principles of immunology, sterility and pyrogen testing

6. **Inventory Control & Drug Supply Management**
   - 6.1 Logistics management and distribution
   - 6.2 Cost recovery drug scheme
   - 6.3 Concept of essential drugs
   - 6.4 Storage of drugs
   - 6.5 Development of Pharmacy and Drug Legislation in Nepal.
   - 6.6 Development of Pharmacy and Pharmaceutical Institutions in Nepal.
   - 6.7 Use of Pharmacopoeia and pharmacopoeias recognized in Nepal
   - 6.8 National Health Policy and National Drug Policy
   - 6.9 Role and Responsibility of Nepal Pharmacy Council

7. **Computer Skills**
   - 7.1 Introduction to computer
   - 7.2 Input, output and memory devices
   - 7.3 Internet and information resources
   - 7.4 Networking concepts

8. **Drug Legislation in Nepal**
   - 8.1 औषधि ऐन, २०३५
   - 8.2 औषधि दर्ता नियमावली, २०३८
   - 8.3 औषधि परामर्श परिषद् र औषधि सल्लाहकार समिति गठन नियमावली, २०३७
   - 8.4 औषधि जांचबूझ तथा निरीक्षण नियमावली, २०४०
   - 8.5 औषधि स्तर नियमावली, २०४३
   - 8.6 औषधि उत्पादन संहिता, २०४१
   - 8.7 नेपाल फार्मेसी काउन्सिल ऐन, २०५७ तथा नेपाल फार्मेसी काउन्सिल नियमावली, २०५९

9. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, मेडिकल ल्याब टेक्नोलोजी उपसमूह, ल्याब टेक्निसियन पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, मेडिकल ल्याब टेक्नोलोजी उपसमूह, ल्याब टेक्निसियन पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject
Section (A): 40 % Marks

1. **Haematology**
   - 1.1 Cleaning of glasswares and safety precaution in the laboratory
   - 1.2 Collection and preservation of different samples for the labortary
   - 1.3 Preparation of chemicals and different stains for the Hematolagical tests
   - 1.4 Formation and development of Erythrocytes, Leucocytes, Thrombocytes
   - 1.5 Principle and clinical procedure for :
     - 1.5.1 Hemoglobin estimation and il's standard curve calibration
     - 1.5.2 Total count of W.B.C, R.B.C, Platelets and reticulocytes
     - 1.5.3 E.S.R, B.T., C.T., and reticulocytes
     - 1.5.4 Coomb's tests
     - 1.5.5 Blood banking and Transfusion
     - 1.5.6 Coagulation profile (mechanism, disorders and investigation)
     - 1.5.7 Le cell preparation
     - 1.5.8 Tissue parasite
     - 1.5.9 Absolutes cell count
2. **Microbiology**
   - 2.1 Bacteriology
     - 2.1.1 Classification of medically important bacteria
     - 2.1.2 Different methods of steriization and disinfection
     - 2.1.3 preparation of different media ingredients uses and interpretation
     - 2.1.4 preparation of chemicals and stains
     - 2.1.5 Cultural procedure of different samples aerobically
     - 2.1.6 Identification of bacteria and confirmative tests serologically and bio-chemically
     - 2.1.7 Different staining methods of bacteria and their principles
     - 2.1.8 T.B Bacteriology and skin scraping for A.F.B.
     - 2.1.9 The universal precaution in microbiology laboratory and safe west disposal of infected materials
   - 2.2 Parasitology
     - 2.2.1 Classification of medically important
       - 2.2.1.1 Protozoal parasite
       - 2.2.1.2 Helminthic parasites
       - 2.2.1.3 blood parasites
     - 2.2.2 Method of identification of different parasites from stool samples by :
       - 2.2.2.1 Wet preparation
       - 2.2.2.2 Concentration methods
       - 2.2.2.3 Cultural methods
     - 2.2.3 Routine Examination and special test in Urine

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, मेडिकल ल्याब टेक्नोलोजी उपसमूह, ल्याब टेक्निसियन पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Section (B): 50 % Marks

3. **Biochemistry**
   - 3.1 Define of mol. wt and eq. wt
   - 3.2 Preparation of normal and molar solution
   - 3.3 Colorimeter/ spectrophotometer
   - 3.4 Principle and procedure of different methods for the estimation of biochemical tests
     - 3.4.1 Sugar, Urea, Creatinine, Uric Acid, LFT Amylase
     - 3.4.2 Cavity fluids examination
     - 3.4.3 C.S.F. examination
     - 3.4.4 24 hours Urine protein

4. **Anatomy and Physiology**
   - 4.1 Important anatomical terminologies
   - 4.2 The composition and function of blood
   - 4.3 The Structure and function of alimentary canal, digestive system, circulatory system, urinary system & respiratory system

5. **Histology/Cytology**
   - 5.1 Different types of fixatives and their uses
6. **Semen analysis**
7. **Computer Skills**
   - 7.1 Introduction to computer
   - 7.2 Input, output and memory devices
   - 7.3 Internet and information resources
   - 7.4 Networking concepts
8. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिकल रेकर्डस समूह, मेडिकल रेकर्डस उपसमूह, मेडिकल रेकर्डस सहायक पद, पाँचौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिकल रेकर्डस समूह, मेडिकल रेकर्डस उपसमूह, मेडिकल रेकर्डस सहायक पद, पाँचौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

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प्राविधिक सेवा, मेडिकल रेकर्डस समूह, मेडिकल रेकर्डस उपसमूह, मेडिकल रेकर्डस सहायक पद, पाँचौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Basic Statistics**
   - 1.1 Introduction to statistics: meaning, importance and limitations
   - 1.2 Data: types and methods of data collection, primary and secondary data, methods of data collection
   - 1.3 Classification and Tabulation of Data : Meaning objectives and types of classification; Statistical tables (Individual, discrete and continuous)
   - 1.4 Presentation of Data : Graphical and Diagrammatic presentation of data; Choice between graphical and diagrammatic presentation of data; Limitations of Diagrams and Graphs
   - 1.5 Measure of central tendency: Mean (A.M., G.M.), Median, Mode; Applications and limitation of average
   - 1.6 Measures of dispersion : Introduction, Types of dispersion with their merits & demerits; Coefficient of variation; Application, use and limitation of dispersion tools

2. **Set Theory and Real Number System**
   - 2.1 Introduction and various examples of sets
   - 2.2 Notations and use of set theory
   - 2.3 Various types of sets
   - 2.4 Numbers: Real – natural, whole, integers, rational, irrational

3. **Matrix and Determinants**
   - 3.1 Matrix: Introduction, addition, subtraction, multiplication of matrix
   - 3.2 Adjoint, inverse of matrix and their uses
   - 3.3 Determinants: Introduction, diagonals and their use to find the numerical values of a determinant
   - 3.4 Properties of matrix and determinants

4. **Sampling Survey and Census**
   - 4.1 Introduction (sample, sampling and Sample size)
   - 4.2 Principle and steps in a Sample survey
   - 4.3 Types of Sampling (simple random sampling, stratified sampling, systemic sampling, cluster sampling, multistage sampling)
   - 4.4 Limitations of sampling
   - 4.5 Merits & demerits between sampling survey and census

Section (B): 50 % Marks

5. **Vital Statistics**
   - 5.1 Major sources of population data

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5.2 Population censuses of Nepal
5.3 Introduction, use and methods of obtaining vital statistics
5.4 Measure of fertility
5.5 Measure of mortality
5.6 Reproduction rates (GRR, VRR)
5.7 Population growth and population projection
5.8 Vital events and registration of vital events

6. **Hospital Management**

6.1 Introduction and types of hospitals in Nepal, section in a hospital, services given by a general hospital (or function of hospitals)
6.2 Present GoN recording and reporting system in a hospital
6.3 Meaning and importance of Health Management Information System (HIMS)
6.4 Hospital defined indicators used by Ministry of Health & Population
6.5 Hospital based HMIS tools
6.6 Introduction, types, importance, need and use of medical records
6.7 Filling and indexing of medical records
6.8 Storage and retrieval medical records
6.9 Processing of records and their flow
6.10 ICD-10 coding system
6.11 Medico-legal aspects of medical records
6.12 Use and importance of medical records
6.13 Confidentiality & safety of patient information
6.14 Different registers used in hospitals

7. **Utility of Data Information**

7.1 Use of data/information in various areas i.e. planning, monitoring, evaluation, supervision and feedback system
7.2 Present PME cycle of health service under Ministry of Health & Population

8. **Policies, Laws and Regulations**

8.1 Nepal Health Sector Programme
8.2 Nepal Health Service Act, 2053 and Regulation, 2055
8.3 Nepal Statistics Act, 2015
8.4 Evidence Act, 2031
8.5 General knowledge about Civil Service Hospital and its Bylaws

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फिजियोथेरापि समूह, फिजियोथेरापि उपसमूह, फिजियोथेरापि सहायक पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. Introduction to physiotherapy

1.1 Definition of physiotherapy
1.2 Scope of physiotherapy in the context of Nepal
1.3 Fields of physiotherapy
1.4 Disability awareness

2. Applied Anatomy

2.1 Muscular system
2.2 Skeletal system
2.3 Cardio respiratory system
2.4 Neurology and neurosurgery
2.5 Dermatology
2.6 Obstetrics and gynaecology

3. Electrotherapeutic Modalities

3.1 Shortwave diathermy
3.2 Microwave Diathermy
3.3 Infrared Therapy
3.4 Transcutaneous electrical nerve stimulation
3.5 Therapeutic muscle stimulator
3.6 Ultrasonic therapy
3.7 Continuous passive motion
3.8 Paraffin wax bath
3.9 Hot packs and superficial heating modalities
3.10 Traction unit
3.11 Extracorporeal Shockwave Therapy (ESWT)
3.12 Laser Therapy

Civil Service Hospital

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Section (B): 50 % Marks

4. Therapeutic Exercise/Treatment planning

- 4.1 Strengthening Exercise
- 4.2 Stretching exercise
- 4.3 Re-education and Co-ordination exercises
- 4.4 Therapeutic massage
  - 4.4.1 Neck
  - 4.4.2 Back
  - 4.4.3 Upper and Lower limbs
  - 4.4.4 Face

5. Rehabilitation (Institutional & Community)

- 5.1 Skeletal system
  - 5.1.1 Fractures, dislocation & sublauxation
  - 5.1.2 Deformities- acquired and congenital
  - 5.1.3 Inflammatory, degenerative and pathological condition – Arthritis
  - 5.1.4 Amputation-upper/lower limbs
- 5.2 Muscular System
  - 5.2.1 Muscles injuries- strain, tendinitis
  - 5.2.2 Muscular distrophy
  - 5.2.3 Ligament injuries - sprain
- 5.3 Neurological
  - 5.3.1 Peripheral Nerve injuries
  - 5.3.2 Cerebro vascular Accident
  - 5.3.3 Spinal cord injuries
  - 5.3.4 Epilepsy
  - 5.3.5 Inflammatory disease:- meningitis, encephalitis, Poliomyelitis
  - 5.3.6 Parkinsonism
  - 5.3.7 Cerebral palsy
- 5.4 Cardio-respiratory
  - 5.4.1 Chest physiotherapy-Breathing exercise/postural drainage
- 5.5 Dermatology
  - 5.5.1 Leprosy
  - 5.5.2 Burns and plastic surgery

6. General knowledge about Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियोग्राफी उपसमूह, रेडियोग्राफर पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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प्राविधिक सेवा, रेडियोलोजी समूह, रेडियोग्राफी उपसमूह, रेडियोग्राफर पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Anatomy and Physiology**
   - 1.1 General introduction
     - 1.1.1 The cell
     - 1.1.2 Reproduction of the individual
   - 1.2 The tissues
     - 1.2.1 Epithelial, Connective, Skeletal, Muscular and Nervous tissue
   - 1.3 General pathology
     - 1.3.1 Bacteria
     - 1.3.2 Viruses
     - 1.3.3 Tumours
   - 1.4 Surface and regional anatomy
     - 1.4.1 The anatomical position
     - 1.4.2 Head, Neck, Thorax, Abdomen and Pelvic cavity
   - 1.5 The skeleton
     - 1.5.1 The structure of bone
     - 1.5.2 Function of bone
     - 1.5.3 The development and growth of bones
     - 1.5.4 The healing of fractures
   - 1.6 The skull
     - 1.6.1 The skull viewed from the above and the below
     - 1.6.2 The skull viewed from the side and the front
     - 1.6.3 The interior of the skullcap
     - 1.6.4 The interior of the base of the skull
     - 1.6.5 The nasal cavity
     - 1.6.6 The accessory nasal sinuses
     - 1.6.7 The individual bones of the skull
   - 1.7 The vertebral column, ribs and sternum
     - 1.7.1 The vertebral column
     - 1.7.2 The ribs
     - 1.7.3 The sternum
   - 1.8 The bones of the upper limb
     - 1.8.1 The clavicle
     - 1.8.2 The scapula
     - 1.8.3 The humerus
     - 1.8.4 The radius
     - 1.8.5 The ulna
     - 1.8.6 The carpal bones
     - 1.8.7 The metacarpal bones
     - 1.8.8 The phalanges
     - 1.8.9 Arteries and nerves related to the bones of the upper limb
     - 1.8.10 Ossification of the bones of the upper limb
   - 1.9 The bones of the lower limb
     - 1.9.1 The hipbone
     - 1.9.2 The pelvis
     - 1.9.3 The femur

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1.9.4 The patella
1.9.5 The tibia
1.9.6 The fibula
1.9.7 The tarsal bones
1.9.8 The metarsal bones
1.9.9 The phalanges
1.9.10 The arches of the foot
1.9.11 Arteries and nerves related to the bone of the lower limb
1.9.12 Ossification of the bones of the lower limb

1.10 The joints of the bones of the lower limb

1.10.1 Types of joints
1.10.2 The muscles and joints of the head
1.10.3 The joints and muscles of the neck and trunk
1.10.4 The joints and muscles of the upper limb
1.10.5 The joint and muscles of the lower limb

1.11 The circulatory system

1.11.1 The blood
1.11.2 The blood vessels
1.11.3 The heart
1.11.4 The pulmonary circulation
1.11.5 The systemic circulation
1.11.6 The veins

1.12 The lymphatic system

1.12.1 Lymph
1.12.2 The lymphatic vessels
1.12.3 The lymph nodes
1.12.4 The lymphatic drainage of the body
1.12.5 Lymphatic tissue
1.12.6 The spleen

1.13 The respiratory system

1.13.1 The nose
1.13.2 The pharynx
1.13.3 The larynx
1.13.4 The trachea
1.13.5 The bronchi
1.13.6 The lungs
1.13.7 The physiology of respiration

1.14 The digestive system

1.14.1 The mouth
1.14.2 The salivary glands
1.14.3 The pharynx
1.14.4 The oesphagus
1.14.5 The stomach
1.14.6 The small intestine
1.14.7 The large intestine
1.14.8 The pancreas
1.14.9 The liver
1.14.10 The biliary apparatus

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1.14.11 The function of the alimentary system

1.15 The urinary system
- 1.15.1 The kidneys
- 1.15.2 The ureters
- 1.15.3 The urinary bladder
- 1.15.4 The urethra
- 1.15.5 The functions of kidneys
- 1.15.6 The control of micturition

1.16 The nervous system
- 1.16.1 Nervous tissue
- 1.16.2 The central nervous system
- 1.16.3 The brain
- 1.16.4 The spinal cord
- 1.16.5 The peripheral nervous system
- 1.16.6 The autonomic nervous system

1.17 The endocrine system
- 1.17.1 The pituitary gland
- 1.17.2 The thyroid gland
- 1.17.3 The parathyroid gland
- 1.17.4 The adrenal glands

1.18 The reproductive system
- 1.18.1 The male reproductive system
- 1.18.2 The female reproductive system

1.19 The skin and the organs of special sense
- 1.19.1 The skin
- 1.19.2 The eye
- 1.19.3 The ear
- 1.19.4 The nose
- 1.19.5 The tongue

2. **Radiation Physics**

2.1 Atomic structure
- 2.1.1 The Nucleus
- 2.1.2 Electron orbits and energy levels

2.2 Production of x-ray, properties of x-rays
- 2.2.1 General radiation (Bremsstrahlung)
- 2.2.2 Characteristic Radiation
- 2.2.3 Intensity of x-rays beams
- 2.2.4 Target material
- 2.2.5 Voltage (kVp) applied

2.3 Basic interactions between x-rays and matter
- 2.3.1 Coherent scattering
- 2.3.2 Photoelectric effect
- 2.3.3 Compton scattering
- 2.3.4 Pair production
- 2.3.5 Photodisintegration

2.4 Radiation measurement and units

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2.4.1 Construction & working of the free air ionization chamber
2.4.2 Thimble ionization chamber & condenser ionization chamber

2.5 Radiation protection
2.5.1 Historical introduction or why the protection is necessary against the radiation
2.5.2 Maximum permissible dose
2.5.3 Tabulation of the recommended maximum permissible doses for the different parts of the body
2.5.4 Following the code of practice
2.5.5 Identifying the protective materials

2.6 Personnel monitoring
2.6.1 The necessity of personnel monitoring & monitoring instruments (film badge, ionization chamber & thermoluminescent dosemeter)

2.7 Safety requirements for operating X-ray unit

3. **Patient Care and Management**

3.1 The hospital, the patient and the radiographer
3.1.1 Clinical responsibility
3.1.2 Legal responsibility
3.1.3 The radiographer and the hospital

3.2 Features of general patient care
3.2.1 General preliminaries to the examination
3.2.2 Moving chair and stretcher patients
3.2.3 The anaesthetized patient
3.2.4 Hygiene in the x-ray department
3.2.5 General comfort and reassurance for the patient

3.3 Drugs in the x-ray department
3.3.1 Poisons and dangerous drugs
3.3.2 Units of measurement
3.3.3 Drugs used in preparation of the patient
3.3.4 Contrast agents used in x-ray examinations
3.3.5 Drugs used in resuscitation
3.3.6 Labeling and issuing

3.4 Sterilization and sterile techniques
3.4.1 Methods of sterilization
3.4.2 Central sterile supply
3.4.3 Preparation of the hands for aseptic procedures

3.5 Preparation of the patient
3.5.1 General abdominal preparation
3.5.2 Clothing of the patient

3.6 First aid in the x-ray department
3.6.1 Radiological emergencies
3.6.2 Shock
3.6.3 Hemorrhage
3.6.4 Burns, scalds
3.6.5 Loss of consciousness
3.6.6 Asphyxia
3.6.7 Fractures

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3.6.8 Electric shock

3.7 Medico-legal aspects of the radiographer's work

3.7.1 Breach of professional confidence

3.7.2 Negligence

3.7.3 Procedure in the event of an accident

3.7.4 The importance of records

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Section (B): 50 % Marks

4. **Radiographic Photography**
   - 4.1 Film
     - 4.1.1 Construction and composition of x-ray film
     - 4.1.2 Types of x-ray film
     - 4.1.3 Characteristic curve, special sensitivity & role of dyeing
     - 4.1.4 Film speed, density, contrast, sensitometry
     - 4.1.5 Artifacts and its causes
   - 4.2 Intensifying screen
     - 4.2.1 Construction and composition of I.S.
     - 4.2.2 Screen speed, sharpness, coating weight
     - 4.2.3 Fluorescent material and phosphorescence
     - 4.2.4 Fluorescent material, new phosphors
   - 4.3 Image
     - 4.3.1 Production of radiographic image
     - 4.3.2 Component of radiographic image
       - 4.3.2.1 Contrast, sharpness, resolution
       - 4.3.2.2 Exposure factors
       - 4.3.2.3 Absorption coefficient
   - 4.4 Film processing
     - 4.4.1 Manual film processing
       - 4.4.1.1 The processing cycle
       - 4.4.1.2 Tanks and containers for processing chemical, processing units
       - 4.4.1.3Mixing chemicals
       - 4.4.1.4 Storage of chemicals
       - 4.4.1.5 Film hangers
     - 4.4.2 Automatic processor
       - 4.4.2.1 Basic principle & it's functioning
   - 4.5 Dark room planning
     - 4.5.1 Location, layout, radiation protection, safelight filter & sensitivity range
   - 4.6 Identification
     - 4.6.1 Methods
     - 4.6.2 Importance
   - 4.7 Silver recovery
     - 4.7.1 General introduction

5. **Radiographic equipment**
   - 5.1 Historical background of x-ray and its production
     - 5.5.1 X-ray tube construction
     - 5.5.2 Stationary and rotating x-ray tube
     - 5.5.3 Recent advancement of an x-ray tube
     - 5.5.4 Tube rating cooling and care of x-ray tube and its faults
   - 5.2 Control panel, x-ray table and tube column
     - 5.2.1 Type of x-ray table
     - 5.2.2 Different metering equipment
     - 5.2.3 X-ray tube support
   - 5.3 Fluoroscopic equipment

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5.3.1 Conventional fluoroscopy, image intensifier tube and Digital fluoroscopy

5.4 Control of scatter radiation & beam restricting devices

5.4.1 Secondary radiation grids

5.4.2 Air gap technique

5.5 Portable and mobile x-ray units

5.5.1 Capacitor discharge and c-arm

5.6 Computed and Direct Digital Radiography

5.7 Introduction to modern modalities (CT, MRI, mammography)

6. Radiographic Technique

6.1 General radiography

6.1.1 Routine Radiography Technique for upper limb
(Fingers, thumb, hand, wrist forearm, elbow, humerus, shoulder, scapula, clavicle)

6.1.2 Routine Radiography Technique for the lower limb,
(Toes, foot, calcaneum, ankle, tibia, fibula, knee, femur, hip joint, neck of femur, pelvis)

6.1.3 Routine Radiographic technique for thoracic cage and its contens
(Chest, heart, ribs and sternum)

6.1.4 Routine technique for the abdomen
Routine technique of plain & erect abdomen x-ray

6.1.5 Routine technique for the spine
(Cervical, thoracic, lumbar, sacrum and coccyx, sacro-illac joint)

6.1.6 Routine technique for the skull

2.1.6.1 The radiograph anatomical landmarks of the skull

2.1.6.2 The process of routine examination of the bones of skull (cranium, facial bone and mandible)

6.1.7 To locate the following by x-rays (scaphoid, forign body in the hand, head of humerues & axial Shoulder, acromio-calvicular joints, sterno-calvicular joints, foreign body in the foot, lateral foot weight bearing, skyline view of patella, tibial Tuberosity)

6.1.8 a) The supplementary views of the chest and abdomen (Apical views, lordotic view & decubitus, oblique views for heart size & lateral with barium swallow, thoracic inlet, diaphragm exursion, inhaled or swallowed foreign body, imperforated anus)

b) The purposes of these views

6.1.9 The supplementary views for the spine and pelvis (soft tissue)
(Neck, odontoid peg (open-mouth),vertebral foramina of cervical spine, upper thoracic spine oblique lumbar spine, lumbosacral junction, oblique sacro-illac joints, illum, acetabulum, pelvimetry, skeletion survey)

6.1.10 The supplementary views for the skull (towne's view, submento vertical, sella turcica, temporo-mandibular joint, nasal bones, paranasal sinuses, mastoids, orbits, optic foramina, foreign body in the eye, dental radiography)

6.1.11 Registration process

a) The steps of registration of patients

b) The importance of a monthly and annual record, filling system and preparing the Performa invoices

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c) Filling of radiographs and reports (x-ray No, hospital number, patient's name, cross reference bill, with patient's name)

6.2 **Radiographic examination with contrast media**

Special examination with contrast media

6.2.1 Contrast media
- 6.2.1.1 Definition of the contrast media
- 6.2.1.2 Types of contrast media
- 6.2.1.3 Methods of introducing the contrast media
- 6.2.1.4 Reactions of contrast media
- 6.2.1.5 Name of the emergency equipments and drugs needed to cope with reactions

6.2.2 Radiographic investigation of Gastro-intestinal tract using contrast media
- 6.2.2.1 Barium swallow
- 6.2.2.2 Barium meal
- 6.2.2.3 Barium follow through
- 6.2.2.4 Examination of GI tract
- 6.2.2.5 Ba-enema
- 6.2.2.6 Small bowel enema
- 6.2.2.7 Loopogram
- 6.2.2.8 State the role of a radiographer during fluoroscopy

6.2.3 Investigation of urinary tract and hystero salpinogram
- 6.2.3.1 Intravenous Urogram (IVU)
- 6.2.3.2 Cystogram
- 6.2.3.3 Micturating cystogram
- 6.2.3.4 Urethrogram
- 6.2.3.5 Retrogtade pyelogram
- 6.2.3.6 Hystero salpinogram (HSG)

6.2.4 Radiographic procedure of the Bollary tract
- 6.2.4.1 Percutaneous transhepatic cholangiography and drainage (PTC and PTCD)
- 6.2.4.2 Endoscopic retrograde cholangio pancreatography (ERCP)
- 6.2.4.3 Operatice cholangiography
- 6.2.4.4 T. Tube cholangiography

6.2.5 Use of portable/mobile x-ray in ward and operation theatre
- 6.2.5.1 The uses of mobile machine
- 6.2.5.2 The technique of using ward radiography
- 6.2.5.3 The technique of using operating theatre radiography
- 6.2.5.4 Technique to help in Hip pinning
- 6.2.5.5 The technique of operative-chlangiography

6.2.6 Vascular and Neurological examinations
- 6.2.6.1 Carotid and vertebral angiogram
- 6.2.6.2 Femoral angiogram
- 6.2.6.3 Aortogram
- 6.2.6.4 Phlebogram
- 6.2.6.5 Myelogram

6.2.7 Special examinations
- 6.2.7.1 Arthrogram
- 6.2.7.2 Dacryccystogram
- 6.2.7.3 Sinogram/Fistulogram

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6.2.7.4 Sailogram
6.2.7.5 Mammogram
6.2.7.6 Macro-radiography
6.2.7.7 Soft tissue radiography

7. **General knowledge about Civil Service Hospital and its Bylaws**

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, रेडिएसन अंकोलोजी उपसमूह, रेडियोथेरापि टेक्निसियन पद, पाँचौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

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प्राविधिक सेवा, मेडिसिन समूह, रेडिएसन अंकोलोजी उपसमूह, रेडियोथेरापि टेक्निसियन पद, पाँचौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject
Section (A): 50 % Marks

1. **Anatomy and Physiology**
   - 1.1 Cell and Tissues (Epithelial, Connective, Skeletal, Muscular and Nervous)
   - 1.2 General pathology : Bacteria, Viruses, Tumours
   - 1.3 Surface and regional anatomy
     - 1.3.1 Anatomical position
     - 1.3.2 Head, Neck, Thorax, Abdomen and Pelvic cavity
   - 1.4 Skeleton System
     - 1.4.1 Structure and function of bones
     - 1.4.2 Development and growth of bones, and healing of fractures
     - 1.4.3 Skull
       - 1.4.3.1 The skull viewed from the above and the below
       - 1.4.3.2 The skull viewed from the side and the front
       - 1.4.3.3 The interior of the skullcap
       - 1.4.3.4 The interior of the base of the skull
       - 1.4.3.5 The nasal cavity
       - 1.4.3.6 The accessory nasal sinuses
       - 1.4.3.7 The individual bones of the skull
     - 1.4.4 Vertebral column, ribs and sternum
     - 1.4.5 Bones of the upper limbs
       - 1.4.5.1 clavicle, scapula, humerus, radius, ulna, carpal bones, metacarpal bones, phalanges
       - 1.4.5.2 Arteries and nerves related to the bones of the upper limb
       - 1.4.5.3 Ossification of the bones of the upper limb
     - 1.4.6 Bones of the lower limbs
       - 1.4.6.1 Hipbone, pelvis, femur, patella, tibia, fibula, tarsal bones, metarsal bones, phalanges
       - 1.4.6.2 The arches of the foot
       - 1.4.6.3 Arteries and nerves related to the bone of the lower limb
       - 1.4.6.4 Ossification of the bones of the lower limb
     - 1.4.7 Types of joints
     - 1.4.8 Muscles and joints of the head, neck and trunk, upper limbs and lower limbs
   - 1.5 Circulatory System
     - 1.5.1 Blood and blood vessels
     - 1.5.2 Heart
     - 1.5.3 Pulmonary circulation
     - 1.5.4 Systemic circulation
     - 1.5.5 Veins
   - 1.6 Lymphatic System
     - 1.6.1 Lymph and lymphatic vessels
     - 1.6.2 Lymph nodes
     - 1.6.3 Lymphatic drainage of the body
     - 1.6.4 Lymphatic tissue
     - 1.6.5 Spleen
   - 1.7 Respiratory System
     - 1.7.1 Nose, pharynx, larynx, trachea, bronchi, lungs

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1.7.2 Physiology of respiration

1.8 Digestive System
- 1.8.1 Mouth, salivary glands, pharynx, oesphagus, stomach, small intestine, large intestine, pancreas, liver, biliary apparatus
- 1.8.2 Function of the alimentary system

1.9 Urinary System
- 1.9.1 Kidneys, ureters, urinary bladder, urethra
- 1.9.2 Functions of kidneys
- 1.9.3 Control of micturition

1.10 Nervous System
- 1.10.1 Nervous tissue
- 1.10.2 Central nervous system, brain and spinal cord
- 1.10.3 Peripheral nervous system
- 1.10.4 Autonomic nervous system

1.11 Reproductive System
- 1.11.1 Female Reproductive System & Breast
  - 1.11.1.1 External genitalia, Uterus, Ovaries: Position, structure functions
  - 1.11.1.2 Menstrual cycle, Reproduction & menopause
  - 1.11.1.3 Breast-Position, structure and its functions
  - 1.11.1.4 Puberty
- 1.11.2 Male Reproductive System:
  - 1.11.2.1 Position structure and functions of scrotum, testes, epididymis, deferent ducts, seminal vesicles, ejaculatory ducts and penis
  - 1.11.2.2 Puberty

1.12 Special Senses
- 1.12.1 Skin- structure and function
- 1.12.2 Ear (external, middle & internal ear)-structure and function
- 1.12.3 Eye- structure and functions
- 1.12.4 Nose- structure and functions
- 1.12.5 Tongue-structure, functions,
- 1.12.6 Taste buds and Sense of taste

1.13 Endocrine System
- 1.13.1 Endocrine glands - pituitary gland, thyroid gland, parathyroid glands, adrenal gland, islets of langerhans, pineal gland, testis, ovaries, thymus etc.
- 1.13.2 Endocrine glands - Position, structure, functions and hormone secretion

2. **Radiation Physics**

2.1 **Atomic structure**
- 2.1.1 General introduction
- 2.1.2 Electron shells & energy levels
- 2.1.3 Mass number, atomic number, atomic mass unit, binding energy
- 2.1.4 Properties of electromagnetic waves
- 2.1.5 Concept of photon and quanta
- 2.1.6 Nuclear fission and fusion

2.2 **Radioactivity**
- 2.2.1 Radioactive elements
- 2.2.2 Radioactive series, different types of radioactive disintegration
- 2.2.3 Properties of radioactive particles

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2.2.4 Radioactive decay law
2.2.5 Alpha, beta and gamma disintegration

2.3 **X-rays and Gamma rays**
2.3.1 Historical background of x-rays
2.3.2 Mechanism and production of x-rays
2.3.3 Properties of x-rays
2.3.4 Continuous and characteristic spectra
2.3.5 Gamma rays and its properties

2.4 **Basic interactions between x-rays and matter**
2.4.1 Coherent scattering
2.4.2 Photoelectric effect
2.4.3 Compton scattering
2.4.4 Pair production
2.4.5 Photodisintegration

2.5 **Radiation detection and measurement**
2.5.1 Principle of measurement
2.5.2 Construction and working of the free air ionization chamber
2.5.3 Thimble ionization chamber
2.5.4 Condenser ionization chamber
2.5.5 Scintillation counter
2.5.6 Gieger-muller counter

2.6 **Clinical Dosimetry**
2.6.1 Radiation absorbed dose
2.6.2 Relationship between Kerma, Exposure and absorbed dose
2.6.3 Cavity theory
2.6.4 Measurement of absorbed dose
2.6.5 Phantom
2.6.6 Dose calibration parameters
2.6.7 Depth dose distribution
2.6.7.1 Percentage depth dose
2.6.7.2 Tissue-air ratio
2.6.7.3 Tissue maximum ratio

2.7 **Review of Electricity**
2.7.1 Electromagnetic induction and its laws
2.7.2 Self and mutual induction,
2.7.3 A.C generator, Peak and effective values of AC
2.7.4 Concept of Reactance, Impedance & phase angle

2.8 **Transformer**
2.8.1 Theory, construction, Losses & Efficiency, Transformer ratings
2.8.2 Filament transformer
2.8.3 High-tension transformer
2.8.4 Autotransformer or variac transformer

Civil Service Hospital

2.9 **Thermionic emission and rectifiers**
- 2.9.1 Diode - construction, principle & characteristics
- 2.9.2 Rectifiers: Self-rectification, Half-wave, Full-wave (two valves and four valves) and constant voltage rectifiers
- 2.9.3 The cold cathode gas filled diode and its use

3. **Clinical Oncology**

3.1 Tumors
- 3.1.1 Tumor definition
- 3.1.2 Benign tumors and malignant tumors
- 3.1.3 Spread of tumors

3.2 Clinical Presentation
- 3.2.1 Symptoms and signs
- 3.2.2 Diagnostic procedure
  - 3.2.2.1 Hemogram
  - 3.2.2.2 Biochemical
  - 3.2.2.3 Tumor marker
  - 3.2.2.4 Radiological- X-ray, U.S.G., C.T, M.R.I
  - 3.2.2.5 Pathological – FNAC, FNAB, Incision biopsy, excision biopsy
  - 3.2.2.6 Surgery

3.3 Staging
- 3.3.1 TNM Classification

3.4 Malignancies and Treatment
- 3.4.1 CNS tumours
- 3.4.2 Ca-Larynx
- 3.4.3 Ca-Tongue, Head and Neck cancers
- 3.4.4 Ca-Breast
- 3.4.5 Ca-Lung
- 3.4.6 Ca-Cervix and Gynecological malignancies
- 3.4.7 Ca-Oesophagus
- 3.4.8 Bone and soft tissue cancers, thyroid

Section (B): 50% Marks

4. **Radiotherapy Technique**

4.1 Principle of Radiotherapy
- 4.1.1 Tumor histology
- 4.1.2 Grade, sensitivity,
- 4.1.3 Anatomical site, critical organs
- 4.1.4 General condition of the patient, extent of tumor, previous treatments
- 4.1.5 Radical/Palliative and prophylaxis

4.2 Types and Methods of Radiotherapy
- 4.2.1 Tele-therapy Technique
- 4.2.2 Brachytherapy Technique

4.3 Radiotherapy Resources
- 4.3.1 Low energy beams
- 4.3.2 High energy beams
- 4.3.3 Electron beams

4.4 Treatment Planning
- 4.4.1 Tumor localization and verification

Civil Service Hospital

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4.4.2 Isodose Curves
4.4.3 Single field, parallel opposed field, multiple field
4.4.4 Rotation therapy
4.4.5 Beam Modification

5. **Radiotherapy Equipment and Quality Assurance**
   5.1 Teletherapy Equipments
      5.1.1 Superficial and orthovoltage equipment
      5.1.2 Cobalt-60 tele therapy equipment
      5.1.3 Linear accelerator
      5.1.4 Simulator
      5.1.5 Brachytherapy equipment
         5.1.5.1 Low dose rate (LDR)
         5.1.5.2 Medium dose rate (MDR)
         5.1.5.3 High dose rate (HDR)
      5.1.6 Tomotherapy
   5.2 Quality Control
      5.2.1 Cobalt-60
      5.2.2 Linear Accelerator
      5.2.3 Brachytherapy
      5.2.4 Simulator
   5.3 Radiation Protection
      5.3.1 Concept of radiation protection
      5.3.2 Justification, Optimization and Limitation
      5.3.3 Units, Maximum Permissible Dose
      5.3.4 Personnel monitoring
      5.3.5 Protective materials

6. **Radiographic equipment**
   6.1 Historical background of x-ray and its production
      6.1.1 5.5.1 X-ray tube construction
      6.1.2 Stationary and rotating x-ray tube
      6.1.3 Recent advancement of an x-ray tube
      6.1.4 Tube rating cooling and care of x-ray tube and its faults
      6.1.5 USG
      6.1.6 CT
      6.1.7 MRI
   6.2 Control panel, x-ray table and tube column
      6.2.1 Type of x-ray table
      6.2.2 Different metering equipment
      6.2.3 X-ray tube support
   6.3 Fluoroscopic equipment
      6.3.1 Conventional fluoroscopy, image intensifier tube and Digital fluoroscopy
   6.4 Control of scatter radiation & beam restricting devices
      6.4.1 Secondary radiation grids
      6.4.2 Air gap technique
   6.5 Portable and mobile x-ray units
      6.5.1 Capacitor discharge and c-arm
   6.6 Computed and Direct Digital Radiography

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Civil Service Hospital

6.7 Introduction to modern modalities (CT, MRI, mammography)

7. **Radiation Biology**
   - 7.1 Cell cycle
   - 7.2 Effect of radiation on the normal cell, tissue and organs
   - 7.3 Radiation sensitivity
   - 7.4 Physical and biological factors affecting radiation sensitivity
     - 7.4.1 LET
     - 7.4.2 RBE
     - 7.4.3 OER
   - 7.5 Cell survival curves
   - 7.6 4Rs of radiobiology
   - 7.7 Radiation hazard and radiation protection

8. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, स्टाफ नर्स पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, स्टाफ नर्स पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Fundamentals of Nursing**
   - 1.1 Basic needs of clients
   - 1.2 The nursing process
   - 1.3 Common nursing procedures used in the hospital
   - 1.4 Stress and coping mechanism
   - 1.5 First aid treatment
   - 1.6 Administration of drugs
   - 1.7 Infection prevention
   - 1.8 Methods of collecting different specimen for routine and culture test

2. **Applied Science**
   - 2.1 Anatomy and Physiology of all body systems and organs
   - 2.2 Body mechanisms, Friction, Gravity, Newton's Law, Force, Transfer of heat, Fluid and electrolyte, Osmosis, Diffusion, Acid base balance, Rehydration therapy
   - 2.3 Common investigation and its significance
   - 2.4 Microbiology
   - 2.5 Infection diseases
   - 2.6 Common drugs, its action and side effects

3. **Medical/Surgical Nursing**
   - 3.1 Developmental tasks, Application of nursing process, Common diagnostic procedures
   - 3.2 Nursing management of common disease conditions including pre and post operative care. Accidents, Injuries, Head Injuries, Spinal cord injury, Meningitis, Encephalitis, Tetanus, Epilepsy, Bronchitis, Asthma, Pulmonary TB, Pleurisy, Common Cold, Rhinitis, Atelectasis, Peptic Ulcer, Intestinal Obstruction, Appendicitis, Peritonitis, Cirrhosis of liver, Haemorrhoids, Cholecystitis, Hepatitis, Hernias, Hydrocele, Bladder stones, Pyelonephritis, Urinary Tract Infection (UTI), Renal stone, Acute and Chronic Renal failure, Uremia
   - 3.3 Congestive Heart Failure (CHF), Angina, Cardiac Arrest, Anaemia, Leukaemia, Myocardial infarction, Gangrene, Diabetes mellitus, Diabetes incipides, Hypertension, Fracture, Dislocation, Osteomylitis
   - 3.4 Care of patient with common sensory disorders and nursing management

4. **Community Health Nursing**
   - 4.1 Concepts of primary health care
   - 4.2 Epidemiological concepts and approaches
   - 4.3 Nutrition, deficiency diseases and management
   - 4.4 Immunization
   - 4.5 Communicable diseases and management
   - 4.6 Health Indicators
   - 4.7 Family planning

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, स्टाफ नर्स पद, पाँचौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Section (B): 50 % marks

5. **Midwifery**
   - 5.1 Anatomy and Physiology of male and female reproductive systems
   - 5.2 Antenatal, natal and post natal care of a mother
   - 5.3 Management of high risk mothers
   - 5.4 Management of minor and major disorders of pregnancy
   - 5.5 Diseases associated with pregnancy
   - 5.6 Care of new born baby with observation and assessment
   - 5.7 Breast care and management

6. **Nursing Care of Gynaecological Problems**
   - 6.1 Disorder of Uterine Bleeding
   - 6.2 Cystocele and Rectocele
   - 6.3 Uterine Prolaps
   - 6.4 Vesico Vaginal Fistula
   - 6.5 STD/HIV/AIDS
   - 6.6 Infertility

7. **Pediatric Nursing**
   - 7.1 Major developmental characteristics and milestones
   - 7.2 Promoting optimum development of children
   - 7.3 Adolescent changes and problems
   - 7.4 Six major killer diseases
   - 7.5 Common health problems in children and their nursing management
   - 7.6 Common health hazards in children in Nepal and their prevention
   - 7.7 Congenital disorders/disabilities
   - 7.8 Role of nurses in reduction of mortality rate of children
   - 7.9 Nursing care of critically ill children

8. **Mental Health**
   - 8.1 Management of clients with mental disorders
   - 8.2 Characteristics of mentally ill patient
   - 8.3 Classification of mental disorders

9. **Leadership and Management in Nursing Planning**
   - 9.1 Management process: Supervision, motivation, implementation and evaluation
   - 9.2 Leadership style
   - 9.3 Organizational structure of Government health services
   - 9.4 National health planning and concept of national health system
   - 9.5 Policies, rules and regulations in management of different level of hospitals and health centres
   - 9.6 Communication Process.

10. **Computer Skills**
    - 10.1 Introduction to computer
    - 10.2 Input, output and memory devices
    - 10.3 Internet and information resources
    - 10.4 Networking concepts

11. **General knowledge about Civil Service Hospital and its Bylaws**

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प्रशासन सेवा, प्रशासन समूह, सामान्य प्रशासन उपसमूह, प्रशासन सहायक पद, पाँचौं तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता पूर्णाङ्क :– ३०

परीक्षा योजना (Examination Scheme)

१. प्रथम चरण : लिखित परीक्षा (Written Examination) **पूर्णाङ्क :- २००**

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या X अङ्क	समय
प्रथम	संस्थागत ज्ञान र समसामयिक विषय	१००	४०	वस्तुगत बहुवैकल्पिक प्रश्न (MCQ)	२५ प्रश्न X २ अङ्क	२ घण्टा
				विषयगत	१० प्रश्न X ५ अङ्क	
द्वितीय	सेवा सम्बन्धी	१००	४०	विषयगत	१२ प्रश्न X ५अङ्क ४ प्रश्न X १० अङ्क	३ घण्टा

२. द्वितीय चरण : अन्तर्वार्ता (Interview) **पूर्णाङ्क :- ३०**

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो पाठ्यक्रमको योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई भागमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

४. लिखित परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।

५. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

६. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a,b,c,d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

७. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :- आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

प्रथम पत्रः– संस्थागत ज्ञान र समसामयिक विषय

१. संस्थागत ज्ञान

१.१ निजामती कर्मचारी अस्पतालको स्थापनाको उद्देश्य, विकासक्रम, काम कर्तव्य र अधिकार

१.२ अस्पतालको विद्यमान अवस्था, चुनौती, समस्या, सुधारका उपाय र भावी दिनमा गर्नुपर्ने कार्यहरु

१.३ अस्पतालको सम्बन्धित मन्त्रालय र विभिन्न गैरसरकारी संस्थासँगको अन्तर सम्बन्ध

१.४ अस्पतालको प्रशासन बाट सम्पादन हुने कार्यहरु, केन्द्रमा रहेका विभाग, इकाइ, युनिट र तिनको प्रशासनसँग सम्बन्ध

१.५ अस्पतालकासुरक्षा र सम्पति संरक्षणका लागि गरिएका प्रवन्ध

१.६ अस्पतालको संचालनको कोषको अवस्था र आर्थिक कार्यभार

१.७ अस्पतालको सामाजिक सेवा इकाइबाट सम्पादित कार्यहरु

१.८ अस्पतालमा मानव स्रोत व्यवस्थापनको अवस्था र भावी रणनीति

१.९ अस्पतालकमा सरसफाई व्यवस्थापनका सम्बन्धमा गरिएका प्रवन्ध

१.१० अस्पतालको लेखा, लेखा परीक्षण र बेरुजूको अवस्था

१.११ अस्पतालको सार्वजनिक सेवा प्रवाहको अवस्था, सार्वजनिक सुनुवाई, नागरिक वडापत्र, गुनाशो व्यवस्थापन, हेल्थ डेस्क सम्बन्धी जानकारी

१.१२ अस्पतालमा विद्युतीय शासनको उपयोग र भावी रणनीति

१.१३ निजामती कर्मचारी अस्पतालको विनियमावली सम्बन्धी जानकारी

१.१४ भम्रण खर्च नियमावली, २०६४

१.१५ सार्वजनिक खरिद ऐन, २०६३ : विधि र खरिद प्रक्रिया

१.१६ चालु आवधिक योजना : उद्देश्य, रणनीति र स्वास्थ्य सम्बन्धमा भएको व्यवस्था

१.१७ सरकारी बजेट सम्बन्धी जानकारी

२. समसामयिक र कानूनी विषय

२.१ कानूनको अर्थ र महत्व, कानूनका स्रोतहरु

२.२ कानूनको शासन, लोकतन्त्र, लोकतान्त्रिक मूल्य र मान्यता

२.३ नागरिकका दायित्व र कर्तव्य, मानवीय मूल्य र मान्यताहरु

२.४ सामाजिक विवाद र द्वन्द तथा द्वन्द व्यवस्थापन

२.५ विद्युतीय सुशासन, ईन्टरनेट र सामाजिक संजालको उत्तरदायी प्रयोग-साईवर नैतिकता र सुरक्षित प्रयोगका उपायहरु

२.६ नेपालको वर्तमान संविधान (मौलिक हक, राज्यका निर्देशक सिद्धान्त र संवैधानिक अंग)

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र - सेवा सम्बन्धी

खण्ड (क) – ५० अङ्क (६ प्रश्न × ५अंक, २ प्रश्न × १०अंक)

१. कार्यालय व्यवस्थापन

१.१ कार्यालय र कार्यालय व्यवस्थापन

१.१.१ कार्यालय : परिचय, महत्व, कार्य र प्रकार

१.१.२ कार्यालय सहायकका कार्य र गुणहरु

१.१.३ कार्यालय व्यवस्थापनको अवधारणा र महत्व

१.१.४ कार्यालयमा संचारको महत्व, प्रकार, माध्यम

१.१.५ कार्यालयमा व्यवस्थापन सूचना प्रणालीको आवश्यकता

१.२ कार्यालय कार्यविधि

१.२.१ दर्ता, चलानी, फाइलिङ र पत्र व्यवहार

१.२.२ टिप्पणी लेखन र टिप्पणी तयार पार्दा ध्यान दिनुपर्ने कुराहरु

१.२.३ प्रस्ताव र प्रतिवेदन लेखन

१.३ अभिलेख व्यवस्थापनको परिचय, उद्देश्य, आवश्यकता र महत्व

१.४ कार्यालयमा जनसम्पर्क व्यवस्थापन

१.५ मासिक प्रगति/वार्षिक प्रगति सम्बन्धी व्यवस्थापन

१.६ कार्यालय निरिक्षण र अनुगमन

१.७ बैठक व्यवस्थापन र निर्णय लेखन

१.८ संगठनात्मक मान्यता र मर्यादा प्रणाली

१.९ कार्यालयमा निर्णयको आवश्यकता र निर्णय लिने प्रकृया

१.१० प्रशासकीय कार्य फछ्र्यौट सम्बन्धी व्यवस्था

१.११ गुनासो व्यवस्थापन र तनाव व्यवस्थापन

१.१२ प्रशासन सहायकको योग्यता, काम, र गुणहरु

१.१३ कार्यालय संसाधनको परिचय, आवश्यकता र किसिम

१.१४ माग फारम, खरिद आदेश, दाखिला रिर्पोट र जिन्सी खाता सम्बन्धी जानकारी

खण्ड (ख) – ५० अङ्क (६ प्रश्न × ५अंक, २ प्रश्न × १०अंक)

२. सार्वजनिक व्यवस्थापन

२.१ सार्वजनिक प्रशासनको परिचय, उद्देश्य र कार्यहरु

२.२ व्यवस्थापनको अवधारणा र आधारभूत सिद्धान्तहरु

२.३ कार्य विवरण, अधिकार प्रत्यायोजन, निर्देशन, नियन्त्रण, समन्वय, उत्प्रेरणा र नेतृत्व सम्बन्धी सामान्य जानकारी

२.४ आर्थिक प्रशासन सम्बन्धी सामान्य जानकारी

२.५ संगठनको परिचय, उद्देश्य ,स्वरुप र संगठनका आधारहरु

२.६ नागरिक वडापत्र (Citizen Charter) : अवधारणा, उद्देश्य र महत्व

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

२.७ सार्वजनिक सेवा प्रवाह अर्थ र महत्व, सार्वजनिक सेवा प्रवाह गर्ने निकाय, तरिकाहरु/माध्यम, सार्वजनिक सेवा प्रवाहमा सेवा प्रदायकको भूमिका र सेवाग्राहीको अधिकार तथा दायित्व

२.८ सार्वजनिक सेवा प्रवाहका चुनौती तथा प्रभावकारी सेवा प्रवाहका उपायहरु

२.९ सार्वजनिक व्यवस्थापनमा नैतिकता, सदाचार, अनुशासन, सुशासन, पारदर्शिता, उत्तरदायित्व र व्यवसायिकता सम्बन्धी अवधारणा र सो को अभ्यास

२.१० सुशासन (व्यवस्थापन तथा सञ्चालन) ऐन, २०६४ को परिच्छेद २,४,५

२.११ भ्रष्टाचार निवारण ऐन, २०५९ को भाग २ कसुर र सजाय

२.१२ सूचनाको हक सम्बन्धी ऐन, २०६४ परिच्छेद २,४,५

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, रेडिएसन अंकोलोजी उपसमूह, मेडिकल फिजिसिस्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व. २०७९/०८०

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, रेडिएसन अंकोलोजी उपसमूह, मेडिकल फिजिसिस्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject
Section (A): 50 % Marks

1. **NUCLEAR AND RADIATION PHYSICS**

1.1 **Nuclear Physics**

Radioactivity - General properties of alpha, beta and gamma rays - Laws of radioactivity - Laws of successive transformations - Natural radioactive series - Radioactive equilibrium - Alpha ray spectra - Beta ray spectra - Theory of beta decay - Gamma emission – Electron capture - Internal conversion - Nuclear isomerism - Artificial radioactivity – Nuclear crosssections - Elementary ideas of fission and reactors – Fusion.

1.2 **Particle Accelerators**

Particle accelerators for industrial, medical and research applications - The Resonant transformer - Van De Graff Generator - Cyclotron – Betatron - Synchro-Cyclotron-Linear Accelerator - Klystron and magnetron - Travelling and Standing Wave Acceleration - Microtron - Electron Synchrotron-Proton synchrotron. Details of accelerator facilities in Nepal.

1.3 **X-ray Generators**

Discovery - Production - Properties of X-rays - Characteristics and continuous spectra - Design of hot cathode X-ray tube - Basic requirements of medical diagnostic, therapeutic - Rotating anode tubes - Safety devices in X-ray tubes – Ray proof and shockproof tubes - Insulation and cooling of X-ray tubes - Faults in X-ray tubes - Electric Accessories for X-ray tubes - Filament and high voltage, Modern Trends.

1.4 **Interaction of Radiation with Matter**

Interaction of electromagnetic radiation with matter Exponential attenuation – Thomson scattering - Photoelectric and Compton process and energy absorption - Pair production - Attenuation and mass energy absorption coefficients - Relative importance of various processes.

Interaction of charged particles with matter - Classical theory of inelastic collisions with atomic electrons - Energy loss per ion pair by primary and secondary ionization. Passage of heavy charged particles through matter - Energy loss by collision - Range energy relation - Bragg curve – Specific

1.5 **Radiation Quantities and Units**

Radiation quantities and units –Particle flux and fluence – Energy flux and fluence – Cross Section – Linear and mass attenuation coefficients - Mass energy transfer and mass energy absorption coefficients - Stopping power - LET - Radiation chemical yield. Dosimetry - Energy imparted - Absorbed dose - Kerma - Exposure - Air kerma rate constant – Charged particle equilibrium (CPE) – Relationship between Kerma, absorbed dose and exposure under CPE - Dose equivalent

1.6 **Radiation Sources**

Natural and artificial radioactive sources - Large scale production of isotopes – Reactor produced isotopes - Cyclotron produced isotopes - Fission products - industrial uses – Telecobalt and Brachy Caesium sources – Gold seeds 125 I Sources - Beta ray applicators - Thermal and fast neutron sources - Preparation of tracers and labelled compounds.

1.7 **Dosimetry & Standardization of X and Gamma Rays Beams**

Standards - Primary and Secondary Standards, Traceability, Uncertainty in measurement. Charged Particle Equilibrium (CPE), Free Air Ion Chamber (FAIC), Design of parallel plate FAIC, Measurement of Air Kerma/ Exposure. Limitations of FAIC. Bragg-Gray theory, Mathematical expression describing Bragg-Gray principle and its derivation. Burlin and Spencer Attix Cavity theories. Transient Charged Particle Equilibrium

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(TCPE), Concept of Dgas, Cavity ion chambers, Derivation of an expression for sensitivity of a cavity ion chamber. General definition of calibration factor - NX, NK, ND, air, ND, W.

IAEA TRS277: Various steps to arrive at the expression for DW starting from NX. TRS398: ND, W, Q : ND, W :KQ,Q0 :KQ , Derivation of an expression for KQ,Q0.

Calorimetric standards – Intercomparison of standard Measurement of DW for External beams from 60Co teletherapy machines: Reference conditions for measurement, Type of ion chambers, Phantom, Waterproof sleeve, Derivation of an expression for Machine Timing error, Procedure for evaluation of Temperature and pressure correction: Thermometers and pressure gauges. Measurement of temperature and pressure. Saturation correction. Parallel plate, cylindrical and spherical ion chambers Two voltage method for continuous and pulsed beams, Polarity correction. Measurement of DW for high-energy photon beams from Linear accelerators: Beam quality, beam quality index, beam quality correction coefficient, Cross calibration. Measurement of DW for high energy Electron beams from linear accelerators: Beam quality, beam quality index, beam quality correction coefficient, Cross calibration using intermediate beam quality. Quality Audit Programmes in Reference and Non-Reference conditions.

Standardization of brachytherapy sources - Apparent activity - Reference Air Kerma Rate – Air Kerma Strength - Standards for HDR 192Ir and 60Co sources - Standardization of 125 I and beta sources - IAEA TECDOC 1274 - room scatter correction. Calibration of protection level instruments and monitors.

1.8 Principles of Radiation Detection

Principles of Radiation detection and measurement - Basic principles of radiation detection - Gas Filled detectors - Ionisation chambers - Theory and design - Construction of condenser type chambers and thimble chambers - Gas multiplication - Proportional and GM Counters - Characteristics of organic and inorganic counters - Dead time and recovery time - Scintillation detectors - Semiconductor detectors - Chemical systems - Radiographic and Radiochromic films – Thermoluminescent Dosimeters (TLD) – Optically SStimulated Luminescence dosimeters (OSLD).

1.9 Radiation Measuring & Monitoring Instruments

Dosimeters based on condenser chambers - Pocket chambers - Dosimeters based on current measurement. Farmer Dosimeters – Radiation field analyser (RFA) - Radioisotope calibrator - Multipurpose dosimeter – Water phantom dosimetry systems - Brachytherapy dosimeters - Thermoluminescent dosimeter readers for medical applications - Calibration and maintenance of dosimeters. Instruments for personnel monitoring - TLD badge readers - - Gamma area (Zone) alarm monitors - Contamination monitors for alpha, beta and gamma radiation – Hand and Foot monitors. Scintillation monitors for X and gamma radiations -Neutron Monitors, Tissue equivalent survey meters. Instruments for counting and spectrometry - Portable counting systems for alpha and beta radiation

2. CLINICAL AND RADIATION BIOLOGY

2.1 Cell Biology

Cell physiology and biochemistry - Structure of the cell - Types of cells and tissue, their structures and functions - Organic constituents of cells - Carbohydrates, fats, proteins and nucleic acids - Enzymes and their functions - Functions of mitochondria, ribosomes, golgi bodies and lysosomes - Cell metabolism - DNA as concepts of gene and gene action – Mitotic and meiotic cell division - Semi conservative DNA synthesis, Genetic variation, Crossing over, mutation, chromosome segregation - Heredity and its mechanisms.

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2.2 **Interaction of Radiation with Cells**

Action of radiation on living cells - Radiolytic products of water and their interaction with biomolecule - Nucleic acids, proteins, enzymes, fats - Influence of oxygen, temperature - Cellular effects of radiation - Mitotic delay, chromosome aberrations, mutations and recombinations - Giant cell formation, cell death Recovery from radiation damage - Potentially lethal damage and sublethal damage recovery - Pathways for repair of radiation damage. Law of Bergonie and Tribondeau.

Survival curve parameters - Model for radiation action - Target theory - Multihit, Multitarget - Repair misrepair hypothesis - Dual action hypothesis - Modification of radiation damage - LET, RBE, dose rate, dose fractionation - Oxygen and other chemical sensitizers - Anoxic, hypoxic, base analogs, folic acid, and energy metabolism inhibitors – Hyperthermic sensitization - Radio-protective agents.

2.3 **Biological Effects of Radiation**

Somatic effects of radiation - Physical factors influencing somatic effects - Dependence on dose, dose rate, type and energy of radiation, temperature, anoxia, - Acute radiation sickness - LD 50 dose - Effect of radiation on skin and blood forming organs, digestive tract – Sterility and cataract formation - Effects of chronic exposure to radiation - Induction of leukaemia - Radiation Carcinogenesis - Risk of carcinogenesis - Animal and human data - Shortening of life span - In-utero exposure - Genetic effects of radiation.

2.4 **Clinical Aspects of Medical Imaging & Radiation Oncology**

Radiation Therapy, Surgery, Chemotherapy, Hormone Therapy, Immunotherapy & Radionuclide therapy, Benign and malignant disease, Methods of spread of malignant disease, Staging and grading systems, Treatment intent - Curative & Palliative, Cancer prevention and public education and Early detection & Screening. Site specific signs, symptoms, diagnosis and management: Head and Neck, Breast, Gynaecological, Gastro-Intestinal tract, Genito-Urinary, prostate,Lung & Thorax, Lymphomas & Leukemias & Other cancers including AIDS related cancers. Patient management on treatment - side effects related to radiation and dose - Acute & Late - Monitoring and common management of side effects - Information and communication.

Professional aspects and role of medical physicists: General patient care - Principles of professional practice - Medical terminology - Research & Professional writing – Patient privacy - Ethical & cultural issues. Legal aspects - Confidentiality, Informed consent, Health and Safety.

2.5 **Biological Basis of Radiotherapy**

Physical and biological factors affecting cell survival, tumour regrowth and normal tissue response -Non-conventional fractionation scheme and their effect of reoxygenation, repair, redistribution in the cell cycle - High LET radiation therapy.

2.6 **Time Dose Fractionation**

Time dose fractionation - Basis for dose fractionation in beam therapy - Concepts for Nominal Standard Dose (NSD), Roentgen equivalent therapy (RET) - Time dose fractionation (TDF) factors and cumulative radiation effects (CRE) - Gap correction, Linear and Linear Quadratic models. BED (biological effective dose)

3. **MEDICAL IMAGING**

3.1 **Principles of X-ray Diagnosis & Conventional Imaging**

Physical principle of diagnostic radiology: Interactions of X-rays with human body, differential transmission of x-ray beam, spatial image formation, visualization of spatial image, limitations of projection imaging technique Viz. superimposition of overlying

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structures and scatter, application of contrast media and projections at different angles to overcome superimposition of overlying structures

3.2 **Radiography techniques:**

Prime factors (kVp, mAs and SID/SFD), influence of prime factors on image quality, selection criteria of prime factors for different types of imaging, different type of projection and slices selected for imaging, objectives of radio-diagnosis, patient dose Vs image quality Filters: inherent and added filters, purpose of added filters, beryllium filter, filters used for shaping X-ray spectrum (K-edge filters: holmium, gadolinium, molybdenum).

Scatter reduction: Factors influencing scatter radiation, objectives of scatter reduction, contrast reduction factor, scatter reduction methods; beam restrictors (diaphragms, cones/cylinders & collimators), grids (grid function, different types of stationary grids, grid performance evaluation parameters, moving grids, artifacts caused by grids, grid selection criteria), air gap technique.

3.3 **QA of conventional diagnostic X-ray equipment:**

Purpose of QA, QA protocols, QA test methods for performance evaluation of x-ray diagnostic equipment

3.4 **Digital X-Ray Imaging and Computed Tomography**

Mammography, Interventional radiology, digital radiography (CR and DRsystems), digital subtraction techniques, Conventional tomography (principle only), orthopan tomography (OPG), Computed Tomography (CT), QA of CT equipment

3.5 **Nuclear Medicine & Internal Dosimetry**

Physics of Nuclear Medicine-Introduction to Nuclear Medicine, Unsealed Sources, Production of Radionuclide used in Nuclear Medicine; Reactor based Radionuclides, Accelerator based Radionuclides, Radionuclide Generators and their operation principles. Various usages of Radiopharmaceuticals. In-vivo Non-imaging procedures; Thyroid Uptake Measurements, Renogram Different Imaging Techniques: Basic Principles, Two dimensional Imaging Techniques Single Photon Emission Computed Tomography, Positron Emission Tomography. Various Image Reconstruction Techniques during Image formation such as Back Projection and Fourier based Techniques, Iterative Reconstruction method and their drawbacks. Attenuation Correction, Scatter Correction, Physics of PET and Cyclotron: Principles of PET, PET Instrumentations, Annihilation, and its use in cancer detection

3.6 **Magnetic Resonance Imaging (MRI)**

Magnetic Resonance image - proton density, relaxation time T1 & T2 images – Image characteristics - MRI system components - Magnets, Magnetic fields, Gradients, Magnetic field shielding, Radio Frequency systems, computer functions - Imaging process – Image artifacts – MRI safety.

3.7 **Ultrasound Imaging and use in medical imaging**

Interaction of sound waves with body tissues, production of ultrasound - transducers – acoustic coupling - image formation - modes of image display - colour Doppler.

Civil Service Hospital

Section (B): 50 % Marks

4. RADIATION THERAPY

4.1 Beam Therapy

Description of low kV therapy x-ray units - spectral distribution of kV x-rays and effect of filtration - thoraeus filter - output calibration procedure. Construction and working of telecobalt units - source design - beam collimation and penumbra - trimmers and breast cones. Design and working of medical electron linear accelerators - beam collimation - asymmetric collimator - multileaf collimator – dose monitoring - electron contamination. Output calibration of 60Co gamma rays, high energy xrays and electron beams using IAEA TRS 398, AAPM TG 51 and other dosimetry protocols.

Relative merits and demerits of kV x-rays, gamma rays, MV x-rays and electron beams. Radiotherapy simulator and its applications. CT and virtual simulations. Central axis dosimetry parameters - Tissue air ratio (TAR) Back scatter/ Peak scatter factor (BSF/PSF) - Percentage depth doses (PDD) - Tissue phantom ratio (TPR) - Tissue maximum ratio (TMR) - Collimator, phantom and total scatter factors. Relation between TAR and PDD and its applications - Relation between TMR and PDD and its applications. SAR, SMR, Off axis ratio and Field factor. Build-up region and surface dose. Tissue equivalent phantoms.

Radiation filed analyzer (RFA). Description and measurement of isodose curves/charts. Beam modifying and shaping devices - wedge filters - universal, motorized and dynamic wedges shielding blocks and compensators. Treatment planning in teletherapy – target volume definition and dose prescription criteria- ICRU 50 and 62 - SSD and SAD set ups - two and three dimensional localization techniques - contouring - simulation of treatment techniques - field arrangements - single, parallel opposed and multiple fields - corrections for tissue inhomogeneity, contour shapes and beam obliquity - integral dose.

Conventional and conformal radiotherapy. Treatment time and Monitor unit calculations. Clinical electron beams - energy specification - electron energy selection for patient treatment - depth dose characteristics (Ds, Dx, R100, R90, R50, Rp etc.) - beam flatness and symmetry - penumbra - isodose plots - monitor unit calculations - output factor formalisms - effect of air gap on beam dosimetry - effective SSD.

4.2 Particulate beam therapy

Relative merits of electron, neutron, x-ray and gamma ray beams - Neutron capture therapy - Heavy ion therapy.

Quality assurance in radiation therapy - precision and accuracy in clinical dosimetry – quality assurance protocols for telecobalt, medical linear accelerator and radiotherapy simulators - IEC requirements - acceptance, commissioning and. quality control of telecobalt, medical linear accelerator and radiotherapy simulators. Portal and in-vivo dosimetry. Electronic portal imaging devices.

4.3 Brachytherapy

Definition and classification of brachytherapy techniques - surface mould, intracavitary, interstitial and intraluminal techniques. Requirement for brachytherapy sources – Description of radium and radium substitutes - 137Cs, 60Co, 192Ir, 125I and other commonly used brachytherapy sources. Dose rate considerations and classification of brachytherapy techniques - Low dose rate (LDR), high dose rate (HDR) and pulsed dose rate (PDR).

Paterson Parker and Manchester Dosage systems. ICRU 38 and 58 protocols. Specification and calibration of brachytherapy sources - RAKR and AKS - IAEA

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TECDOC 1274 and ICRU 72 recommendations. Point and line source dosimetry formalisms - Sievert Integral - AAPM TG-43/43U1 and other dosimetry formalisms.

Afterloading techniques - Advantages and disadvantages of manual and remote afterloading techniques. AAPM and IEC requirements for remote afterloading brachytherapy equipment. Acceptance, commissioning and quality assurance of remote after loading brachytherapy equipment. ISO requirements and QA of brachytherapy sources. Integrated brachytherapy unit.

Brachytherapy treatment planning - CT/MR based brachytherapy planning - forward and inverse planning - DICOM image import / export from OT – Record & verification.Brachytherapy treatment for Prostate cancer. Ocular brachytherapy using photon and beta sources. Intravascular brachytherapy - classification - sources – dosimetry procedures - AAPM TG 60 protocol. Electronic brachytherapy (Axxent, Mammosite, etc.)

4.4 Computers in Treatment Planning

Scope of computers in radiation treatment planning - Review of algorithms used for treatment planning computations - Pencil beam, double pencil beam, Clarkson method, convolution superposition, lung interface algorithm, fast Fourier transform, Inverse planning algorithm, Monte Carlo based algorithms. Treatment planning calculations for photon beam, electron beam, and brachytherapy - Factors to be incorporated in computational algorithms. Plan optimization - direct aperture optimization - beamlet optimization - simulated annealing - dose volume histograms - Indices used for plan comparisons - Hardware and software requirements - beam & source library generation. Networking, DICOM and PACS. Acceptance, commissioning and quality assurance of radiotherapy treatment planning systems using IAEA TRS 430 and other protocols.

4.5 Special and Advanced Techniques of Radiotherapy

Special techniques in radiation therapy - Total body irradiation (TBI) - large field dosimetry - total skin electron therapy (TSET) - electron arc treatment and dosimetry – intraoperative radiotherapy. Stereotactic radiosurgery/radiotherapy (SRS/SRT) - cone and mMLC based XKnife - Gamma Knife - immobilization devices for SRS/SRT - dosimetry and planning procedures - Evaluation of SRS/SRT treatment plans - QA protocols and procedures for X and Gamma Knife units - Patient specific QA. Physical, planning, clinical aspects and quality assurance of stereotactic body radiotherapy (SBRT) and Cyber Knife based therapy. Intensity modulated radiation therapy (IMRT) - principles - MLC based IMRT - step and shoot and sliding window techniques - Compensator based IMRT - planning process – inverse treatment planning - immobilization for IMRT - dose verification phantoms, dosimeters, protocols and procedures - machine and patient specific QA. Intensity Modulated Arc Therapy (IMAT e.g. Rapid Arc). Image Guided Radiotherapy (IGRT) - concept, imaging modality, kV cone beam CT (kVCT), MV cone beam CT (MVCT), image registration, plan adaptation, QA protocol and procedures - special phantom, 4DCT. Tomotherapy - principle - commissioning - imaging - planning and dosimetry - delivery - plan adaptation - QA protocol and procedures.

5. RADIATION SAFETY

5.1 Radiation Protection standards

Radiation dose to individuals from natural radioactivity in the environment and manmade sources. Basic concepts of radiation protection standards – Historical background - International Commission on Radiological Protection and its recommendations – The system of Radiological Protection – Justification of Practice, Optimisation of Protection

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and individual dose limits – Radiation and tissue weighting factors, equivalent dose, effective dose, committed equivalent dose, committed effective dose – Concepts of collective dose- Potential exposures, dose and dose constraints – System of protection for intervention - Categories of exposures – Occupational, Public and Medical Exposures - Permissible levels for neutron flux - Factors governing internal exposure

5.2 **Principles of Monitoring and Protection**

Evaluation of external radiation hazards - Effects of distance, time and shielding – Shielding calculations - Personnel and area monitoring - Internal radiation hazards – Radio toxicity of different radionuclides and the classification of laboratories – Control of contamination – Bioassay and air monitoring – chemical protection – Radiation accidents – disaster monitoring

5.3 **Safety in the Medical Uses of Radiation**

Planning of medical radiation installations – General considerations – Design of diagnostic x-ray, tele gamma and accelerator installations, brachytherapy facilities and medical radioisotope laboratories.

Evaluation of radiation hazards in medical diagnostic therapeutic installations – Radiation monitoring procedures - Protective measures to reduce radiation exposure to staff and patients - Radiation hazards in brachytherapy departments and teletherapy departments and radioisotope laboratories - Particle accelerators Protective equipment - Handling of patients - Waste disposal facilities - Radiation safety during source transfer operations Special safety features in accelerators, reactors. Protection during radioactive source loading.

5.4 **Applications of Radiation in industry, Agricultural and Research**

Radioisotope gauges - Tracer applications for radioisotopes in agriculture and industry- Gamma chamber -Radiation sterilization - Irradiation of food and drugs – Radiation protection in Industrial Radiographic Installations - Enclosed, open top, open field and skyshine. Tritium and C-14 monitoring – Monitoring of Spillage - Contamination and control.

5.5 **Radioactive Waste Disposal**

Radioactive wastes – sources of radioactive wastes - Classification of waste – Treatment techniques for solid, liquid and gaseous effluents – Permissible limits for disposal of waste - Sampling techniques for air, water and solids – Geological, hydrological and meteorological parameters – Ecological considerations. Disposal of radioactive wastes - General methods of disposal - Management of radioactive waste in medical, industrial, agricultural and research establishments.

5.6 **Transport of Radioisotopes**

Transportation of radioactive substances - Historical background - General packing requirements - Transport documents - Labeling and marking of packages – Regulations applicable for different modes of transport - Transport by post - Transport emergencies - Special requirements for transport of large radioactive sources and fissile materials - Exemptions from regulations – Shipment approval – Shipment under exclusive use – Transport under special arrangement – Consignor's and carrier's responsibilities

5.7 **Legislation**

Physical protection of sources - Safety and security of sources during storage, use, transport and disposal – Security provisions: administrative and technical – Security threat and graded approach in security provision

National legislation – Regulatory framework – Atomic Energy Act – Atomic Energy (Radiation Protection) Rules – Applicable Safety Codes, Standards, Guides and Manuals – Regulatory Control – Licensing, Inspection and Enforcement – Responsibilities of

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Employers, Licensees, Radiological Safety Officers and Radiation Workers – National inventories of radiation sources – Import, Export procedures

5.8 **Radiation Emergencies and their Medical Management**

Radiation accidents and emergencies in the use of radiation sources and equipment in industry and medicine - Radiographic cameras and teletherapy units - Loading and unloading of sources - Loss of radiation sources and their tracing - Typical accident cases. Radiation injuries, their treatment and medical management - Case histories.

6. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अप्थाल्मोलोजी समूह, अप्थाल्मोलोजी उपसमूह, अप्टोमेट्रिष्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व. २०७९/०८०

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Civil Service Hospital

निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अप्थाल्मोलोजी समूह, अप्थाल्मोलोजी उपसमूह, अप्टोमेट्रिष्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Basic Human Anatomy and Physiology**

Basic anatomy and physiology the following system:

- 1.1 Musculoskeletal system
- 1.2 GI system
- 1.3 Digestive system
- 1.4 Respiratory system
- 1.5 Nervous system
- 1.6 Cardiovascular system
- 1.7 Endocrine System
- 1.8 Reproductive system

2. **Ocular Anatomy and Physiology**

- 2.1 Embryology of eye (ocular)
- 2.2 Anatomy, physiology, nerve supply and vascular supply pertaining to :
  - 2.2.1 Formation of optic vesicle & optic stalk, formation of lens vesicle, formation of optic cup, changes in associated mesoderm, development of various structure of eye ball – retina, optic nerve, crystalline lens, cornea, sclera, choroid, cilliary body, iris, viterous. Development of accessory structures of eyeball – eyelids, lacrimal apparatus, extra-ocular muscles, orbit. Milestones in the development of the eye.
  - 2.2.2 Orbit: Bony orbit - Size, shape & relations, walls of the orbit, Base of the orbit, Apex of orbit. Orbital fascia - Fascial bulbi, Fascial sheaths of extraocular muscles, intermuscular septa. Spaces of orbit - Orbit fat & reticular tissue - Apertures at the base of orbit- Contents of the orbit – Orbital nerve - oculomotor , Trochler, Abducent, Trigeminal, facial nerves - their functional components, course & distribution, clinically applied aspects.
  - 2.2.3 Cornea - Layers & peculiarities, Blood supply & nerve supply of cornea. Structure of cornea. Corneal transparency & hydration, Regulation of corneal transparency & hydration. Corneal vascularization. Maurice theory & Goldman's theory
  - 2.2.4 Lens & Zonules - Structure of lens, capsule, Ant. Epithelium, lens fibers (structured & zonal arrangement); Ciliary zonules - structure gross appearance; Arrangement of zonules fibers. Lens: Introduction, function of lens. Lens transparency. Lens culture. Changes in ageing lens.
  - 2.2.5 Uveal Tract & its vascular supply - Iris macroscopic & microscopic appearance. ciliary body – Macroscopic structure. Chloride - Macroscopic structure. Blood supply to uveal structure- short & Long Posterior artery & Anterior Artery. Venous drainage. Uveal tissue: Uveal meshwork. Uveo-scleral drainage. Schlemm's canal switch.
  - 2.2.6 Vitreous - main masses of vitreous. Base of the vitreous. Hyaloidean vitreous. Vitreous cells. Aqueous humour: Formation of Aqueous humour. Drainage & circulation of Aqueous Humor. Rates of production & flow. Functions of Aqueous humour. Vitreous Humour: Composition & distribution of vitreous humour, Physiology & function of vitreous humour, Optical role of vitreous humour.

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2.2.7 Sclera – Anterior, posterior & middle apertures. Episclera. Sclera proper. Lamina fusca. Blood supply of the sclera. Nerve suply of the sclera.

2.2.8 Anterior chamber and its angle- angle of the anterior chamber. Trabecular meshwork. Canal of Schlemm. Schwalbe's line. Drainage of aqueous humor.

2.2.9 Retina & its vascular supply - Retinal structure-layers of retina. Rod & Cones. Organization and Function of retina. Microscopic structure of fovea centralize, Blood retinal barrier. Anatomy of optic nerve, optic chaisma optic tracts, Lateral Geneculate body, optic radicalism - visual cortex, Arrangement of nerve fibers. Physiology of optic nerve. Papilledema of optic nerve. Optic atrophy. Blood supply of visual pathways. Ocular Circulation: Vascular structure of the eye – ocular circulation, blood-ocular barrier (Blood-retinal, blood Vitreous & blood aqueous barrier). Regulation of ocular circulation. Geneculate cortex: Structure of geneculate cortex. Electrophysiologyc. Projection – retinal projection. Visual cortex & function of visual cortex.

2.3 Protective Mechanism of the eye – Blinking – muscles of lead closer & lid opening, Muller's muscle, blinking reflexes. Lacrimation – Lacrimal glands, Pre corneal tear film, Chemistry of lachrymal secretion tear film, Tear film dynamics (secretion of tear, formation of tear, retention & redistribution of tear, displacement phenomena, evaporation from tear film, drying & breakup of tear film, dynamic events during blinking, elimination of tear.)

2.4 The ocular motor system – Extra ocular muscles their function & nerve supply. Mechanics of actions of extra ocular muscles -cross sectional area of muscle, length of muscle. Arc of contact, muscle plane, Muscle axis of rotation. Physiology of ocular movement – Basic Kinematics (position of gaze, Fick's axes). Ocular Movement (monocular and Binocular). Supra nuclear control of eye movements. Ocular movements - Monocular Movements (Adduction, Abduction, supraduction, Infraduction, Incycloduction, excycloduction) and Binocular Movements –VERSIONS - (saccadic & pursuit movement, position maintenance movements, stabilization movements & their characteristics). VERGENCES – (Convergence,divergence, vertical vengeance), Intraocular pressure – Features of normal IOP, Factors influencing the IOP,Control of IOP,Measurement of IOP.

2.5 The pupillary & ciliary muscle - Anatomy of sphincter & Dilator muscle. Ciliary muscle – Anatomy, types.

2.6 The nerve supply of the eye ball.

2.7 The lachrymal appears - Lachrymal gland, Palpebral part, Duets of lachrymal gland, structure of the lachrymal gland, Blood supply & nerve supply of the lachrymal gland, lachrymal passages.

2.8 Anatomy of the Ocular Adnexa & glands; Structures of the lids; Skin, Subcutaneous Areolar Layer, Layer of Staiated muscle, Submuscular Areolar Tissue, Fibrous Layer, Conjunctiva.Glands of the Lids- Meibomaian Glands, Glands of Zela and Glands of Moll. Blood Supply of the Lids, Lymphatic Drainage of the Lids, Nerve Supply of the Lids.

2.9 Conjunctiva - Palpebral Conjunctiva, Bulbar Conjunctiva, Conjunctival Fornix, Microscopic Structure of the conjunctiva- Epithelium, Substantia Propria. Conjunctival Glands→ Krause's Glands, Wofring's Glands,

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2.10 Henley's Glands, Manz Glands. Blood Supply of the Conjunctiva, Nerve Supply of the Conjunctiva, Caruncle, Plica Semilunaris.

2.11 Pupil – Normal pupil, Physiological changes in pupil size – Isocoria, Pupillary unrest, Hippies. Pupillary reflex – Light reflex, Near reflex, Darkness reflex , Psycho sensory reflex, Lid closure reflex

3. **Visual Science**

3.1 Measurement of visual threshold. Principle and components of visual functions such as visual acuity, contrast sensitivity, light and dark adaptation, spatial vision, temporal vision, color vision. Eye movements- Entopic phenomenon, Circadian cycles in vision, Functional retinal physiology, Parallel processing

3.2 Striated cortical and extra-striated cortical functions related to processing of visual information, motion detection, signal detection, spatial and temporal perception, binocular space perception

3.3 Organization of all these receptive field structures and neural channeling.

3.4 Basic concept & metabolism of carbohydrate, protein & fat. Process of glycolysis, glycogenolysis, TCA cycle significance.

3.5 Vitamins - source, daily requirement, Metabolism, Functions, deficiency.

3.6 Basic outline of hormone action

3.7 Physical & Chemical Characteristics of hormone. Types of hormone. General mechanism of hormone action via Massenger system.

3.8 Cornea – Biochemical composition of cornea. Sources of Nutrients-Oxygen, Glucose, Amino acid. Metabolic pathway in cornea – Glycolysis, HMP shunt.

3.9 Tear film- Functions of Tear film. Different layers of Tear film. Chemical composition of tears. Tear film abnormalities. Tests for film Adequacy.

3.10 Lens – Biochemical composition of lens. Lens protein – their types & characteristics. Lens

3.11 Metabolism - Carbohydrate metabolism, protein metabolism. Cataract – Due to biochemical defects of lens. Antioxidant mechanism in the lens.

3.12 Biochemistry of the visual process - Photopigments – Rhodopsin & Iodopsin. Chemical nature of Rhodopsin. Visual cycle (Bleaching of Rhodopsin, Transducin cycle, Role of Phosphodiestareses).

3.13 Accommodation – Far point, near point, range & amplitude of Accommodation. Mechanism of accommodation – Increased tension theory, Relaxation theory, Role of lens capsule, Gullstrand mechanical model of accommodation. Stimulus for accommodation. Ocular changes in accommodation. Changes in accommodation with arc (Presbyopia). Nervous mechanism for accommodation

3.14 Color vision- Physiological, Photochemical & neurological basis of color vision. Electrophysiology of color vision. Granit's modulator and dominator theory, Purkinje phenomenon. Young-Helmholtz theory. Types of color defects. Color blindness. Neural analysis

3.15 Visual perception – Higher integrative activity, Binocular perception, stereoscopic depth perception. Neurophysiology of perception – Higher visual pathways (primary visual Pathway to cerebral center, Lateral Geniculate body, non-geniculate targets for retinofugal input, visual center). Neurophysiology of perception – Spatial analysis, Double pathway to higher visual centers.

3.16 Physiology of vision: Visual acuity – visual angle, components of Visual acuity, measurement of visual acuity. Contrast Sensitivity – Types, Neural Mechanism, Measurement of contrast sensitivity (Arden gratings, Cambridge low contest

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gratings, Pelli – Robson chart). Light & Dark adaptation – Dark adaptation curve, Mechanism of dark adaptation, Factors influencing dark adaptation, Time course of light adaptation, Mechanism of light adaptation, Rod vs. cone light adaptation. Parkinje shift of spectral sensitivity. Binocular vision – Grades of binocular vision (simultaneous, fusion & stereopsis), Advantages of binocular vision, visual direction & horopter, Binocular fusion, Dichoptic stimulation , Depth perception, Integration of motor & sensory system.

4. **Physiologic and Geometric Optics**

4.1 Physical optics includes properties of light such as Propagation, Reflection, Refraction, Interference, Diffraction, Polarization, Absorption and Scattering

4.2 LASER and Photometry along with its application in eye.

4.3 Geometrical Optics: Schematic and reduced eyes and their properties. Optical constants of the eye and their measurement. Purkinje images. Corneal curvature and thickness. Keratometry and pachometry. Indices of aqueous and vitreous.

4.4 Optical Defects of the Eye- Shape of Cornea, Shape & RI of the lens, Optical axis, Visual axis, Fixation axis, Aberration of the Optical system of eye, Depth of focus, Diffraction & resolving power.

4.5 Emmetropia and ametropia, Axial versus spherical ametropia, Myopia Hypermetropia (Hyperopial) Astigmatism.

4.6 Correction of ametropia

4.7 Correction of myopia- spectacle refraction (F) – ocular refraction (K) – Relationship between F and K. correction of hypermetropia- the effect of vertex distance change. Correction of ametropia with Thick lenses.

4.8 Ammetropia in the actual human eye. The growth of the human eye in emmetropia. Spherical ametropia in adult eye. Genetic aspects of refractive error. Progressive myopia. Juvenile stress myopia.

4.9 Accommodation - possible mechanism of accommodation- Schiener disc experiment- theories of accommodation- modern theory- changes in the lens during accommodation- the amplitude of accommodation- the measurement of the amplitude n of accommodation- depth of field, luminance and blur tolerance- amplitude of accommodation versus age.

4.10 Presbiopia-near vision addition- estimate of addition-unequal near vision addition- effect of changing the spectacle distance – hypermetropia and accommodation.

4.11 Aphakia. Reflective error in aphakia. The retinal image size in aphakia. Correction of aphkia by a contact lens. Use of an intracocular implant. Power of the implant and retinal image size. Clinical aspects of aphakia.

4.12 Astigmatism. - Oblique astigmatism. Astigmatism in the reduced eye. The retinal images of point and extended objects. Classification of astigmatism. Correction of astigmatism by sphero- cylindrical, toric and contact lenses.

4.13 Retinoscopy – principle and use. Clinical recording of standard of vision-visual acuity.

4.14 Subjective refractive methods. Problem of review of objective refractive methods Cross- cylindrical method of detecting astigmatism

4.15 Eye as an imaging instrument. Schematic eyes. Diffraction and the eye. Image formation in wave optics.

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4.16 Aberrations of the lens and cornea. Chromatic aberration of the eye. Optical performance of the eye. Total performance of the eye. Variation of visual performance with focus. Contrast sensivity of the eye.

Section (B): 50 % Marks

5. **Optical & Ophthalmic Instrumentation & Procedure**

5.1 Tonometer – Principles, types, clinical importance, application
5.2 Pachometer – Principles, types, clinical importance
5.3 Devices for color vision testing – CS testing / Glare testing.
5.4 Ultrasonography – Principles and application.
5.5 F.F.A – Principles and demonstration of film.
5.6 PAM – Principles and importance.
5.7 Perimeter – Basics of perimetry – Humphray instruments, Automated perimetry – basics, types, interpretation of normal Glaucoma Field of Definition.
5.8 LASER – Introduction – Different types of LASER - LASER safety, Ophthalmic LASER application
5.9 Specular & Confocal Microscopy
5.10 Focimeter or Lensometer.
5.11 Retinoscope.
5.12 Keratometer.
5.13 Binoculars, telescopes and projectors.
5.14 Simple and Compound Microscopes
5.15 Spectrometer.
5.16 Autorefractometer- subjective and objective types
5.17 Opthalmoscopes- direct and indirect types.
5.18 Refractometers- Auto refractors, Dioptron
5.19 Slit lamp Biomicroscope
5.20 Standard Test Charts
5.21 Trial case lenses-best forms.
5.22 Trial frame design.
5.23 Cross cylinder.
5.24 Orthoptic Instruments : Prism Bar, Synoptophore, Maddox Wing, Maddox Rod, Red Green Goggles, Hess Screen, Risley Prisms, RAF Gauge, Cover test, Hirschberg test, Krimsky test, Diplopia charting, Visuoscopy, Accommodative flipper
5.25 Electrodiagnostic tests – ERG, EOG, VER
5.26 BINOCULAR VISION TEST: Test for simultaneous macular perception, test for fusion, test for stereopsis-synoptophore or stereoscope test, vectograph test, titmus stereo test,randomdot sterogram test,simple motor task test based on stereopsis.

6. **General Pharmacology**

6.1 Nature & Sources of drug. Routes of drug administration (general & Ocular). Drug excretion & toxicity.
6.2 Pharmacokinetics of drugs - site of drug action, structure activity relationship. Drug receptor. Mechanism of action of a drug. Dose response relationship. Adverse drugs reactions (ADR), Manifestations of ADR. Factors influencing drug metabolism & drug action. Classification of drugs. Preparation and packaging of

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ophthalmic drugs. Drug action and effectiveness. Ocular penetration. Topical anesthetics

6.3 Ophthalmic Drugs – antibiotics, corticosteroids, anesthetics, viscoelastics agents. Antiglaucomic drugs.

7. **Ophthalmic Lens and Dispensing optics**

7.1 Lens optics, Lens design material

7.2 Ophthalmic lens: Characteristics of lenses. Power of lenses. Aberration of lens. Prism prescription. Prism effects in a lens. Neutralization.

7.3 Spectacle lenses: Characteristics of lens materials.

7.4 Measurement of various lens parameters and powers, Ophthalmic prisms, Lens power transposition and verifications, Various tinted and protective lenses, Latest ophthalmic lens and designs

7.5 Selection of lens and frames, Face and frame measurement, Spectacle and frame mounting, Spectacle fittings and principles, edging and frame adjustment, Special dispensing for different vocation.

7.6 Various anatomical and physiological aspects related to contact lens fittings

7.7 Ocular Prosthesis materials, design, manufacturing handling and fitting and care

7.8 Contact lens history & development. Benefits of contact lens over spectacle. Manufacturing methods-spin cast, Lethe cut, Cast modeling.

7.9 Slit lamp Examination technique

7.10 Corncal topography- Keratometry & Extended Keratometry

7.11 Contact lens optics - Contact lens & spectacle lens. Back vertex calculation. Contact lens & Tear lens system. Classification of contact lens & its material (soft & RGP); Material property. Contact lens terminology. RGP & soft lens design. FDA classification of contact lens material. Patient selection & prescreening. Indications & contra indications of contact lens. Soft spherical contact lens fitting & Assesment. Soft contact lens case & maintenance. Spherical RGP contact lens fitting & assessment. RGP contact lens care & maintenance.

7.12 Lens types: Single vision lens. Bi-focal lenses. Tri-focal lenses. Vocational & occupational multifocal progressive lenses. Opthalmic lens coating

7.13 Absorptive lenses: Classification of lens tints. Chemical that produces color & assist in absorptive characteristics of glass lenses. Effect in prescription on lens color. Availability of tinted lenses.

7.14 Impact resistant lenses: Types of impact resistant lenses.

7.15 Lens for special uses: Fresnel lenses. Thinlite lenses. Lenses for the Aphakic patient. Aspheric lenses.

7.16 Lens surfacing & quality. Principles of lens surface generation. Glass assessment. Faults in lens materials & lens surface. Inspection of lens quality.

7.17 Basics of dispensing: Spectacle frame, Frame types, Frame measurements, Segment specification, Frame Selection, Lens Selection, Facial Measurement, Measuring heights

7.18 Eye protection: Industrial eye protection, Sport, Standards covering eye protection, Lens materials & impact resistance. Frame & eye protection.

8. **Ocular Diseases**

8.1 The sign and symptoms, assessment and management of following ocular diseases : Unilateral or bilateral red eye, Gradual loss of vision, Sudden loss of vision, Swelling and pain in and around the eye, Dry eye and Ocular surface

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disorder, Night blindness, Leukocoria, Neuroophthalmic conditions, Abnormal pupillary reactions, Congenital disorders, Degenerative disorders, Dystrophies, Optometric management of headache, Phakomatosis and tumours.

8.2 Disease of the Lids – Congenital Deformities of the Lids. Oedema of the Lids. Inflammatory Conditions of the Lids. Deformities of the Lid Margins. Deranged Movement of the Eyelids.

8.3 Neoplasm's of the Lids. Injuries of the Lids.

8.4 Diseases of the Lachrymal Apparatus -.Dry Eye. Disease of the Lachrymal Gland. Disease of the Lachrymal Passages. Operations for Chronic Dacryocystitis.

8.5 Disease of the Conjunctiva- Subconjunctival Haemorrhage Infective Conjunctivitis. Follicular Conjunctivitis. Granulomatous Conjunctivitis. Allergic Conjunctivitis. Conjunctivitis Associated with Skin conditions. Degenerative conditions of the Conjunctiva. Vitamin- A Deficiency. Cysts and Tumours of the Conjunctiva. Conjunctival Pigmentation. Injuries of the Conjunctiva.

8.6 Disease of the Cornea – Congenital Anomalies. Inflammation of the Cornea (Keratitis). Superficial Keratitis. Deep Keratitis. Vascularisation of Cornea. Opacities of the Cornea. Keratoplasty. Corneal Degenerations. Corneal Dystrophy's. Corneal Pigmentation. Corneal Injuries. Refractive Corneal Surgery. Corneal Ulcer (Bacterial , Viral , Fungal)

8.7 Disease of the Sclera- Episcleritis. Scleritis. Staphyloma of the Sclera. Blue Sclerotic Scleromalacia Performs. Nanophthalmos. Injuries of the Sclera.

8.8 Disease of the Iris.-. Congenital Anomalies. Inflammations (Anterior Uveitis). Specific Types of Iriodocyclitis. Degenerations of the Iris. Cysts and Tumours of the Iris. Injuries of the Iris.

8.9 Disease of the Celery Body- Inflammations of the Celery Body. Purulent Iriodocyclitis (Panophthalmitis). Evisceration. Sympathetic Opthalmia. Vogt-Koyanagi – Harada Syndrome.

8.10 Tumours of the Celery body. Injuries of the Celery body.

8.11 Glaucoma- .Formation of Aqueous Humor. Drainage of Aqueous. Intraocular Pressure (IOP)

8.12 Ocular Rigidity.

8.13 Tonography. Developmental Glaucoma (Buphthalmos). Primary Narrow Angle Glaucoma. Primary Open Angle Glaucoma. Normotensive Glaucoma. Ocular Hypertension. Secondary Glaucoma. Surgical Procedures for Glaucoma, YOGPI, trabeculectomy. Laser Procedure in Glaucoma.

8.14 Artificial Drainage Devices in Glaucoma Surgery.

8.15 Disease of the Lens - Congenital Malformations. Cataract. Congenital and Developmental Cataract. Senile Cataract. Traumatic Cataract. Complicated Cataract. Secondary Cataract. After Cataract. Dislocation of the Lens. Surgical Procedures for Removal of the Lens.

8.16 Phacoemulsification (ICCE, ECCE, IOL). Small Incision Cataract Surgery. Intra-ocular Lens Implantation.

8.17 Diseases of the Vitreous Humor- Congenital Anomalies. Vitreous Opacities. Hereditary Vitreo – Retinal Degeneration's. Vitreous Haemorrhage. Detachment of Vitreous Humor. Vitreous Surgery.

8.18 Methods of clinically assessing the posterior segment (direct & indirect opthalmoscopy)

8.19 Disease of the Retina- Congenital & Dev. Defects. Inflammation of the Retina (Retinitis). Retinal Vasculitis. Oedema of the Retina. Haemorrhage of the Retina.

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Vascular Occlusion. Retinal Arteriosclerosis. Retinopathies. Retinal Telangiectasis. Degeneration's of the Retina. Detachment of the Retina. Surgical Procedures for Retinal Detachment. Tumours of the Retina. Phakomatoses. Injuries of the Retina.

8.20 Disease of the Optic Nerve - Congenital Anomalies. Papilloedema. Inflammation of the Optic Nerve (Optic-Neuritis). Ischaemic Optic Neuropathy. Optic Atrophy. Tumours of the Optic Nerve. Injuries of the Optic Nerve.

8.21 Symptomatic Disturbances of Visual Function – Visual Field Defects. Amblyopia. Amaurosis. Nigh Blindness. Day Blindness. Defects in Color Vision. Congenital Word Blindness. Malingering.

8.22 Neuro – eye disease: Evaluation of optic nerve disease. Clinical features of optic nerve dysfunction. Optic disc changes. Optic atrophy. Special investigation. Classification of optic neuritis. Optic neuritis and demyelination. Systemic features of multiple sclerosis, Special investigation. Parainfectious optic neuritis. Infectious optic neuritis.

8.23 Non-arteritic anterior ischaemic optic neuropathy. Arteritic anterior ischaemic optic neuropathy

8.24 Clinical features of giant cell arteritis. Special investigation. Arteritic anterior ischaemic optic neuropathy.

8.25 Leber hereditary optic neuropathy

8.26 Hereditary optic atrophies

8.27 Kjer syndrome. Behr syndrome. Wolfram syndrome.

8.28 Alcohol-tobacco amblyopia

9. **Clinical Ophthalmology**

9.1 Arterial Hypertension: Pathophysiology, classification, clinical examination, diagnosis, complications, management. Hypertension and the eye.

9.2 Diabetes mellitus: Pathophysiology, classification, clinical features, diagnosis, complications, management. Diabetes mellitus and the eye.

9.3 Acquired Heart Disease: Embolism - Rheumatic heart disease, Subacute bacterial endocarditis. Heart disease & the eye.

9.4 Malignancy: Definitions, nomenclature, characteristics of benign & malignant neoplasms. Grading and staging of cancer, diagnosis, principles of treatment. Neoplasia and the eye.

9.5 Connective Tissue Disease- Anatomy and pathophysiology: Arthritis. Eye and connective tissue disease.

9.6 Thyroid Disease: Anatomy and physiology of the thyroid gland. Classification of thyroid disease. Diagnosis, complications, clinical features, management of thyroid disease involving eye.

9.7 Tuberculosis: Etiology, pathology, clinical features, pulmonary TB, diagnosis, complications, treatment of tuberculosis involving the eye.

9.8 Tropical Disease and the Eye: Leprosy, Syphilis, Malaria.

9.9 Vitamin deficiency and the eye

9.10 Neurological disease and the eye: Classification of neurological diseases. Demyelinating diseases, Visual pathway lesions, Papiloedema.

9.11 Genetic disorders and the eye.

9.12 Phacomatoses & the eye.

9.13 Parasitic and Protozoal infestations of eye

9.14 Effects of High altitude on eye

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9.15 Ocular emergencies – Foreign body, Eye Pain, Watering, Injuries-perforating, non-perforating & chemical

10. **Low Vision and visual rehabilitation**
    - 10.1 Definition, disorders causing low vision and visual impairment
    - 10.2 Examination of low vision patients
    - 10.3 Assessment techniques
    - 10.4 Low vision magnification systems
    - 10.5 Devices, prescribing guidelines Optical and non-optical aids
    - 10.6 Psychological, behavioral and social counseling
    - 10.7 Visual rehabilitation and agencies working for blind and visual impairments.

11. **Pediatric Optometry and Binocular Vision**
    - 11.1 Visual Development, emmetropization and maturation of vision.
    - 11.2 Principles of eye movement, disorders, assessments and managements.
    - 11.3 Principles of muscle actions, field of vision and fixation.
    - 11.4 Principles of binocular single vision, various grades of binocular vision.
    - 11.5 Motor and sensory adaptation to various oculo-motor disorders, non-strabismic disorders, strabismic disorders, accommodative disorders, vergence disorders, amblyopia and nystagmus.
    - 11.6 Binocular optical defects - clinical investigatoin and treatment. Binocular muscular anomalies-heterophoria-the causes of imbalance, exophoria, esophoria, hyperphoria, cyclophoria, symptoms of heterophoria, treatment.
    - 11.7 Binocular muscular anomalis-heterotropia—the vision in concomitant strabismus, treatment.
    - 11.8 Binocular muscular co-ordination-convergence-voluntary and reflex convergence, reflex convergence, the measurement of convergence, the relation between accommodation and convergence, binocular accommodation, fatigue of convergence.

12. **Geriatric optometry and vision care**
    - 12.1 Anatomic, physiological and visual changes with age.
    - 12.2 Management of visual disorders in aging population and counseling.

13. **Community optometry**
    - 13.1 Definition, components, concepts, importance of community health diagnosis.
    - 13.2 Program related to elimination of eye and vision related problems.
    - 13.3 Nutritional deficiencies and its consequence in vision.

14. **Ethics in Optometry:** National eye health policies, Code of conducts of health systems and councils of Nepal. World Council of Optometry (WCO).

15. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फार्मेसी समूह, फार्मेसी उपसमूह, फर्मासिस्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व. २०७९/०८०

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फार्मेसी समूह, फार्मेसी उपसमूह, फर्मासिस्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Pharmaceutics**
   - 1.1 Introduction, scope and area of Pharmaceutics
   - 1.2 Pharmaceutical development and pharmaceutical institution in Nepal
   - 1.3 Introduction to pharmacopoeias and other compendia; pharmacopoeial standards and their needs; importance and application of pharmacopoeial specification
   - 1.4 Introduction to Good Manufacturing Practice, Good Laboratory Practice and Good Pherucercy Practice
   - 1.5 Quality Assurance and WHO guidelines and ISO 9000
   - 1.6 Prescription, proper handling of prescription, incompatibilities
   - 1.7 Pharmaceutical dosage form: Fast, Immediate, Sustained/controlled release including novel drug delivery system. e.g. mucosal drug delivery systems
   - 1.8 Pharmaceutical additives
   - 1.9 Physical pharmacy; application of thermodynamics; rate and order of reaction; accelerated stability testing and shelf-life of drugs; pH; buffered and isotonic solution; solution of electrolytes; micromeritics; colloidal system; theology
   - 1.10 Concept and studies of Bio-availability and Bioequivalence
   - 1.11 Alternative systems of medicine: Ayurveda, Homoeopathy and Unani

2. **Microbiology**
   - 2.1 Scope of microbiology with special reference to pharmaceutical sciences, basic principles of sterility and pyrogen testing, fundamental of Immunology, Testing of vaccines used in Extended Programme of Immunization
   - 2.2 Microbial contamination test in pharmaceuticals, food, water and environment; classification of pathogenic microorganisms
   - 2.3 Basic principles of Biotechnology
   - 2.4 Methodology of sterilization

3. **Pharmaceutical analysis**
   - 3.1 Fundamental titrametric analysis: acid-base, oxidation-reduction, non-aqueous, complexometric and potentiometric titrations
   - 3.2 Spectroscopic methods of analysis, Absorption, Visible, IR, UV spectroscopy, Fluorimetry, Polarimerty, Atomic absorption and Emission spectroscopy
   - 3.3 Gravimetric analytical methods and their applications
   - 3.4 Separation techniques: Column, Paper, Thin layer, Ion exchange, Gel and Gas chromatography; High Performance Liquid Chromatography, High Performance Thin Layer Chromatography, Electrophoreses
   - 3.5 Extraction procedures and role of partition coefficient
   - 3.6 Principles and application of microbiological assay of antibiotics and vitamins.
   - 3.7 Good Laboratory Practices, validation, references standards
   - 3.8 Statistical analysis, sampling technique and use of statistics

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फार्मेसी समूह, फार्मेसी उपसमूह, फर्मासिस्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Section (B): 50% Marks

4. **Pharmacognosy**
   - 4.1 Definition, history & scope of Pharmacognosy
   - 4.2 Medicinal herbs of Nepal: Origin, distribution, cultivation, drying, pulverization, storage, and quality control
   - 4.3 Plant analysis, types of plant constituents and physico-chemical standards
   - 4.4 Plant based drugs in modern medicine
   - 4.5 Extraction process and isolation of active ingredients, pilot plant processing

5. **Pharmacology**
   - 5.1 Mechanism and action of drugs, their safety, uses and mode of administration
   - 5.2 Pharmacokinetics, pharmacodynamics and pharmacological evaluation of drugs
   - 5.3 Poisoning: control and treatment
   - 5.4 Adverse drug reaction and drug interactions

6. **Medicinal Chemistry**
   - 6.1 Characterization of organic compounds of pharmaceutical interest and specific reactions
   - 6.2 Synthesis of important pharmaceuticals, their pharmacological action and anti-microbial activities

7. **Pharmaceutical Care & Drug Supply Management**
   - 7.1 Comprehensive knowledge of clinical and hospital pharmacy; patient counseling and dosage adjustment in elderly, impaired liver and kidney; use of drug in neonates, children, pregnancy and lactation
   - 7.2 Logistics management (selection, procurement, storage and distribution)
   - 7.3 Drug Financing Schemes (cost recovery, sharing and insurance)
   - 7.4 Concept of Essential Drugs, National Formulary, Hospital Formulary and Drug & Therapeutics Committee
   - 7.5 Standard Treatment Schedules and rational use of drugs
   - 7.6 Role of Pharmacist in hospital and community

8. **Chemotherapeutic agents -** MOA, indications, side effects, drug interaction

9. **Related Legislations**
   - 9.1 औषधि ऐन, २०३५
   - 9.2 औषधि दर्ता नियमावली, २०३८
   - 9.3 औषधि परामर्श परिषद् र औषधि सल्लाहकार समिति गठन नियमावली, २०३७
   - 9.4 औषधि जांचबूझ तथा निरीक्षण नियमावली, २०४०
   - 9.5 औषधि स्तर नियमावली, २०४३
   - 9.6 औषधि उत्पादन संहिता, २०४१
   - 9.7 लागु औषध (नियन्त्रण) ऐन, २०३३

10. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फिजियोथेरापि समूह, फिजियोथेरापि उपसमूह, फिजियोथेरापिष्ट पद, छैठौं तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१०प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फिजियोथेरापि समूह, फिजियोथेरापि उपसमूह, फिजियोथेरापिष्ट पद, छैठौं तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Applied Anatomy and Physiology**
   - 1.1 Applied Anatomy
     - 1.1.1 Regional (Muscles, Bones, Joints, Nerves, Blood vessels, Lymphatics)
       - 1.1.1.1 Upper limb
       - 1.1.1.2 Lower limb
       - 1.1.1.3 Head
       - 1.1.1.4 Neck
       - 1.1.1.5 Trunk
     - 1.1.2 Systemic
       - 1.1.2.1 Muscular
       - 1.1.2.2 Skeletal
       - 1.1.2.3 Nervous
       - 1.1.2.4 Cardio-vascular
       - 1.1.2.5 Respiratory
       - 1.1.2.6 Metabolic & Endocrine
       - 1.1.2.7 Excretory
       - 1.1.2.8 Reproductive
       - 1.1.2.9 Integumentary system
     - 1.1.3 Radiological
       - 1.1.3.1 Investigation
       - 1.1.3.2 Finding
     - 1.1.4 Surface Anatomy
   - 1.2 Physiology
     - 1.2.1 Physiology of the following systems:
       - 1.2.1.1 Muscular
       - 1.2.1.2 Skeletal
       - 1.2.1.3 Nervous
       - 1.2.1.4 Cardio-vascular
       - 1.2.1.5 Respiratory
       - 1.2.1.6 Metabolic & Endocrine
       - 1.2.1.7 Excretory
       - 1.2.1.8 Reproductive
       - 1.2.1.9 Integumentary system

2. **Pharmacology, Pathology, Microbiology, Biochemistry**
   - 2.1 Pharmacology
     - 1.2.2 Drug allergy
     - 1.2.3 Drug toxicity
     - 1.2.4 Methods of administration
     - 1.2.5 Hormones
     - 1.2.6 Vitamins
     - 1.2.7 Drugs acting on neuromuscular junction and muscles
     - 1.2.8 Drugs acting on cardio-respiratory system
     - 1.2.9 Drugs acting on CNS, PNS, ANS
     - 1.2.10 Chemotherapeutic agents

   - 2.2 Pathology

Civil Service Hospital

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2.2.1 Inflammation/ tissue repair/ cell repair
2.2.2 Infection/tumors-etiology spreads and types
2.2.3 Blood: Anemia, rheumatic and coronary heart diseases
2.2.4 Respiratory system: Pneumonia, asthma, bronchitis, bronchiectasis, emphysema
2.2.5 Bones and joints disease: auto immune disease, different arthritis, osteomyelitis
2.2.6 Skin: leprosy
2.2.7 Polio, myopathies, CNS infections and psoriasis

2.3 Microbiology
2.3.1 Sterilization
2.3.2 Bacteriology/virology
2.3.3 Immunity
2.3.4 Allergy and hypersensitivity

2.4 Biochemistry
2.4.1 Metabolism of carbohydrates, vitamins, fats, proteins

3. **Biomechanics and Kinesiology**
3.1 Basics principles of mechanics including Centre of gravity, line of gravity, force, Newton's law, friction, stability, equilibrium, levers etch
3.2 Biomechanics of spine, upper extremity and lower extremity
3.3 Biomechanics of posture and its deviations
3.4 Biomechanics of gait and its deviations

4. **Rehabilitation in Neurology:** (Clinical condition and different exercises regimes, therapeutic modalities and equipment's, prosthetics and orthotics used for the management of the condition)
4.1 Cerebral vascular accident
4.2 Acquired brain injury, spinal cord injury
4.3 Tumors
4.4 Degenerative neurological/neuromuscular disorder
4.5 Demyelinating disorders
4.6 Inflammatory/ infectious condition
4.7 Cerebellar/vestibular disorders
4.8 Neuropathies
4.9 Developmental/ birth injuries e.g. CP
4.10 Dementia and other cognitive disorder

5. **Rehabilitation in Musculoskeletal and Sports:** (Clinical condition and different exercises regimes, therapeutic modalities and equipments, prosthetics and orthotics used for the management of the condition)
5.1 Muscle contusion/strain/ ligament sprain/tear/weakness
5.2 Pelvic floor dysfunction
5.3 Tendinopathy, tendon tear/ rupture/ tendonosis
5.4 Joint derangement/dysfunction, fracture, dislocation, subluxation
5.5 Degenerative joint diseases, osteoporosis, osteopenia
5.6 Amputation
5.7 Congenital malformation

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5.8 Sports injuries
5.9 Mechanical spinal abnormalities
5.10 Inflammatory/infectious conditions
5.11 Nerve compression/ radiculopathy/ peripheral nerve injuries

Civil Service Hospital

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Section (B): 50 % Marks

6. **Rehabilitation in Cardio-respiratory:** (Clinical condition and different exercises regimes, therapeutic modalities and equipments, prosthetics and orthotics used for the management of the condition)
   - 6.1 Heart diseases, malformation, injury
   - 6.2 Myocardial ischemia, infarction, heart failure, cor-pulmonale
   - 6.3 Tumors
   - 6.4 Pneumonia, atelectasis, ARDS, asthma, COPD, pulmonary edema
   - 6.5 Arterial and venous diseases
   - 6.6 Pleural effusion, cystic fibrosis, tuberculosis

7. **Rehabilitation in Pediatrics:** (Clinical condition and different exercises regimes, therapeutic modalities and equipments, prosthetics and orthotics used for the management of the condition)
   - 7.1 Congenital and acquired musculoskeletal disorders
   - 7.2 Congenital and acquired neurological disorders
   - 7.3 Congenital and acquired cardio-pulmonary disorders
   - 7.4 Developmental disorder, learning disorders, burns, vitamins deficiency

8. **Rehabilitation in Gynecology:** (Clinical condition and different exercises regimes, therapeutic modalities and equipments, prosthetics and orthotics used for the management of the condition)
   - 8.1 Pregnancy, stages of labour, complications
   - 8.2 Gynecological disorders- salpingitis, parametritis, retro-uterus, prolapse of uterus, pelvic inflammatory diseases, urinary incontinence

9. **Rehabilitation in Geriatrics**
   (Clinical condition and different exercises regimes, therapeutic modalities and equipments, prosthetics and orthotics used for the management of the condition)
   - 9.1 Musculoskeletal disorder
   - 9.2 Cardiopulmonary disorder
   - 9.3 Neurological disorders
   - 9.4 Burns, nutritional disorders
   - 9.5 Dementia, depression

10. **Rehabilitation in Multisystem**
    (Clinical condition and different exercises regimes, therapeutic modalities and equipments, prosthetics and orthotics used for the management of the condition)
    - 10.1 HIV/AIDS, autoimmune disease, hemophilia
    - 10.2 Fibromyalgia, chronic pain
    - 10.3 Obesity, burns
    - 10.4 Wounds/ ulcers
    - 10.5 Skin condition like dermatitis, psoriasis

11. **Ethics, Management, Research, and Evidence based practice**
    - 11.1 Ethics
      - 11.1.1 Ethics and professionalism
      - 11.1.2 Standard of practice, competency
      - 11.1.3 Continuing Physical Therapy education, lifelong learning

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Civil Service Hospital

11.2 Management
- 11.2.1 People management, communication and team work
- 11.2.2 Development and implementation of policies and procedures
- 11.2.3 Budgets
- 11.2.4 Staffing and Record keeping
- 11.2.5 Job descriptions, roles and responsibilities
- 11.2.6 Performance evaluations and appraisals
- 11.2.7 Interviewing

11.3 Research
- 11.3.1 Introduction to research, research design
- 11.3.2 Questionnaires, surveys and sampling
- 11.3.3 Ethical issues in research, elements of informed consent
- 11.3.4 Structure of a research proposal
- 11.3.5 Reliability and validity
- 11.3.6 Research design and types of research
- 11.3.7 Errors in research, hypothesis testing

11.4 Evidence based practice

12. **Clinical Practice**
- 12.1 Data collection
- 12.2 Tests/measurements
- 12.3 Data interpretation
- 12.4 Prognosis
- 12.5 Goal setting and care planning
- 12.6 Implementation
- 12.7 Education/communication with patients and their family members
- 12.8 Intervention progression

13. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियोग्राफी उपसमूह, रेडियोग्राफी टेक्नोलोजिष्ट पद, छैठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१०प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **ANATOMY & PHYSIOLOGY**
   - 1.1 INTRODUCTION
     - 1.1.1 General anatomical terms
     - 1.1.2 Human cell structure and function
     - 1.1.3 The tissues
   - 1.2 MUSCULO-SKELETAL SYSTEM
     - 1.2.1 Formation, growth and development of bones
     - 1.2.2 Function of bone according to the size and shape of bone
     - 1.2.3 Classification of bone
     - 1.2.4 Classification of joints and their function
     - 1.2.5 Different groups of muscle responsible for joint movement
   - 1.3 NERVOUS SYSTEM
     - 1.3.1 Neuron and nerve cells
     - 1.3.2 Central nervous system and brain
     - 1.3.3 Parts of ventricles of the brain and their extent
     - 1.3.4 The cerebrospinal fluid
     - 1.3.5 Midbrain and brain stem
     - 1.3.6 Peripheral nervous system
     - 1.3.7 Autonomic nervous system
     - 1.3.8 Cranial nerves, spinal nerves
   - 1.4 CARDIO-VASCULAR SYSTEM
     - 1.4.1 Blood vessels- arteries, veins, and capillaries
     - 1.4.2 Different parts of heart and its function
     - 1.4.3 Cardiac cycle
     - 1.4.4 Systemic circulation
     - 1.4.5 Pulmonary circulation
     - 1.4.6 Coronary circulation
     - 1.4.7 Aorta
     - 1.4.8 Inferior venacava (IVC) & Superior venacava (SVC)
   - 1.5 THE LYMPHATIC SYSTEM
     - 1.5.1 Lymphatic System
     - 1.5.2 Lymph nodes
     - 1.5.3 Spleen
     - 1.5.4 Thymus gland
   - 1.6 THE RESPIRATORY SYSTEM
     - 1.6.1 Respiration, Alveolar respiration
     - 1.6.2 Lungs and Pleura
     - 1.6.3 Organs of the respiratory system, Respiratory passages (Nose, Pharynx, Larynx, Trachea, Bronchioles, Alveoli)
   - 1.7 THE DIGESTIVE SYSTEM
     - 1.7.1 Organs of the digestive system, Mouth, Pharynx, Esophagus, Stomach, Small intestine, large intestine, rectum and anal canal Salivary glands
     - 1.7.2 Function of alimentary tract
     - 1.7.3 Pancreas, Liver, biliary tract and their function
     - 1.7.4 Metabolism of Carbohydrates, Protein and fat
   - 1.8 THE URINARY SYSTEM

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Civil Service Hospital

1.8.1 Organs of urinary system: Kidneys, ureters, bladder, and urethra
1.8.2 Kidneys-position, gross structure, cortex, medulla pelvis
1.8.3 Functional unit of kidney: nephron, function of kidneys
1.8.4 Formation of urine, water-electrolyte balances in body
1.8.5 Ureters: Position structure and function
1.8.6 Micturation-reflex control
1.8.7 Structure and function of the urinary bladder and urethra
1.8.8 Supra-renal glands, prostate gland

1.9 THE REPRODUCTIVE SYSTEM
1.9.1 Female Reproductive System & Breast
1.9.1.1External genitalia, Uterus, Ovaries: Position, structure functions
1.9.1.2 Menstrual cycle, Reproduction& menopause
1.9.1.3 Breast-Position, structure and its functions
1.9.1.4 Puberty
1.9.2 Male Reproductive System:
1.9.2.1 Position structure and functions of scrotum, testes, epididymis, deferent ducts, seminal vesicles, ejaculatory ducts and penis
1.9.2.2 Puberty

1.10 SPECIAL SENSES
1.10.1 Skin- structure and function
1.10.2 The ear (external, middle & internal ear)-structure and function
1.10.3 The Eyes- structure & functions.
1.10.4 Nose- structure and functions
1.10.5 Tongue-structure, functions
1.10.6 Taste buds and Sense of taste

1.11 THE ENDOCRINE SYSTEM
1.11.1 Endocrine glands - pituitary gland, thyroid gland, parathyroid glands, adrenal gland, islets of langerhans, pineal gland, testis, ovaries, thymus
1.11.2 Endocrine glands - Position, structure, functions and hormone secretion

2. BASIC RADIATION PHYSICS

2.1 REVIEW OF ELECTRICITY
2.1.1 Electromagnetic induction and its laws
2.1.2 Self and mutual induction
2.1.3 A.C generator, Peak and effective values of AC
2.1.4 Concept of Reactance, Impedance & phase angle

2.2 TRANSFORMER
2.2.1 Theory, construction, Losses & Efficiency, Transformer ratings
2.2.2 Filament transformer
2.2.3 High-tension transformer
2.2.4 Autotransformer or variac transformer

2.3 THERMIONIC EMISSION AND RECTIFIERS
2.3.1 Diode - construction, principle & characteristics
2.3.2 Rectifiers: Self-rectification, Half-wave, Full-wave (two valves and four valves) and constant voltage rectifiers
2.3.3 The cold cathode gas filled diode and its use

2.4 ATOMIC STRUCTURE AND ELECTROMAGNETIC RADIATION
2.4.1 Electron, proton, neutron, mass number, and atomic number
2.4.2 Isotopes, isobars and isomers

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2.4.3 Electron shells & energy levels
2.4.4 Excitation and ionization
2.4.5 Emission of electromagnetic waves, spectra
2.4.6 Properties of electromagnetic waves
2.4.7 Concept of photon and quanta
2.4.8 Photoelectric effect, photocell

2.5 RADIOACTIVITY
2.5.1 Radioactive elements, radioactive disintegration
2.5.2 Properties of radioactive particles
2.5.3 Radioactive decay law, half-life, mean life
2.5.4 Artificial radioactivity: Radioactivity induced by neutron bombardment and proton bombardment
2.5.5 Nuclear binding energy, nuclear stability
2.5.6 Alpha, beta and gamma disintegration
2.5.7 Introduction to fission and fusion

2.6 X-RAYS
2.6.1 Historical background
2.6.2 X-ray tube
2.6.3 Mechanism of x-ray production
2.6.4 Properties of x-rays, intensity & quality of x-rays, continuous and characteristic spectra
2.6.5 Effects of variation of tube current and voltage, Brag's law for wavelength determination
2.6.6 X-ray control and indicating equipment: simple circuit diagram as illustration of sequence from mains supply to exposure control
2.6.7 Mains voltage circuit
2.6.8 Mains cables, Switches and fuses
2.6.9 Mains voltage compensation, earthing, insulation, voltage drops in cables
2.6.10 X-ray tube voltage control and indication
2.6.11 Exposure controls. Contactors and timers
2.6.12 X-ray tube current control and filament supply, mA compensation, Generator regulation

2.7 INTERACTION OF RADIATION WITH MATTER
2.7.1 Thompson scattering
2.7.2 Photoelectric interaction
2.7.3 Compton scattering
2.7.4 Pair production
2.7.5 Transmission of a homogenous and heterogeneous x-ray beam through matter
2.7.6 Effects of filtration
2.7.7 Relative amount of scatter from an x-ray beam during the passage through matter
2.7.8 Effects of collimation

2.8 RADIATION DETECTION AND MEASUREMENT
2.8.1 Principle of measurement
2.8.2 Ionization chamber, Electrometer
2.8.3 Scintillation counter
2.8.4 Gieger-muller counter
2.8.5 Thimble chamber
2.8.6 Condenser chamber

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2.9 RADIATION PROTECTION
- 2.9.1 Objective and principle of radiation protection
- 2.9.2 Radiation and Radiation units
- 2.9.3 Personnel monitoring
- 2.9.4 Protective materials
- 2.9.5 ICRP recommendations on dose limits

2.10 ULTRASOUND
- 2.10.1 Longitudinal waves
- 2.10.2 Principles of ultrasound, intensity, power and fields
- 2.10.3 Transmission of ultrasound
- 2.10.4 Velocity of ultrasound in different media
- 2.10.5 Ultrasonic interactions, absorption and scattering mechanism in tissue, refraction and reflection of ultrasound
- 2.10.6 Damping of ultrasound in media
- 2.10.7 Doppler effect

3. RADIOGRAPHIC TECHNIQUE

3.1 UPPER LIMB
- 3.1.1 Technique for whole hand, fingers, thumb, wrist joint, Radio ulnar joints
- 3.1.2 Supplementary technique: carpal tunnel, scaphoid, ulnar groove, head of radius
- 3.1.3 Supplementary views of elbow, humerus & Supra-condylar projection

3.2 SHOULDER GIRDLE AND THORAX
- 3.2.1 Technique for shoulder joint, acromio-clavicular joint, and scapula
- 3.2.2 Supplementary views: projection to show recurrent dislocation of shoulder, infero-superior projection of clavicle, sterno- clavicular joint, sternum, ribs

3.3 LOWER LIMB
- 3.3.1 Technique for whole foot, toes, great toe, calcaneum, talo-calcaneal joint, ankle joint, lower leg with ankle joint
- 3.3.2 Knee joint, patella, tibio-fibular joints
- 3.3.3 Supplementary technique for torn ligaments, flat feet, axial view of calcaneum, skyline view of patella, intercondylar notch view

3.4 VERTEBRAL COLUMN
- 3.4.1 Technique for cranio-vertebral joint, atlanto-occipital joint, first three cervical vertebra, odontoid peg view
- 3.4.2 Cervical spine for intervertebral joints and foramina, cervico thoracic vertebrae
- 3.4.3 Thoracic spine, thoraco-lumbar vertebrae
- 3.4.4 Lumber spine, intervertebral joints and foramina, lumbo-sacral joint, sacrum, coccyx
- 3.4.5 Supplementary techniques, to demonstrate scoliosis, kyphosis, spondylolisthesis

3.5 PELVIC GIRDLE AND HIP REGION
- 3.5.1 Technique for whole pelvis, ileum, ischium and pubic bones
- 3.5.2 Sacroiliac joints, symphysis pubis, hip joints, acetabulum, neck of femur
- 3.5.3 Supplementary projections: acetabulam view, judet view, Von-Rosen view and frog leg view for hip joint (CDH)

3.6 SKULL

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3.6.1 Routine views of Skull, Towne's view, SMV, Emergency Skull radiography
3.6.2 Technique for mastoids, styloid process, IAM
3.6.3 Routine views for facial bones, mandible, zygomatic arches, nasal bone, maxilla, temporo-mandibular joints
3.6.4 Optic foramina, macroradiography for optic foramina
3.6.5 Routine and special views for Paranasal sinuses

3.7 CHEST RADIOGRAPHY
3.7.1 Routine radiography of chest, High kV technique for Chest
3.7.2 Supplementary views: apicogram, lordotic and oblique views, lateral decubitus, diaphragmatic excursions double exposure technique

3.8 WARD AND OPERATION THEATRE RADIOGRAPHY
3.8.1 Knowledge of Electrical supply, radiation protection
3.8.2 Radiography of bed-ridden patients
3.8.3 Radiography in operation theatre

3.9 MAMMOGRAPHY
3.9.1 Soft tissue radiography
3.9.2 Principle and technique of mammography

3.10 MACRO-RADIOGRAPHY
3.10.1 Definition, principles and its applications
3.10.2 Magnification factors and uses of magnification radiography

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियोग्राफी उपसमूह, रेडियोग्राफी टेक्नोलोजिष्ट पद, छैठौं तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Section (B): 50 % Marks

4. **SPECIAL RADIOLOGICAL PROCEDURES**

4.1 FIRST AIDS AND EMERGENCY CARE

4.1.1 Introduction to Shock, emergency treatment, Cardio-Pulmonary resuscitation (CPR)

4.1.2 Introduction to Haemorrhage, primary management of haemorrhage

4.2 CONTRAST MEDIA

4.2.1 Introduction to contrast media

4.2.2 Definition, types and uses of contrast media

4.2.3 Properties of contrast media

4.2.4 Adverse effects of contrast media and their management

4.2.5 Emergency trolley setting

4.2.6 Life saving drugs and emergency trays

4.3 ALIMENTARY TRACT

4.3.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming & post procedure care for following investigations:

4.3.1.1 Barium swallow

4.3.1.2 Barium meal

4.3.1.3 Barium follow -through

4.3.1.4 Small bowel enema

4.3.1.5 Barium enema -single contrast, -double contrast

4.3.1.6 Loopogram

4.4 BILIARY TRACT

4.4.1 Definition, indications, contraindications, equipment required contrast media, preparation of the patient, technique / procedure, filming, post procedure care for following investigations:

4.4.1.1 Percutaneous transhepatic cholangiography (PTC)

4.4.1.2 Endoscopic retrograde cholangio-pancreatography (ERCP)

4.4.1.3 Per operative cholangiography (POC)

4.4.1.4 T-tube cholangiography

4.5 URINARY TRACT

4.5.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:

4.5.1.1 Intravenous urography (IVU), Modification of IVU and additional techniques

4.5.1.2 Percutaneous nephrostomy (PCN)

4.5.1.3 Retrograde pyelography (RGP)

4.5.1.4 Micturating cysto-urethrography

4.6 REPRODUCTIVE SYSTEM

4.6.1 Definition, indications, contraindications, equipment required contrast media, preparation of the patient, technique/procedure, filming, post procedure care for Hysterosalpingography

4.7 CARDIO-VASCULAR SYSTEM

4.7.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:

4.7.1.1 Carotid angiography

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4.7.1.2 Abdominal aortography
4.7.1.3 Portal venography
4.7.1.4 Peripheral and lower limb venography

4.8 MYELOGRAPHY
4.8.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:
4.8.1.1 Lumabr, Thoracic and Cervical Myelogrphy
4.8.1.2 Post Myelo-CT (CT Myelography)

4.9 ARTHROGRAPHY
4.9.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:
4.9.1.1 Knee Arthrography
4.9.1.2 Hip Arthrography

4.10 SINOGRAPHY
4.10.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique /procedure, filming, post procedure care for Sinography

4.11 SIALOGRAPHY
4.11.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:
4.11.1.1 Parotid sialography
4.11.1.2 Sub-mandibular sialography

4.12 DACRYOCYSTOGRAPHY
4.12.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for Dacryocystography.

5. EQUIPMENT FOR DIAGNOSTIC RADIOLOGY

5.1 X-RAY TUBES
5.1.1 Overview of production of x-rays, Historical background
5.1.2 Components of an x-ray tube: Cathode assembly, Anode assembly
5.1.3 Stationary and rotating anodes
5.1.4 Line focus principle, anode heel effect, Off-focus radiation
5.1.5 Glass envelope, tube shielding, care of x-ray tubes
5.1.6 X-ray tube faults
5.1.7 Modification and recent advances in x-ray tube

5.2 RADIOGRAPHIC COUCHES, STANDS AND TUBE SUPPORTS
5.2.1 X-ray tube supports
5.2.2 Radiographic couches
5.2.3 Chest stands and vertical bucky
5.2.4 Modern basic radiographic units

5.3 EXPOSURE TIMERS
5.3.1 Clockwork timer, synchronous motor and impulse timers
5.3.2 Electronic timers
5.3.3 Autotimers (photoelectric timer and ionization chamber timer)

5.4 BEAM CENTERING & BEAM LIMITING DEVICES

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- 5.4.1 Cones and cylinders, Aperture diaphragms
- 5.4.2 Light beam diaphragms, Positive beam limitation

5.5 PORTABLE AND MOBILE RADIOGRAPHIC EQUIPMENTS
- 5.5.1 Main features of portable and mobile equipment
- 5.5.2 Mains dependent mobile equipment
- 5.5.3 Capacitor discharge equipment
- 5.5.4 Battery powered generators

5.6 CONTROL OF SCATTERED RADIATION
- 5.6.1 Significance of scattered radiation
- 5.6.2 Reduction in the amount of scatter radiation produced (field size, use of appropriate exposure factors, compression band)
- 5.6.3 Reduction in the amount of scatter radiation reaching to the film (metal backing of cassettes, filters, air-gap technique, cones and diaphragms, Grids)
- 5.6.4 Grid: construction, function, grid characteristics, grid types and patterns. Grid movement
- 5.6.5 Reduction in the effect of scatter (use of intensifying screens)

5.7 FLUOROSCOPIC EQUIPMENT
- 5.7.1 Conventional fluoroscopy
- 5.7.2 Mobile and specialised fluoroscopic units
- 5.7.3 Image intensified fluoroscopy
- 5.7.4 Image intensifier- construction and working principle
- 5.7.5 TV camera and TV monitor
- 5.7.6 Digital fluoroscopy

5.8 EQUIPMENT FOR DENTAL RADIOGRAPHY
- 5.8.1 A simple dental radiographic unit, Orthopantomography (OPG)

5.9 VASCULAR IMAGING EQUIPMENT
- 5.9.1 Generators and x-ray tubes
- 5.9.2 C-Arm/U-Arm assembly
- 5.9.3 Angiographic tables
- 5.9.4 Automatic pressure injectors
- 5.9.5 Digital subtraction Angiography

5.10 MAMMOGRAPHIC EQUIPMENT
- 5.10.1 Mammography x-ray tube
- 5.10.2 Image receptors in mammography
- 5.10.3 Apparatus for magnification radiography in mammography
- 5.10.4 Digital mammography/ Digital Breast tomosynthesis

5.11 DIGITAL IMAGING
- 5.11.1 Introduction to digital imaging concepts and advantages of image digitization
- 5.11.2 Digital image structure
- 5.11.3 Digital radiography: Scanned projection radiography (SPR), Computed radiography (CR), Direct digital radiography (DR)

5.12 COMPUTED TOMOGRAPHY (CT)
- 5.12.1 Basic principles of CT
- 5.12.2 Generations of CT/ MDCT/Newer advances in CT
- 5.12.3 System components
- 5.12.4 Image characteristics & Image quality in CT
- 5.12.5 Artifacts in CT.

5.13 MAGNETIC RESONANCE IMAGING (MRI)

Civil Service Hospital

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5.13.1 Fundamental concepts: magnetic moments, precession, resonance, nuclear magnetic resonance (NMR)
5.13.2 Introduction to MR Scanners: imaging magnets, RF transmitter and receiver coils, shim coils and gradient coils
5.13.3 Principal parameters of MRI: spin density, T1 relaxation time, T2 relaxation time
5.13.4 Basic principles of MR imaging and related parameters
5.13.5 Spin echo pulse sequence
5.13.6 Gradient echo pulse sequence
5.13.7 Artifacts in MRI
5.13.8 Advances in MR technology.

5.14 CT AND MRI TECHNIQUE
5.14.1 Technique for Brain
5.14.2 Technique for Head, Chest, Abdomen and other body parts
5.14.3 Technique for CTA and MRA
5.14.4 Technique for Spine and Joint

6. RADIOGRAPHIC PHOTOGRAPHY

6.1 PHOTOGRAPHIC PRINCIPLE
6.1.1 Photographic effect
6.1.2 Photosensitive materials
6.1.3 Photographic emulsion
6.1.4 Characteristic curve
6.1.5 Spectral sensitivity
6.1.6 Direct exposure film (x-ray sensitive)
6.1.7 Gurney-Mott theory of latent image formation

6.2 FILM MATERIALS
6.2.1 Construction of x-ray film
6.2.2 Film for medical imaging
6.2.3 Comparison between single coated and double coated x-ray films

6.3 FILM STORAGE
6.3.1 Different storage areas
6.3.2 Ideal storage condition
6.3.3 Stock control and film ordering methods

6.4 INTENSIFYING SCREENS
6.4.1 Luminescence: fluorescence and phosphorescence
6.4.2 Construction of Intensifying screen and their types
6.4.3 Types of phosphors: calcium tungsten, rare earth and their comparison
6.4.4 Detective Quantum efficiency (DQE)
6.4.5 Quantum mottle
6.4.6 Care, monitoring and cleaning of IF screen
6.4.7 X-ray film cassettes
6.4.8 Cassette function, construction, materials used, types and care of cassettes

6.5 RADIOGRAPHIC PROCESSING
6.5.1 Manual and Automatic processing
6.5.2 Processing cycles
6.5.3 Processing chemical
6.5.4 Care and maintenance of automatic processors
6.5.5 The principle of dry silver imager

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6.5.6 Silver recovery
6.5.7 Daylight processing

6.6 DESIGN AND CONSTRUCTION OF DARKROOM
6.6.1 The layout of an ideal darkroom
6.6.2 Darkroom location, size, radiation protection, floor, walls / ceiling, ventilation and heating, entrance, white lighting and safe light and its test, film hoppers loading bench and wet bench

6.7 THE RADIOGRAPHIC IMAGE
6.7.1 Radiographic image quality
6.7.2 Factors affecting radiographic image quality
6.7.3 Image artifacts

6.8 IDENTIFICATION AND VIEWING OF RADIOGRAPHS
6.8.1 Methods of film

6.9 Quality assurance in radiography

7. **General knowledge about Civil Service Hospital and its Bylaws**

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निजामती कर्मचारी अस्पताल

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व. २०७९/०८०

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निजामती कर्मचारी अस्पताल

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Paper I and II: Technical subject
Section (A): 50 % Marks

1. **Anatomy and Physiology**
   - 1.1 Cell and Tissues (Epithelial, Connective, Skeletal, Muscular and Nervous)
   - 1.2 General pathology : Bacteria, Viruses, Tumours
   - 1.3 Surface and regional anatomy
     - 1.3.1 Anatomical position
     - 1.3.2 Head, Neck, Thorax, Abdomen and Pelvic cavity
   - 1.4 Skeleton System
     - 1.4.1 Structure and function of bones
     - 1.4.2 Development and growth of bones, and healing of fractures
     - 1.4.3 Skull
       - 1.4.3.1 The skull viewed from the above and the below
       - 1.4.3.2 The skull viewed from the side and the front
       - 1.4.3.3 The interior of the skullcap
       - 1.4.3.4 The interior of the base of the skull
       - 1.4.3.5 The nasal cavity
       - 1.4.3.6 The accessory nasal sinuses
       - 1.4.3.7 The individual bones of the skull
     - 1.4.4 Vertebral column, ribs and sternum
     - 1.4.5 Bones of the upper limbs
       - 1.4.5.1 clavicle, scapula, humerus, radius, ulna, carpal bones, metacarpal bones, phalanges
       - 1.4.5.2 Arteries and nerves related to the bones of the upper limb
       - 1.4.5.3 Ossification of the bones of the upper limb
     - 1.4.6 Bones of the lower limbs
       - 1.4.6.1 Hipbone, pelvis, femur, patella, tibia, fibula, tarsal bones, metarsal bones, phalanges
       - 1.4.6.2 The arches of the foot
       - 1.4.6.3 Arteries and nerves related to the bone of the lower limb
       - 1.4.6.4 Ossification of the bones of the lower limb
     - 1.4.7 Types of joints
     - 1.4.8 Muscles and joints of the head, neck and trunk, upper limbs and lower limbs
   - 1.5 Circulatory System
     - 1.5.1 Blood and blood vessels
     - 1.5.2 Heart
     - 1.5.3 Pulmonary circulation
     - 1.5.4 Systemic circulation
     - 1.5.5 Veins
   - 1.6 Lymphatic System
     - 1.6.1 Lymph and lymphatic vessels
     - 1.6.2 Lymph nodes
     - 1.6.3 Lymphatic drainage of the body
     - 1.6.4 Lymphatic tissue
     - 1.6.5 Spleen
   - 1.7 Respiratory System
     - 1.7.1 Nose, pharynx, larynx, trachea, bronchi, lungs
     - 1.7.2 Physiology of respiration

Civil Service Hospital

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1.8 Digestive System
- 1.8.1 Mouth, salivary glands, pharynx, oesphagus, stomach, small intestine, large intestine, pancreas, liver, biliary apparatus
- 1.8.2 Function of the alimentary system

1.9 Urinary System
- 1.9.1 Kidneys, ureters, urinary bladder, urethra
- 1.9.2 Functions of kidneys
- 1.9.3 Control of micturition

1.10 Nervous System
- 1.10.1 Nervous tissue
- 1.10.2 Central nervous system, brain and spinal cord
- 1.10.3 Peripheral nervous system
- 1.10.4 Autonomic nervous system

1.11 Reproductive System
- 1.11.1 Female Reproductive System & Breast
  - 1.11.1.1 External genitalia, Uterus, Ovaries: Position, structure functions
  - 1.11.1.2 Menstrual cycle, Reproduction & menopause
  - 1.11.1.3 Breast-Position, structure and its functions
  - 1.11.1.4 Puberty
- 1.11.2 Male Reproductive System:
  - 1.11.2.1 Position structure and functions of scrotum, testes, epididymis, deferent ducts, seminal vesicles, ejaculatory ducts and penis
  - 1.11.2.2 Puberty

1.12 Special Senses
- 1.12.1 Skin- structure and function
- 1.12.2 Ear (external, middle & internal ear)-structure and function
- 1.12.3 Eye- structure and functions
- 1.12.4 Nose- structure and functions
- 1.12.5 Tongue-structure, functions,
- 1.12.6 Taste buds and Sense of taste

1.13 Endocrine System
- 1.13.1 Endocrine glands - pituitary gland, thyroid gland, parathyroid glands, adrenal gland, islets of langerhans, pineal gland, testis, ovaries, thymus etc.
- 1.13.2 Endocrine glands - Position, structure, functions and hormone secretion

2. **Radiation Physics**

2.1 **Atomic structure**
- 2.1.1 General introduction
- 2.1.2 Electron shells & energy levels
- 2.1.3 Mass number, atomic number, atomic mass unit, binding energy
- 2.1.4 Properties of electromagnetic waves
- 2.1.5 Concept of photon and quanta
- 2.1.6 Nuclear fission and fusion

2.2 **Radioactivity**
- 2.2.1 Radioactive elements
- 2.2.2 Radioactive series, different types of radioactive disintegration
- 2.2.3 Properties of radioactive particles
- 2.2.4 Radioactive decay law

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2.2.5 Alpha, beta and gamma disintegration

2.3 **X-rays and Gamma rays**
- 2.3.1 Historical background of x-rays
- 2.3.2 Mechanism and production of x-rays
- 2.3.3 Properties of x-rays
- 2.3.4 Continuous and characteristic spectra
- 2.3.5 Gamma rays and its properties

2.4 **Basic interactions between x-rays and matter**
- 2.4.1 Coherent scattering
- 2.4.2 Photoelectric effect
- 2.4.3 Compton scattering
- 2.4.4 Pair production
- 2.4.5 Photodisintegration

2.5 **Radiation detection and measurement**
- 2.5.1 Principle of measurement
- 2.5.2 Construction and working of the free air ionization chamber
- 2.5.3 Thimble ionization chamber
- 2.5.4 Condenser ionization chamber
- 2.5.5 Scintillation counter
- 2.5.6 Gieger-muller counter

2.6 **Clinical Dosimetry**
- 2.6.1 Radiation absorbed dose
- 2.6.2 Relationship between Kerma, Exposure and absorbed dose
- 2.6.3 Cavity theory
- 2.6.4 Measurement of absorbed dose
- 2.6.5 Phantom
- 2.6.6 Dose calibration parameters
- 2.6.7 Depth dose distribution
  - 2.6.7.1 Percentage depth dose
  - 2.6.7.2 Tissue-air ratio
  - 2.6.7.3 Tissue maximum ratio

2.7 **Review of Electricity**
- 2.7.1 Electromagnetic induction and its laws
- 2.7.2 Self and mutual induction,
- 2.7.3 A.C generator, Peak and effective values of AC
- 2.7.4 Concept of Reactance, Impedance & phase angle

2.8 **Transformer**
- 2.8.1 Theory, construction, Losses & Efficiency, Transformer ratings
- 2.8.2 Filament transformer
- 2.8.3 High-tension transformer
- 2.8.4 Autotransformer or variac transformer

2.9 **Thermionic emission and rectifiers**

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2.9.1 Diode - construction, principle & characteristics
2.9.2 Rectifiers: Self-rectification, Half-wave, Full-wave (two valves and four valves) and constant voltage rectifiers
2.9.3 The cold cathode gas filled diode and its use

3. **Clinical Oncology**
   3.1 Tumors
      3.1.1 Tumor definition
      3.1.2 Benign tumors and malignant tumors
      3.1.3 Spread of tumors
   3.2 Clinical Presentation
      3.2.1 Symptoms and signs
      3.2.2 Diagnostic procedure
         3.2.2.1 Hemogram
         3.2.2.2 Biochemical
         3.2.2.3 Tumor marker
         3.2.2.4 Radiological- X-ray, U.S.G., C.T, M.R.I
         3.2.2.5 Pathological – FNAC, FNAB, Incision biopsy, excision biopsy
         3.2.2.6 Surgery
   3.3 Staging
      3.3.1 TNM Classification
   3.4 Malignancies and Treatment
      3.4.1 CNS tumours
      3.4.2 Ca-Larynx
      3.4.3 Ca-Tongue, Head and Neck cancers
      3.4.4 Ca-Breast
      3.4.5 Ca-Lung
      3.4.6 Ca-Cervix and Gynecological malignancies
      3.4.7 Ca-Oesophagus
      3.4.8 Bone and soft tissue cancers, thyroid

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Section (B): 50% Marks

4. **Radiotherapy Technique**
   - 4.1 Principle of Radiotherapy
     - 4.1.1 Tumor histology
     - 4.1.2 Grade, sensitivity,
     - 4.1.3 Anatomical site, critical organs
     - 4.1.4 General condition of the patient, extent of tumor, previous treatments
     - 4.1.5 Radical/Palliative and prophylaxis
   - 4.2 Types and Methods of Radiotherapy
     - 4.2.1 Tele-therapy Technique
     - 4.2.2 Brachytherapy Technique
   - 4.3 Radiotherapy Resources
     - 4.3.1 Low energy beams
     - 4.3.2 High energy beams
     - 4.3.3 Electron beams
   - 4.4 Treatment Planning
     - 4.4.1 Tumor localization and verification
     - 4.4.2 Isodose Curves
     - 4.4.3 Single field, parallel opposed field, multiple field
     - 4.4.4 Rotation therapy
     - 4.4.5 Beam Modification

5. **Radiotherapy Equipment and Quality Assurance**
   - 5.1 Teletherapy Equipments
     - 5.1.1 Superficial and orthovoltage equipment
     - 5.1.2 Cobalt-60 tele therapy equipment
     - 5.1.3 Linear accelerator
     - 5.1.4 Simulator
     - 5.1.5 Brachytherapy equipment
       - 5.1.5.1 Low dose rate (LDR)
       - 5.1.5.2 Medium dose rate (MDR)
       - 5.1.5.3 High dose rate (HDR)
     - 5.1.6 Tomotherapy
   - 5.2 Quality Control
     - 5.2.1 Cobalt-60
     - 5.2.2 Linear Accelerator
     - 5.2.3 Brachytherapy
     - 5.2.4 Simulator
   - 5.3 Radiation Protection
     - 5.3.1 Concept of radiation protection
     - 5.3.2 Justification, Optimization and Limitation
     - 5.3.3 Units, Maximum Permissible Dose
     - 5.3.4 Personnel monitoring
     - 5.3.5 Protective materials

6. **Radiographic equipment**
   - 6.1 Historical background of x-ray and its production
     - 6.1.1 5.5.1 X-ray tube construction
     - 6.1.2 Stationary and rotating x-ray tube

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6.1.3 Recent advancement of an x-ray tube
6.1.4 Tube rating cooling and care of x-ray tube and its faults
6.1.5 USG
6.1.6 CT
6.1.7 MRI

6.2 Control panel, x-ray table and tube column
6.2.1 Type of x-ray table
6.2.2 Different metering equipment
6.2.3 X-ray tube support

6.3 Fluoroscopic equipment
6.3.1 Conventional fluoroscopy, image intensifier tube and Digital fluoroscopy

6.4 Control of scatter radiation & beam restricting devices
6.4.1 Secondary radiation grids
6.4.2 Air gap technique

6.5 Portable and mobile x-ray units
6.5.1 Capacitor discharge and c-arm

6.6 Computed and Direct Digital Radiography

6.7 Introduction to modern modalities (CT, MRI, mammography)

7. **Radiation Biology**

7.1 Cell cycle

7.2 Effect of radiation on the normal cell, tissue and organs

7.3 Radiation sensitivity

7.4 Physical and biological factors affecting radiation sensitivity
7.4.1 LET
7.4.2 RBE
7.4.3 OER

7.5 Cell survival curves

7.6 4Rs of radiobiology

7.7 Radiation hazard and radiation protection

8. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, सिस्टर पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **<u>परीक्षा योजना (Examination Scheme)</u>**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

<u>द्रष्टव्य</u> :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, सिस्टर पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Fundamentals of Nursing**
   - 1.1 Basic needs of clients
   - 1.2 The nursing process
   - 1.3 Common nursing procedures used in the hospital
   - 1.4 Stress and coping mechanism
   - 1.5 First aid treatment
   - 1.6 Administration of drugs
   - 1.7 Infection prevention
   - 1.8 Methods of collecting different specimen for routine and culture test

2. **Applied Science**
   - 2.1 Anatomy and Physiology of all body systems and organs
   - 2.2 Body mechanisms, Friction, Gravity, Newton's Law, Force, Transfer of heat, Fluid and electrolyte, Osmosis, Diffusion, Acid base balance, Rehydration therapy
   - 2.3 Common investigation and its significance
   - 2.4 Microbiology
   - 2.5 Infection diseases
   - 2.6 Common drugs, its action and side effects

3. **Medical/Surgical Nursing**
   - 3.1 Developmental tasks, Application of nursing process, Common diagnostic procedures
   - 3.2 Nursing management of common disease conditions including pre and post operative care. Accidents, Injuries, Head Injuries, Spinal cord injury, Meningitis, Encephalitis, Tetanus, Epilepsy, Bronchitis, Asthma, Pulmonary TB, Pleurisy, Common Cold, Rhinitis, Atelectasis, Peptic Ulcer, Intestinal Obstruction, Appendicitis, Peritonitis, Cirrhosis of liver, Haemorrhoids, Cholecystitis, Hepatitis, Hernias, Hydrocele, Bladder stones, Pyelonephritis, Urinary Tract Infection (UTI), Renal stone, Acute and Chronic Renal failure, Uremia
   - 3.3 Congestive Heart Failure (CHF), Angina, Cardiac Arrest, Anaemia, Leukaemia, Myocardial infarction, Gangrene, Diabetes mellitus, Diabetes incipides, Hypertension, Fracture, Dislocation, Osteomylitis
   - 3.4 Care of patient with common sensory disorders and nursing management

4. **Community Health Nursing**
   - 4.1 Concepts of primary health care
   - 4.2 Epidemiological concepts and approaches
   - 4.3 Nutrition, deficiency diseases and management
   - 4.4 Immunization
   - 4.5 Communicable diseases and management
   - 4.6 Health Indicators
   - 4.7 Family planning

Section (B): 50 % marks

5. **Midwifery**
   - 5.1 Anatomy and Physiology of male and female reproductive systems
   - 5.2 Antenatal, natal and post natal care of a mother

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5.3 Management of high risk mothers
5.4 Management of minor and major disorders of pregnancy
5.5 Diseases associated with pregnancy
5.6 Care of new born baby with observation and assessment
5.7 Breast care and management

6. **Nursing Care of Gynaecological Problems**
6.1 Disorder of Uterine Bleeding
6.2 Cystocele and Rectocele
6.3 Uterine Prolaps
6.4 Vesico Vaginal Fistula
6.5 STD/HIV/AIDS
6.6 Infertility

7. **Pediatric Nursing**
7.1 Major developmental characteristics and milestones
7.2 Promoting optimum development of children
7.3 Adolescent changes and problems
7.4 Six major killer diseases
7.5 Common health problems in children and their nursing management
7.6 Common health hazards in children in Nepal and their prevention
7.7 Congenital disorders/disabilities
7.8 Role of nurses in reduction of mortality rate of children
7.9 Nursing care of critically ill children

8. **Mental Health**
8.1 Management of clients with mental disorders
8.2 Characteristics of mentally ill patient
8.3 Classification of mental disorders

9. **Leadership and Management in Nursing Planning**
9.1 Management process: Supervision, motivation, implementation and evaluation
9.2 Leadership style
9.3 Organizational structure of Government health services
9.4 National health planning and concept of national health system
9.5 Policies, rules and regulations in management of different level of hospitals and health centres
9.6 Communication Process.

10. **Computer Skills**
10.1 Introduction to computer
10.2 Input, output and memory devices
10.3 Internet and information resources
10.4 Networking concepts

11. **General knowledge about Civil Service Hospital and its Bylaws**

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अटोरिनोल्यारिङ्गोलोजी समूह, अटोरिनोल्यारिङ्गोलोजी उपसमूह, अडियोलोजिष्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अटोरिनोल्यारिङ्गोलोजी समूह, अटोरिनोल्यारिङ्गोलोजी उपसमूह, अडियोलोजिष्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

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प्राविधिक सेवा, अटोरिनोल्यारिङ्गोलोजी समूह, अटोरिनोल्यारिङ्गोलोजी उपसमूह, अडियोलोजिष्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

1. **Introduction to Audiology**
   - 1.1 Origin of Audiology, its growth & development.
   - 1.2 History, growth & development of Audiology in Nepal.
   - 1.3 Scope of Audiology and branches of audiology
   - 1.4 Acoustics of sound, Sound measurements, dB concept and binaural hearing, Psychoacoustic principles, methods & applications. Tuning fork test, Hearing loss-causes, types, classification, degree, pattern of hearing loss, neo-natal screening, need of early identification, Development of auditory system, auditory behaviors at different age, High risk register, Genetics & Associated syndromes related to hearing and balance.
   - 1.5 Define frequency and intensity. Physical and Psychophysical scales, Equal loudness contours, Frequency weighting curves, combined sources, Pitch and Timbre. Fourier analysis of complex tones.
   - 1.6 Power and pressure formulae: zero dB reference for pressure and power.
   - 1.7 Relationship between phones and sones.
   - 1.8 Use of phone and sone.
   - 1.9 Use of phone and sonograph.
   - 1.10 Theories of hearing.
   - 1.11 The effects of Head Shadow and Pinna Shadow.
   - 1.12 Special role of hearing in visual impaired.
   - 1.13 Curve for threshold of hearing MAP and MAF.
   - 1.14 Concept of masking, Factors affecting Hearing Evaluation, Formal and Informal Testing, Use of different stimuli in Hearing test, Types of Audiograms.

2. **Introduction to Speech & Language Pathology**
   - 2.1 Normal speech language development, Neuro-anatomy related to speech and language, Theories and models of language acquisition.
   - 2.2 Articulation & Phonology: Normal development, Models of phonological development.
   - 2.3 Articulation & Phonological disorder- assessment procedures & management approaches.
   - 2.4 Cleft lip & palate and glossectomy: Definition, etiology, clinical features, assessment and management approaches.
   - 2.5 Voice disorders and Laryngectomy: Definition, etiology, clinical features, differential diagnosis, assessment and management approaches.
   - 2.6 Fluency disorder: Definition, normal development, theories of fluency development, differential diagnosis of fluency disorders, assessment and management in adult and children.
   - 2.7 Adult motor speech disorders: Dysarthria and Apraxia- Definition, etiology, clinical features, differential diagnosis, assessment and management approaches.
   - 2.8 Childhood Motor Speech Disorders: Cerebral Palsy, Dysarthria, Apraxia, DOS-Definition, etiology, classification, clinical features, assessment and management approaches.
   - 2.9 Normal swallowing & Dysphagia.
   - 2.10 Childhood Communication Disorder: Definitions, etiology, classification and characteristics of communication disorders in children with Hearing

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Impairment, Intellectual disability, Autism Spectrum Disorder, ADD and ADHD, SLI and LLD, Learning disability, Acquired Childhood Aphasia, Multiple impairments.

2.11 Aphasia: Definition, etiology, classification. Other Neuro-communication disorders: Definition, causes, types/classification, Assessment and Treatment-RHD, Dementia, Primary Progressive Aphasia, Sub-cortical Aphasia, TBI.

2.12 Communication, Language and Speech Intervention: General intervention approaches and principles. Specific intervention techniques, AAC, Role of parents, caregivers and family and team approach. Counseling- meaning, scope, principles, types in context of speech & language impairments

2.13 Epidemiology & Prevention of Speech, Language & Hearing Disorders.

2.14 Code of Ethics, Legislative support for rehabilitation- prepare policy, disability act. Empower parents, person with disabilities and community, Vocational training. Strategies for awareness, public education and information.

3. **Basic Medical Sciences Related To Speech & Hearing**

3.1 General Anatomy and physiology: Neuron, synapse, reflex action, bioelectrical phenomena, action potential, depolarization, nerve fibers and synapses. Division and functions of the nervous system. Normal anatomy of the brain, its divisions, general lobes, Broadmann's areas and vascular supply of brain. Reticular formations, basal ganglia, cerebellum, circle of Willis, spinal cord and its structure. Blood brain barrier. Cerebrospinal fluid – formation & flow. Reflex action and common reflexes. Congenital cerebral and cranial defects. Capillaries, arteries, veins, cardiac cycle, and aneurysm. Vascular shock – its reference to aphasia / speech disorders. Bones of the skull; parts of a temporal bone. Properties of muscles. Muscles of the neck, face and tongue.

3.2 Anatomy & physiology of respiratory system: Mechanism of respiration – internal and external influence, nervous control – vital capacit – tidal volume, residual air, efficiency tests of respiration, artificial respiration. Types of breathing. Explain hypoxia, asphyxia and cyanosis.

3.3 Embryology: The development of branchial arches and pouches and their derivatives. The development of face and its developmental anomalies. The development of palate and correlate with cleft lip and cleft palate. The development of tongue and thyroid gland and correlate with developmental anomalies. The development of external ear, middle ear and inner ear and correlate with developmental anomalies.

3.4 Endocrinology: Define hormone and their functions; regulation of secretion of hormone and its influence in voice disorder. Hormonal controls and changes at puberty. Hypothyroidism and its effect on voice.

3.5 General Pathology, Genetics & immunology: Define inflammation, infection, and tumor – benign & malignant, tissue healing. Normal structure of chromosome and define karyotyping. Structural and numerical aberrations of chromosome. Significance of medical genetic, its importance in diagnosis and management of Speech & Hearing disorders. General outline of immunology related with speech and hearing.

4. **ENT: Anatomy, Physiology and Diseases**

4.1 **Ear:** Otology - Anatomy & physiology of external, middle & inner ear. Ascending and descending auditory pathways, vestibular pathway. Mechanism

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of hearing: peripheral and central. Functions of utricle, saccule and vestibular apparatus in relation to posture and equilibrium. Tests for posture and equilibrium. Diseases of the external, middle and inner ear leading to hearing loss: congenital malformations, traumatic lesions, infections, neoplasm, Keratosis obturans, foreign bodies, wax, etc. diseases of the middle ear – different types of otitis media namely acute otitis media, otitis media with effusion and its sequelae, chronic otitis media & complications, otosclerosis, neoplasms, eustachian tube disorders and their management. Diseases of the inner ear such as labyrinthitis, Meniere's disease, prebyacusis, ototoxicity, and noise induced hearing loss, sudden SNHL, BPPV, vestibular neuronitis, differential diagnosis of vertigo and their management. Other causes of hearing loss – tumors of the cerebello- pontine angle, vestibular schwannoma. Causes and management of tinnitus. Pseudohypoacusis, ANSD, CAPD, Tinnitus, Vestibular, Assessment & Management.

4.2 **Nose:** Rhinology- Anatomy & physiology nose, paranasal sinuses. Congenital diseases of nose – cleft lip, cleft palate, choanal atresia. rhinolalia, rhinosinusitis, deviated nasal septum, sinonasal polyposis.

4.3 **Oral cavity & Pharynx:** Anatomy & physiology of oral cavity, oropharynx, nasopharynx, laryngopharynx. Disorders of oral cavity, nasopharynx, oropharynx, and laryngopharynx and their effect to causes of speech disorders. Diseases of the tonsils and adenoids. Normal structure and function of esophagus mechanism of swallowing. Esophageal conditions: Gastroesophageal reflux disorder, congenital abnormality – atresia, Tracheo-oesophageal fistula, Stenosis, short oesophagus. The muscles of palate in terms of their origin, insertion, actions, blood supply and innervations.

4.4 **Larynx:** Laryngology- Anatomy & physiology of larynx, muscles of larynx in relation to their attachments, actions and innervations; mention the blood supply of larynx. Structure and function of vocal cords and physiology of phonation. Difference between an infant and an adult larynx disorders of laryngeal structure – laryngomalacia, laryngeal web, subglottic stenosis, posterior laryngeal cleft, tumors and cysts. Laryngitis: acute laryngitis, acute laryngotracheobronchitis, acute epiglottitis, laryngotracheal diphtheria, specific laryngitis. Causes, management of chronic laryngitis. Identify Vocal cord polyps, Reinke's Edema, Vocal nodules. Neuromuscular dysfunctions of the larynx – vocal cord palsy, spastic dysphonia. Differential diagnosis of hoarseness. laryngectomy, oesophageal speech, tracheo oesophageal puncture, artificial larynx.

Section (B): 50 % Marks

5. **Basic Acoustics and Electronics**

5.1 Basic Acoustics: Vibrating systems (Simple Complex vibrations, Vibration spectra); Waves and Resonance of a mass-spring vibrator; Sound Pressure, Power and Loudness, Pitch, Timbre and Acoustics of Rooms.

5.2 Basics of electricity and Electronics - concept of DC (direct current) and AC (alternating current), voltage, electrical energy and power. Safety and precautions from electric hazards, grounding concept.

5.3 Basic electronic device and its applications – Diode and its applications-rectification, switching, Varycap, LED, Photodiode, photocell. Power supply-Block diagram, circuit diagram, working principle. Transistor (BJT) and its

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application-Amplification, Oscillation, Switching, Logic function. FET and MOSFET and its application and advantages. Power Electronic devices- DIAC, TRIAC explanation and application. Microelectronics-Analog and digital integrated circuits, microprocessor, microcomputers, microprocessors, micro-controllers

5.4 Microphones as transducers - Definition, basic characteristics of Microphone; basic characteristics and application of Moving Coil Microphone-schematic diagram and working principle; basic characteristics and application of Condenser Microphone-schematic diagram and working principle; other types of microphones and its application-crystal microphone, magnetic microphone, ribbon microphone, electrets microphone

5.5 Loudspeakers as transducers - Dynamic loudspeaker (cone type) -Schematic diagram, working principle, characteristics, applications; Horn speaker-principle, applications; Baffles and enclosures and its applications; Multi-speaker systems-2 and 3 Way speaker network; Loudspeaker efficiency, quality

5.6 Recording and Reproduction of sound - concept of Audio Gramophone recording; Audio Magnetic Recording concept, recording block diagram, working principle and characteristics; Audio optical recording-compact disc, block diagram, working principle and characteristics; Audio digital recording-ADC (analog to digital sound conversion), DAC(digital to analog sound conversion), RAM memory; Sound compression and formats-MPEG-1, MPEG-3, DVD; stereophonic sound, multi-dimensional sound, HI-FI sound characteristics and HIFI sound reproduction systems, dynamic sound; Noise and distortion in sound recording and reduction methods- Dolby Amplifier and Hearing aid; Basic single and multistage stage amplifiers: simple circuit, coupling, decoupling function, amplification power, distortion, noise; Basic power amplifiers and its types: simple circuits and characteristics

5.7 Hearing aids and earphones: simple circuit, working principle, basic factors of designing hearing aid; analog and digital Multi-meter, Audio generator, Function Generator, Frequency counter meter, Oscilloscope (Demonstration and handling); Sound Level Meter, Spectrum Analyzer, Distortion Analyzer, Level Recorder; Sound analyzing soft-wares, voice recognizing techniques, digital signal processing (DSP)

5.8 Noise in the environment: types and sources. Effects of Noise

5.9 Noise - Induced Hearing Loss (NIHL) Acoustic Trauma: Incidence/prevalence, Audiological and Otological characteristics.

5.10 Instruments: Sound Level Meter (SLM) - types, parts and functions - Digital, Nondigital, portable, system settings for different types of measurements. Transducers, Noise Dose Meters, Analyzers, recorders, read-out devices. Purpose, utility and requirements.

5.11 Instrumentation and procedure for indoor and outdoor measurements of ambient noise, traffic noise, air-craft noise, community noise, and industrial noise.

5.12 Ear Protective Devices (EPDs): Properties of EPDs: Attenuation, Comfort, And Durability. Evaluation of attenuation characteristics of EPDs. Implementation for effective use of EPDs.

6. **Linguistics, Human Communication, Speech-Language Development and Disorders**

6.1 Linguistics : Introduction, branches and scope

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6.2 Language : Nature, properties and functions of language
6.3 Communication : Nature and types
6.4 Phonetics and phonology, phone, phoneme and allophone.
6.5 Branches of phonetics and fundamentals of acoustic phonetics.
6.6 Speech production process: Initiation, phonation, articulation.
6.7 Classify speech sounds: Segmentals and suprasegmentals.
6.8 Interdependency and interrelation between communication, speech & language.
6.9 Distribution of sounds and principles of phonemic analysis with reference to Nepalese languages. Distinctive features and its application in articulatory disorders.
6.10 Syllables: Structure and types. Role of syllables in defining vowels, consonants, dipthongs and semivowels. Define morphology, morph, morpheme and allomorph. Morphological analysis: inflection and derivation.
6.11 Word and its types, Processes of word formation.
6.12 Semantics, Syntax and Pragmatics
6.13 History and development of the profession of Speech- Language Pathology (SLP) specifically in Nepal, neighboring countries and abroad.
6.14 Mechanism of speech and language production
6.15 Different models of Speech production.
6.16 Developmental stages of speech and language.
6.17 Definition, etiology, characteristics, classification and impact of: Hearing Impairment, Mental Retardation, Cerebral palsy, Seizure disorders and assessment procedures, differential diagnosis and management in brief.
6.18 Definition, etiology, characteristics and classification of: Autism Spectrum Disorders/ Pervasive Developmental Disorders. Attention Deficit Disorder/ Attention Deficit Hyperactivity Disorder. Assessment procedures, differential diagnosis and management.
6.19 Definition, etiology, characteristics, classification and impact of: Specific language Impairment, Learning Disability, Acquired aphasias in childhood, Traumatic Brain Injury in childhood. Assessment procedures, differential diagnosis and management.

7. **Diagnostic Audiology and Hearing Techonolgies/Aids**

7.1 Audiological test battery: Administering & Interpreting - Pure-tone air and bone conduction testing, Play audiometry, Speech audiometry, Electrophysiological test, Vestibular test, Site of lesion test, Tests for Functional Hearing Loss.
7.2 Speech audiometry tests: Speech Awareness Threshold (SAT), Speech Recognition Threshold (SRT), Speech. Identification Score (SIS), Most Comfortable Level (MCL), Uncomfortable Level (UCL) and Dynamic Range (DR). Materials for each of these tests. Role of Masking for SRT and SIS. Role of Speech Audiometry in differential diagnosis. Merits and demerits of Speech Audiometry.
7.3 Historical perspectives and usefulness of Difference Limen Tests, Bekesy Audiometry, Short Increment Sensitivity Index (SISI), Loudness Balance Tests - ABLB, MLB, Tone Decay Test, STAT.
7.4 Automatic Audiometry
7.5 Terminology and principle of Immittance Audiometry and Instrumentation.
7.6 Tympanometry – multi frequency and multi component.
7.7 Pseudo-hypoacusis: Terminologies, incidence and causes of Pseudohypoacusis

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7.8 Historical development of hearing aids/ technologies: Non-electrical hearing aids, Electric hearing aids.
7.9 Hearing aid components and their function: Microphone, Amplifier, Receiver, Digital Circuits, Tone Controls and Filters, Telecoils, Bone Conductors, Batteries
7.10 Types of hearing aids: Body level, ear level (BTE, ITE, ITC, CIC, IIC), Spectacle (AC/BC); importance of Monaural Vs Binaural Vs Pseudobinaural. Use and importance of Directional hearing aids, modular hearing aids
7.11 Extended low frequency amplification, frequency transposition, amplification devices and systems
7.12 Concept regarding Routing of signals, head shadow/baffle/diffraction effects.
7.13 Signal enhancing technology
7.14 Electro-acoustic Characteristics & measurements for hearing aids
7.15 Standard measurement procedures & specifications of electro-acoustic characteristics of hearing aids according to ISI, IEC and ANSI
7.16 Digital hearing aids, Master hearing aids.
7.17 Hearing Aid selection
7.18 Hearing aids, Implantable Devices and Assistive Devices - Classification/Types, Electro-acoustic Measurement, Selection/candidacy, Programming, Ear-mold.

8. **Paediatric Audiology**
8.1 Development of the auditory system in children and auditory behavior at different stages.
8.2 Behavioral Observation Audiometry (BOA): Conditioning Techniques including CORA, VRA and its modifications, TROCA, Play audiometry.
8.3 Speech Audiometry in Children. Speech Recognition Tests including VASC, WIPI; NuChip, Glendonald Auditory Screening Procedure (GASP), Early Speech Perception Test (EST), Speech tests developed in Nepal and other countries. Electrophysiological Tests. Evoked Response Audiometry

9. **Psychology related to Speech and Hearing**
9.1 Role of clinical psychology in speech and hearing disorders.
9.2 Concept of normality and abnormality, models of mental disorders, biological, psychological, social models.
9.3 Stages of Emotional and Social development of a child

10. **Aural Rehabilitation**
10.1 Need / goals, approaches in aural rehabilitation, effect of hearing loss, integration and educational placement.
10.2 Auditory training & its method, speech reading.
10.3 Classroom amplification devices, adults & geriatrics rehabilitation, home training and counseling-meaning, scope, principles, types in context of hearing impairment.

11. **Audiological setup:** sound treated room, equipment used, Calibration, repair and maintenance, international standards for audiometric setup, instrument and testing.

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12. **Legislations related to noise**
    - 12.1 DRC - Definition: historical aspects; Use of TTS and PTS: Information in establishing DRC, CHABA; AFR 160-3 AAOO, ASAZ. Damage Risk Contours Walsh - Healy Act. OSHA, DRC for impulse noise.
    - 12.2 Claims for hearing loss: Fletcher point eight formula; 1947, AMA method; AAOO AMA formula, California variation of AAOO formula.

13. **Research Methodology and Biostatistics**
    - 13.1 Introduction about Biostatistics, variables, data, population sample, parameter statistics, scales of measurement. Data collection, Classification & Presentation of data.
    - 13.2 Descriptive statistics: Statistics of location, Mean Median Mode, Geometric mean, Range, Statistics of Dispersion, Mean Deviation, Standard Deviation, Coefficient of Variation. Correlation & Regression.
    - 13.3 Basic concepts of research designs.
    - 13.4 Sampling Statistics: Sampling & Sampling Distribution, Sampling Errors & sampling statistics, Standard errors, Degree of freedom, Types of Sampling. Probability Distribution
    - 13.5 Experimental Design: Controlled and uncontrolled experiment, Sampling types, Sample size & pilot experiment, Single factor experiment & Factorial experiment-example, Analysis of variance (ANOVA).
    - 13.6 Applications: Collection, presentation and analysis of hospital statistical data with examples.
    - 13.7 Proposal writing and report writing.

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, मेडिकल ल्याब टेक्नोलोजी उपसमूह, ल्याब टेक्नोलोजिष्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, मेडिकल ल्याब टेक्नोलोजी उपसमूह, ल्याब टेक्नोलोजिष्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

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प्राविधिक सेवा, प्याथोलोजी समूह, मेडिकल ल्याब टेक्नोलोजी उपसमूह, ल्याब टेक्नोलोजिष्ट पद, छैठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 %

1. **Haematology**
   - 1.1 Cleaning of glasswares and safety precaution in the laboratory
   - 1.2 Collection and preservation of different samples for the laboratory
   - 1.3 Preparation of chemicals and different stains for the Hematological tests
   - 1.4 Quality control in the laboratory
   - 1.5 Formation and development of erythrocytes, leucocytes, thrombocytes
   - 1.6 Principle and clinical procedure for:
     - 1.6.1 Hemoglobin estimation and it's standard curve calibration
     - 1.6.2 Total count of W.B.C., R.B.C., Platelets and reticulocytes
     - 1.6.3 E.S.R., B.T., C.T., and RBC indices
     - 1.6.4 Coomb's tests
     - 1.6.5 Blood banking & Transfusion
     - 1.6.6 Coagulation profile (mechanism, disorder & investigations)
     - 1.6.7 LE cell preparation
     - 1.6.8 Tissue parasite
     - 1.6.9 Absolutes cell count
     - 1.6.10 The composition and function of blood
     - 1.6.11 Classification of leukemia
   - 1.7 Identify different types of leukemia and their morphological features

2. **Microbiology**
   - 2.1 Bacteriology
     - 2.1.1 Classification of medically important bacteria
     - 2.1.2 Characteristics of Microorganism: Prokaryotes, Eukaryotes, Viruses
     - 2.1.3 Different methods of sterilization and disinfections
     - 2.1.4 Preparation of different media and ingredients uses and interpretation
     - 2.1.5 Preparation of chemicals and stains
     - 2.1.6 Cultural procedure of different samples aerobically
     - 2.1.7 Identification of bacteria and confirmative tests serologically and biochemically
     - 2.1.8 Different staining methods of bacteria and their principles
     - 2.1.9 T.B. Bacteriology and skin scraping for A.F.B
     - 2.1.10 Quality control in Bacteriology Laboratory
     - 2.1.11 The universal precaution in microbiology laboratory and safe west disposal of infected materials
   - 2.2 Virology
     - 2.2.1 General properties of virus comparing with bacteria, terminology used in virology and basic laboratory procedure used in the diagnosis of viral disease
     - 2.2.2 Principle of viral isolation, embryonated egg and tissue culture
     - 2.2.3 Immunology of viral infection
   - 2.3 Parasitology
     - 2.3.1 Classification of human and vectors
     - 2.3.2 General characteristics of Protozoa, Helminthes, trematodes/ cestodes
     - 2.3.3 Methods of collection, transportation and storage of different types of specimens

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2.3.4 Methods of identification parasites from different types of clinical materials

2.4 Mycology

2.4.1 Terminologies used in mycology sample collection for fungal infection (skin scarping, nails and hair) and method of wet preparation

2.4.2 Examination and identification by different method and culture

2.5 Immunology

2.5.1 Immune system and infectious diseases

2.5.2 Structure, types and function of Immunoglobulin

2.5.3 Toxin/ antitoxin and antibody/antigen reaction; and their various types

2.5.4 Principle and procedure for the estimation of:

2.5.4.1 V.D.R.L., (RPR)
2.5.4.2 A.S.O.
2.5.4.3 C.R.P.
2.5.4.4 Rheumatoid factor
2.5.4.5 Blood Grouping
2.5.4.6 Cancer Marker
2.5.4.7 Agglutination Reaction
2.5.4.8 Precipation Reaction
2.5.4.9 Flocculation Reaction
2.5.4.10 ELISA
2.5.4.11 Haemagglutination Reaction

Section (B): 50% Marks

3. **Biochemistry**

3.1 Molecular weight and equivalent weight

3.2 Preparation of normal and molar solution

3.3 Colorimeter/spectrophotometer

3.4 Principle and procedure of different methods for the estimation of biochemical tests

3.4.1 Sugar, Urea, Cratinine, Uric Acid, Billirubin, GPT, GOT, ALP, Lipid profile, Cardic profile,Renal function test, Liver Function Test, Cleareance study, Amylase & Electrolytes

3.4.2 Cavity fluids examination

3.4.3 C.S.F. examination

3.4.4 24 hours Urine Protein

3.5 Simple theory of lights waves, function of filters Beers and Lamberts law, absorbance and percent transmission

3.6 Tumor Marker

3.6.1 Estimation and interpretation of AFP, B-hCG, CEA, CA-125, CA 19-9, CA 15-3, PSA

3.7 Management of Biochemistry Laboratory

4. **Histology/Cytology**

4.1 Different types of fixatives and their uses

4.2 Methods of decalcification

4.3 Methods of processing of tissues to prepare paraffin block tissue

4.4 Methods of cutting section from the paraffin block tissue and staining Procedure

4.5 Principle and application of immunohistochemistry

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4.6 Immnunoflourscence technique
4.7 Electron Microscopic and its applications
4.8 Safety measures and quality assurance in Histopatholaboratory
4.9 Uses of Cytogenetics, Flowcytometry, and Polarized microscopy in cytological study

5. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रम योजनालाई निम्नानुसारका दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता पूर्णाङ्क :– ३०

परीक्षा योजना (Examination Scheme)

१. प्रथम चरण : लिखित परीक्षा (Written Examination) **पूर्णाङ्क :- २००**

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्नसंख्या X अङ्क	समय
प्रथम	संस्थागत ज्ञान र समसामयिक विषय	१००	४०	वस्तुगत बहुवैकल्पिक प्रश्न (MCQ)	२५ प्रश्न X २ अङ्क	२ घण्टा
				विषयगत	१० प्रश्न X ५ अङ्क	
द्वितीय	सेवा सम्बन्धी	१००	४०	विषयगत	१२ प्रश्न X ५अङ्क ४ प्रश्न X १० अङ्क	३ घण्टा

२. द्वितीय चरण : अन्तर्वार्ता (Interview) **पूर्णाङ्क :- ३०**

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो पाठ्यक्रमको योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई भागमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

४. लिखित परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र/विषयमा दिईए अनुसार हुनेछ ।

५. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

६. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A,B,C,D मा लेख्नुपर्नेछ । सानो अक्षर (Small letter) a,b,c,d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

७. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :- आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्रशासन सेवा, प्रशासन समूह, सामान्य प्रशासन उपसमूह, प्रशासकीय अधिकृत पद, छैठौं तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

प्रथम पत्रः– संस्थागत ज्ञान र समसामयिक विषय

१. संस्थागत ज्ञान

१.१ निजामती कर्मचारी अस्पतालको स्थापनाको उद्देश्य, विकासक्रम, काम कर्तव्य र अधिकार

१.२ अस्पतालको विद्यमान अवस्था, चुनौती, समस्या, सुधारका उपाय र भावी दिनमा गर्नुपर्ने कार्यहरु

१.३ अस्पतालको सम्बन्धित मन्त्रालय र विभिन्न गैरसरकारी संस्थासँगको अन्तर सम्बन्ध

१.४ अस्पतालको प्रशासन बाट सम्पादन हुने कार्यहरु, केन्द्रमा रहेका विभाग, इकाइ, युनिट र तिनको प्रशासनसँग सम्बन्ध

१.५ अस्पतालकासुरक्षा र सम्पति संरक्षणका लागि गरिएका प्रवन्ध

१.६ अस्पतालको संचालनको कोषको अवस्था र आर्थिक कार्यभार

१.७ अस्पतालको सामाजिक सेवा इकाइबाट सम्पादित कार्यहरु

१.८ अस्पतालमा मानव स्रोत व्यवस्थापनको अवस्था र भावी रणनीति

१.९ अस्पतालकमा सरसफाई व्यवस्थापनका सम्बन्धमा गरिएका प्रवन्ध

१.१० अस्पतालको लेखा, लेखा परीक्षण र बेरुजूको अवस्था

१.११ अस्पतालको सार्वजनिक सेवा प्रवाहको अवस्था, सार्वजनिक सुनुवाई, नागरिक वडापत्र, गुनाशो व्यवस्थापन, हेल्थ डेस्क सम्बन्धी जानकारी

१.१२ अस्पतालमा विद्युतीय शासनको उपयोग र भावी रणनीति

१.१३ निजामती कर्मचारी अस्पतालको विनियमावली सम्बन्धी जानकारी

१.१४ भम्रण खर्च नियमावली, २०६४

१.१५ सार्वजनिक खरिद ऐन, २०६३ : विधि र खरिद प्रक्रिया

१.१६ चालु आवधिक योजना : उद्देश्य, रणनीति र स्वास्थ्य सम्बन्धमा भएको व्यवस्था

१.१७ सरकारी बजेट सम्बन्धी जानकारी

२. समसामयिक र कानूनी विषय

२.१ कानूनको अर्थ र महत्व, कानूनका स्रोतहरु

२.२ कानूनको शासन, लोकतन्त्र, लोकतान्त्रिक मूल्य र मान्यता

२.३ नागरिकका दायित्व र कर्तव्य, मानवीय मूल्य र मान्यताहरु

२.४ सामाजिक सेवा - अर्थ, आवश्यकता, महत्व, क्षेत्र, विशेषता र क्रियाकलाप

२.५ सामाजिक तथा संस्थागत विवाद र द्वन्द तथा द्वन्द व्यवस्थापन

२.६ विविधता व्यवस्थापन र समावेशीकरणको (Inclusion) अवधारणा र महत्व

२.७ नेपालको वर्तमान संविधान (मौलिक हक, राज्यका निर्देशक सिद्धान्त, नीति तथा दायित्व र संवैधानिक अंगहरु)

२.८ सुशासनको अवधारणा र नेपालमा सुशासनको अवस्था

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प्रशासन सेवा, प्रशासन समूह, सामान्य प्रशासन उपसमूह, प्रशासकीय अधिकृत पद, छैठौं तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

२.९ सार्वजनिक व्यवस्थापनमा सदाचार, नैतिकता, ,सार्वजनिक कोषको सदुपयोग, अनुशासन, आचारसंहिता, पारदर्शिता, उत्तरदायित्व र व्यवसायिकता र सो को अभ्यास

२.१० विद्युतीय सुशासन, ईन्टरनेट र सामाजिक संजालको उत्तरदायी प्रयोग-साईवर नैतिकता र सुरक्षित प्रयोगका उपायहरु

२.११ सुशासन (व्यवस्थापन तथा सञ्चालन) ऐन, २०६४ को परिच्छेद २,४,५

२.१२ भ्रष्टाचार निवारण ऐन, २०५९ को भाग २ कसुर र सजाय

२.१३ सूचनाको हक सम्बन्धी ऐन, २०६४ परिच्छेद २,४,५

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निजामती कर्मचारी अस्पताल

प्रशासन सेवा, प्रशासन समूह, सामान्य प्रशासन उपसमूह, प्रशासकीय अधिकृत पद, छैठौं तहको खुल्ला

प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र - सेवा सम्बन्धी

खण्ड (क) – ५० अङ्क (६ प्रश्न × ५अंक, २ प्रश्न × १०अंक)

1. **सार्वजनिक प्रशासन**
   - 1.1 सार्वजनिक प्रशासनको परिचय, उदेश्य, कार्यक्षेत्र र चूनौतीहरु
   - 1.2 प्रशासनिक विधिहरु (कार्य विश्लेषण, कार्य विवरण, कार्य मूल्याङ्कन, कार्य विस्तृतिकरण, कार्य ढाँचा, संगठन तथा व्यवस्थापन पद्धति)
   - 1.3 सार्वजनिक प्रशासनको संचालन विधिहरु
     - 1.3.1 समन्वय : अर्थ, महत्व र समन्वयका तरिकाहरु
     - 1.3.2 अधिकार प्रत्यायोजन र अधिकार निक्षेपण
     - 1.3.3 सुपरिवेक्षण, अनुगमन तथा मूल्यांकन
   - 1.4 सार्वजनिक प्रशासनमा निर्णय लिने प्रक्रिया
   - 1.5 कर्मचारी प्रशासनका विविध पक्षहरु: नियुक्ति, बढुवा, तलब सुविधा, सुपरिवेक्षण, बृति विकास, कार्यक्षमता मूल्यांकन र अवकाश
   - 1.6 सार्वजनिक प्रशासनमा जनशक्तिको स्थान, उत्प्रेरणा, गुनासो समाधान, नेतृत्व शैली, व्यवसायिक स्वास्थ्य तथा सुरक्षा, व्यवसायिकता, नैतिकता, आचरण र अनुशासन, पुरस्कार र दण्ड/सजाय सम्बन्धी व्यवस्था
   - 1.7 संगठनको परिचय, स्वरुप तथा संगठन गठनका आधारहरु
   - 1.8 संगठनका सिद्धान्तहरु (आदेशको एकात्मकता, नियन्त्रणको सिमा, पदशोपान) र नेपालको सार्वजनिक क्षेत्रमा त्यसको प्रयोग
   - 1.9 संगठनका केही प्रमुख पक्षहरु: संगठनात्मक व्यवहार, समूह गतिशिलता र समूहगत कार्य
   - 1.10 सार्वजनिक नीति तर्जुमा, कार्यान्यवन र मूल्यांकन प्रशासनको भूमिका

2. **व्यवस्थापन**
   - 2.1 व्यवस्थापनको अवधारणा र आधारभूत सिद्धान्तहरु
   - 2.2 कुशल व्यवस्थापकका कार्य र गुणहरु
   - 2.3 व्यवस्थापकीय सीप र शैलीहरु
   - 2.4 व्यवस्थापनका विभिन्न प्रकार (सहभागितामूलक, नियन्त्रणात्मक)
   - 2.5 मानव श्रोत व्यवस्थापन : प्राप्ति, विकास, उपयोग र सम्भार
   - 2.6 व्यवस्थापनका केही प्रमुख पक्षहरु (द्वन्द व्यवस्थापन, तनाव व्यवस्थापन, समय व्यवस्थापन, दैवी प्रकोप व्यवस्थापन, संकट व्यवस्थापन र परिवर्तन व्यवस्थापन)
   - 2.7 सार्वजनिक संस्थानहरुको व्यवस्थापन
   - 2.8 श्रमिक संगठन (Trade Union) र सामुहिक सौदावादी (Collective Bargaining)
   - 2.9 नेपालका सार्वजनिक संस्थानहरुको स्थापनाको उद्देश्य, विधमान अवस्था, सम्भावना र चुनौतीहरु
   - 2.10 पाटन स्वास्थ्य विज्ञान प्रतिष्ठानको विद्यमान अवस्था, सम्भावना र चुनौतीहरु

खण्ड (ख) – ५० अङ्क (६ प्रश्न × ५अंक, २ प्रश्न × १०अंक)

3. **लेखा र लेखा प्रणाली**
   - 3.1 लेखाको अवधारणा, आधारभूत तत्व, उद्देश्य र महत्व
   - 3.2 सरकारी लेखा प्रणलीको सिद्धान्तहरु र नेपालमा यसको प्रयोग
   - 3.3 लेखापरिक्षणको अवधारण तथा आधारभूत सिद्धान्त, प्रकार, महत्व एवं उपादेयता

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3.4 आन्तरिक नियन्त्रण प्रणाली, आन्तरिक लेखा परिक्षण तथा अन्तिम लेखा परिक्षण
3.5 आर्थिक अनुशासन र वित्तीय व्यवस्थापन र लेखापरिक्षण
3.6 सार्वजनिक जवाफदेहीको अवधारणा र त्यसको प्रयोग
3.7 बेरुजु र बेरुजु फछ्यौर्ट सम्बन्धी व्यवस्था

4. **आर्थिक प्रशासन र प्रशासकीय व्यवस्थापनका विधि र तौरतरिका**

4.1 आर्थिक प्रशासनको अर्थ, क्षेत्र, प्रमुख कार्यहरु र महत्व
4.2 आर्थिक प्रशासनसंग संलग्न निकाय : (नेपाल सरकार, अर्थ मन्त्रालय, महालेखा नियन्त्रक कार्यालय, कोष तथा लेखा नियन्त्रण कार्यालय, केन्द्रिय तथा कार्य संचालन स्तरका कार्यालयहरु)
4.3 बजेटका सिद्धान्त, महत्व, नेपालको सरकारी वजेट प्रणालीको विकास, बजेट तर्जुमाको वर्तमान व्यवस्था, कार्यान्वयन, मूल्याङ्कन प्रक्रिया र वजेट चक्र
4.4 व्यवस्थापन परीक्षण
4.5 नेपालको सार्वजनिक प्रशासनमा नेतृत्वको प्रकार, प्रबृत्ति र यसको भूमिका
4.6 सार्वजनिक सेवा प्रवाहको प्रभावकारिता र नागरिक बडापत्रको व्यवहारिक पक्ष
4.7 प्रशासकीय व्यवस्थापनमा नागरिकको सहभागिता एवं नागरिक समाजसँगको सहकार्य र साझेदारी निर्माण
4.8 कार्यालय व्यवस्थापन र कार्यविधि
4.9 मस्यौदा लेखन सम्बन्धी सीप

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, नर्सिङ्ग सुपरभाईजर पद, सातौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व. २०७९/०८०

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प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, नर्सिङ्ग सुपरभाईजर पद, सातौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 %

1. **Nursing concept & Principles**
   - 1.1 Nursing Theory
     - 1.1.1. V. Henderson
     - 1.1.2. D. Orem
     - 1.1.3. Roy's
     - 1.1.4. Florence Nightingale
   - 1.2. Nursing Process
     - 1.2.1 Steps of Nursing process
   - 1.3. Pain and Stress management
     - 1.3.1 Nursing Management
     - 1.3.2 Medical Management
   - 1.4. Holistic Health Care
     - 1.4.1 Components of holistic health care
     - 1.4.2 Methods of holistic care
     - 1.4.3 Alternative medicines
   - 1.5 Creativity in Nursing
     - 1.5.1 Methods of creativity
     - 1.5.2 Barriers of creativity
   - 1.6. Professional Development
     - 1.6.1 Nursing ethics
     - 1.6.2 Trends
     - 1.6.3 Professional and clients right
     - 1.6.4 Legal Right
     - 1.6.5 ICN code of Nursing
     - 1.6.6 ICM code of Nursing
     - 1.6.7 (N.A.N.) Nursing Association of Nepal
     - 1.6.8 (N.N.C.) Nepal Nursing Council
     - 1.6.9 Laws related to health and nursing
       - 1.6.9.1 Medico legal case
       - 1.6.9.2 Disposal of dead body
       - 1.6.9.3 Organ transplantation
       - 1.6.9.4 Narcotic Drugs
       - 1.6.9.5 Abortion
2. **Behavioral Science and Psychology applied in Nursing**
   - 2.1 Major cultural groups and their health seeking behaviour.
   - 2.2 Factors affecting health of the people.
     - 2.2.1 Socio economic conditions
     - 2.2.2 Education
     - 2.2.3 Politics
     - 2.2.4 Gender
     - 2.2.5 Physical environment
   - 2.3 Social problems in Nepal
     - 2.3.1 Population explosion and migration
     - 2.3.2 Poverty
     - 2.3.3 Unemployment
     - 2.3.4 Substance abuse
     - 2.3.5 Prostitution

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- 2.3.6 Violence
- 2.3.7 Child abuse / Exploitation
- 2.3.8 Gender bias
- 2.3.9 Girl trafficking

2.4 Psychology applied to Nursing
- 2.4.1 Characteristics of human behavior
- 2.4.2 Causes of behavioral changes
- 2.4.3 Emotional development
- 2.4.4 Control of emotions

3. **Education Science in Nursing**

3.1 Teaching and Learning
- 3.1.1 Principles
- 3.1.2 Factors which affect Teaching / Learning

3.2 Roles and Responsibilities of a Teacher.

3.3 Teaching Methods and Media
- 3.3.1 Teaching methods
  - 3.3.1.1 Microteaching problems
  - 3.3.1.2 Evidenced based learning
  - 3.3.1.3 Self-directed learning
  - 3.3.1.4 Seminar/Symposium exhibition
  - 3.3.1.5 Case study presentation
- 3.3.2 Media
  - 3.3.2.1 Audio Aids
  - 3.3.2.2 Video Aids
  - 3.3.2.3 Audio / Video Aids

3.4 In-service Education
- 3.4.1 Need Assessment
- 3.4.2 Planning, organizing & conducting
- 3.4.3 Class room teaching
- 3.4.4 Clinical Teaching
- 3.4.5 Evaluation and Feedback

3.5 Components of Curriculum Development

3.6 Evaluation
- 3.6.1 Types
- 3.6.2 Characteristics of evaluation tools

4. **Health Care Management**

4.1 Trends of Health Care delivery system in Nepal

4.2 Management:
- 4.2.1 Concept, principles, theories
- 4.2.2 Resource management

4.3 Planning:
- 4.3.1 Elements, process
- 4.3.2 Benefits and Limitation

4.4 Organization
- 4.4.1 Types, Principles, elements

4.5 Organizational behavior
- 4.5.1 Group Dynamic
- 4.5.2 Communication
- 4.5.3 Organizational conflict and management (Problem solving)

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4.6 Organizational structures of Health Care Delivery system in Nepal
4.7 Leadership
- 4.7.1 Theories
- 4.7.2 Types
- 4.7.3 Functions
- 4.7.4 Characteristics

4.8 Supervision and monitoring
- 4.8.1 Concept
- 4.8.2 Purpose

4.9 Personnel development
- 4.9.1 Motivation
- 4.9.2 Morale
- 4.9.3 Leadership and decision making

4.10 Human Recourse Development
- 4.10.1 Elements, steps
- 4.10.2 Production/distribution

4.11 Health Economics
- 4.11.1 Concepts
- 4.11.2 Demand and supply
- 4.11.3 Cost benefit and cost effectiveness in Nursing Management
- 4.11.4 Application in Nursing service

4.12 Health Information Management
4.13 Disaster Management
4.14 Quality Assurance Management
4.15 Job description
4.16 National Policies
- 4.16.1 National Health Policy
- 4.16.2 Strategy
  - 4.16.2.1 Priority

4.17 Current fifth five- year plan
- 4.17.1 Millennium development goal
- 4.17.2 Second long-term health plan

5. **Research & Statistics**

5.1 Research Terminology
- 5.1.1 Variables, Principles, Hypothesis, Operational definitions
- 5.1.2 Limitations & Delimitations
- 5.1.3 Validity & Reliability

5.2 Ethics & Regulations in Health & Nursing Research
- 5.2.1 Ethics in Research.
- 5.2.2 National Ethical guidelines in Health research in Nepal (NHRC)

5.3 Methodology
- 5.3.1 Types of research
- 5.3.2 Sampling Techniques
- 5.3.3 Method of data collection
- 5.3.4 Development of Instrumentation
- 5.3.5 Statistical Data analysis
- 5.3.6 Report writing & Dissemination

5.4 Importance of Research in Nursing services

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6. **Applied Health Sciences**

6.1 Anatomy and physiology of:
- 6.1.1 Cardiovascular System
- 6.1.2 Respiratory system
- 6.1.3 Digestive system
- 6.1.4 Muscular skeletal system
- 6.1.5 Nervous system
- 6.1.6 Special senses
- 6.1.7 Reproductive system
- 6.1.8 Endocrine system

6.2 Pharmacology
- 6.2.1 Principles of pharmacy kinetics and pharmacy dynamic
- 6.2.2 Important Drugs and their actions
- 6.2.3 List of essential Drugs ass specified by WHO/ DDA (Department of Drug Administration)
- 6.2.4 Lifesaving drugs

6.3 Patho- physiology
- 6.3.1 General concepts of necrosis
- 6.3.2 Inflammation
- 6.3.3 Thrombosis
- 6.3.4 Embolism
- 6.3.5 Wound – healing oedema
- 6.3.6 Neoplasms
- 6.3.7 Antigens and antibodies

6.4 Microbiology
- 6.4.1 Classification of Micro – organism
- 6.4.2 Microbial Morphology and the process of:
  - 6.4.2.1 Drug sensitivity testing
  - 6.4.2.2 Important terminologies
  - 6.4.2.3 Opportunistic infections
  - 6.4.2.4 Pathogens
  - 6.4.2.5 Bacterial toxins
- 6.4.3 Sterilization
  - 6.4.3.1 Different methods and Types

6.5 Biochemistry
- 6.5.1 Digestion and absorption of carbohydrate, protein and fat
- 6.5.2 Malabsorption
- 6.5.3 Classifications of vitamins and requirement of different age group

6.6 Nutrition
- 6.6.1 Assessment of Nutrition status
- 6.6.2 Therapeutic diet in various medical conditions
- 6.6.3 Menu planning & calculation of calorie for different age group
- 6.6.4 Food belief & practice
- 6.6.5 Common Nutritional deficiency diseases

Civil Service Hospital

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Section (B): 50 %

7. **Mental Health**
   - 7.1 Concept of mental health / Illness
     - 7.1.1 Neuroses
     - 7.1.2 Psychoses
     - 7.1.3 Mental Retardation
     - 7.1.4 Epilepsy
     - 7.1.5 Alcohols and Drug abuse
     - 7.1.6 Psychosexual problems
   - 7.2 Role and Responsibilities of Nurse in :
     - 7.2.1 Primodial
     - 7.2.2 Primary Prevention
     - 7.2.3 Secondary care
     - 7.2.4 Tertiary prevention
   - 7.3 Modality of Treatment
     - 7.3.1 Drug therapy
     - 7.3.2 ECT
     - 7.3.3 Counseling
     - 7.3.4 Diversional Therapy
     - 7.3.5 Legal Responsibilities
     - 7.3.6 Emergency management of violent patient
   - 7.4 Common Mental Health problems in Nepal

8. **Advanced Nursing**
   - 8.1 Developmental tasks of different age groups
   - 8.2 Problem solving approach in care of patient
   - 8.3 Application of holistic approach in care of patient
   - 8.4 Advancement in the diagnostic procedures for different illnesses
   - 8.5 Case study and case presentation

9. **Nursing care of geriatric and Communicable diseases**
   - 9.1 Physiological changes and common physical problems.
   - 9.2 Common medical problems
   - 9.3 Cognitive changes and diagnostic methods in use.
   - 9.4 Support system / family support / community support.
   - 9.5 Mental preparation for adaptations to changing needs.
   - 9.6 Water borne diseases
   - 9.7 Air borne diseases
   - 9.8 Vector transmission
   - 9.9 (STI) Sexual Transmitted Infection
   - 9.10 Trans placental diseases

10. **Medical Surgical Nursing (Adult+ Child) Nursing Care & Management of clients suffering with diseases related to following systems**
    - 10.1 Respiratory problems
    - 10.2 Cardiovascular problems
    - 10.3 Neurological problems
    - 10.4 Muscular-Skeletal problems
    - 10.5 Hepatobiliary problems

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10.6 Endocrine problems
10.7 Gastrointestinal problems
10.8 Reproductive problems
10.9 Genital urinary problems
10.10 Special Senses problems

11. **Nursing Management of Patient in Burn Unit and OT**
    11.1 Pain Management
    11.2 Fluid & electrolyte balance
    11.3 Infection preventions
    11.4 Reconstructive / Rehabilitation.
    11.5 Preparation of OT
    11.6 Pre and Post OT. care

12. **Role of the Nurse in ICU/ CCU and Emergency Nursing**
    12.1 Advance nursing
    12.2 Management of clients with critical conditions / cardiac conditions
    12.3 Resuscitation
    12.4 Use of various monitors
    12.5 Specific Investigation and treatment.
    12.6 Emergency preparedness
    12.7 Emergency Resuscitations
    12.8 Mass casualty management

13. **Obstetric Nursing (Midwifery)**
    13.1 Parental Nursing
        13.1.1 Preconception and parental Preparedness
        13.1.2 Prenatal assessment and management
        13.1.3 Preparation of child birth
        13.1.4 Management of High risk pregnancy
    13.2 Intra- natal (Labor)
        13.2.1 Assessment of client during Labor
        13.2.2 Care required during different stages of Labor
        13.2.3 Immediate care of new born / mother
        13.2.4 Management of complications of labor.
    13.3 Newborn / Neonate Management
        13.3.1 Assessment of newborn
        13.3.2 Physiological needs of a newborn & neonate
        13.3.3 Management of minor / major disorders
    13.4 Post Natal
        13.4.1 Physiology of puerperium & need of post natal mother.
        13.4.2 Lactation & trends in breast feeding
        13.4.3 Minor discomforts in puerperium & their management
        13.4.4 Major disorders of puerperium & their management.
        13.4.5 Follow up and advice on F/P

14. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, मेडिकल ल्याब टेक्नोलोजी उपसमूह, वरिष्ठ ल्याब टेक्नोलोजिष्ट पद, सातौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व. २०७९/०८०

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Paper I and II: Technical subject

Section (A): 50 %

1. **Haematology**
   - 1.1 Cleaning of glasswares and safety precaution in the laboratory
   - 1.2 Collection and preservation of different samples for the laboratory
   - 1.3 Preparation of chemicals and different stains for the Hematological tests
   - 1.4 Quality control in the laboratory
   - 1.5 Formation and development of erythrocytes, leucocytes, thrombocytes
   - 1.6 Principle and clinical procedure for:
     - 1.6.1 Hemoglobin estimation and it's standard curve calibration
     - 1.6.2 Total count of W.B.C., R.B.C., Platelets and reticulocytes
     - 1.6.3 E.S.R., B.T., C.T., and RBC indices
     - 1.6.4 Coomb's tests
     - 1.6.5 Blood banking & Transfusion
     - 1.6.6 Coagulation profile (mechanism, disorder & investigations)
     - 1.6.7 LE cell preparation
     - 1.6.8 Tissue parasite
     - 1.6.9 Absolutes cell count
     - 1.6.10 The composition and function of blood
     - 1.6.11 Classification of leukemia
   - 1.7 Identify different types of leukemia and their morphological features

2. **Microbiology**
   - 2.1 Bacteriology
     - 2.1.1 Classification of medically important bacteria
     - 2.1.2 Characteristics of Microorganism: Prokaryotes, Eukaryotes, Viruses
     - 2.1.3 Different methods of sterilization and disinfections
     - 2.1.4 Preparation of different media and ingredients uses and interpretation
     - 2.1.5 Preparation of chemicals and stains
     - 2.1.6 Cultural procedure of different samples aerobically
     - 2.1.7 Identification of bacteria and confirmative tests serologically and biochemically
     - 2.1.8 Different staining methods of bacteria and their principles
     - 2.1.9 T.B. Bacteriology and skin scraping for A.F.B
     - 2.1.10 Quality control in Bacteriology Laboratory
     - 2.1.11 The universal precaution in microbiology laboratory and safe west disposal of infected materials
   - 2.2 Virology
     - 2.2.1 General properties of virus comparing with bacteria, terminology used in virology and basic laboratory procedure used in the diagnosis of viral disease
     - 2.2.2 Principle of viral isolation, embryonated egg and tissue culture
     - 2.2.3 Immunology of viral infection
   - 2.3 Parasitology
     - 2.3.1 Classification of human and vectors
     - 2.3.2 General characteristics of Protozoa, Helminthes, trematodes/ cestodes
     - 2.3.3 Methods of collection, transportation and storage of different types of specimens
     - 2.3.4 Methods of identification parasites from different types of clinical materials

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Civil Service Hospital

2.4 Mycology
- 2.4.1 Terminologies used in mycology sample collection for fungal infection (skin scarping, nails and hair) and method of wet preparation
- 2.4.2 Examination and identification by different method and culture

2.5 Immunology
- 2.5.1 Immune system and infectious diseases
- 2.5.2 Structure, types and function of Immunoglobulin
- 2.5.3 Toxin/ antitoxin and antibody/antigen reaction; and their various types
- 2.5.4 Principle and procedure for the estimation of:
  - 2.5.4.1 V.D.R.L., (RPR)
  - 2.5.4.2 A.S.O.
  - 2.5.4.3 C.R.P.
  - 2.5.4.4 Rheumatoid factor
  - 2.5.4.5 Blood Grouping
  - 2.5.4.6 Cancer Marker
  - 2.5.4.7 Agglutination Reaction
  - 2.5.4.8 Precipation Reaction
  - 2.5.4.9 Flocculation Reaction
  - 2.5.4.10 ELISA
  - 2.5.4.11 Haemagglutination Reaction

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Section (B): 50% Marks

3. **Biochemistry**
   - 3.1 Molecular weight and equivalent weight
   - 3.2 Preparation of normal and molar solution
   - 3.3 Colorimeter/spectrophotometer
   - 3.4 Principle and procedure of different methods for the estimation of biochemical tests
     - 3.4.1 Sugar, Urea, Cratinine, Uric Acid, Billirubin, GPT, GOT, ALP, Lipid profile, Cardic profile,Renal function test, Liver Function Test, Cleareance study, Amylase & Electrolytes
     - 3.4.2 Cavity fluids examination
     - 3.4.3 C.S.F. examination
     - 3.4.4 24 hours Urine Protein
   - 3.5 Simple theory of lights waves, function of filters Beers and Lamberts law, absorbance and percent transmission
   - 3.6 Tumor Marker
     - 3.6.1 Estimation and interpretation of AFP, B-hCG, CEA, CA-125, CA 19-9, CA 15-3, PSA
   - 3.7 Recent advances in clinical biochemistry
   - 3.8 Management of Biochemistry Laboratory

4. **Histology/Cytology**
   - 4.1 Different types of fixatives and their uses
   - 4.2 Methods of decalcification
   - 4.3 Methods of processing of tissues to prepare paraffin block tissue
   - 4.4 Methods of cutting section from the paraffin block tissue and staining Procedure
   - 4.5 Principle and application of immunohistochemistry
   - 4.6 Immnunoflourscence technique
   - 4.7 Electron Microscopic and its applications
   - 4.8 Safety measures and quality assurance in Histopatholaboratory
   - 4.9 Uses of Cytogenetics, Flowcytometry, and Polarized microscopy in cytological study

5. **General knowledge about Civil Service Hospital and its Bylaws**

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियोग्राफी उपसमूह, वरिष्ठ रेडियोग्राफी टेक्नोलोजिष्ट पद, सातौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :–

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियोग्राफी उपसमूह, वरिष्ठ रेडियोग्राफी टेक्नोलोजिष्ट पद, सातौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियोग्राफी उपसमूह, वरिष्ठ रेडियोग्राफी टेक्नोलोजिष्ट पद, सातौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 %

1. **Anatomy and Physiology**
   1. Introduction
      - 1.1.1 General anatomical terms
      - 1.1.2 Human cell structure and function
      - 1.1.3 The tissues
   2. Musculo-Skeletal System
      - 1.2.1 Formation, growth and development of bones
      - 1.2.2 Function of bone according to the size and shape of bone
      - 1.2.3 Classification of bone
      - 1.2.4 Classification of joints and their function
      - 1.2.5 Different groups of muscle responsible for joint movement
   3. Nervous System
      - 1.3.1 Neuron and nerve cells
      - 1.3.2 Central nervous system and brain
      - 1.3.3 Parts of ventricles of the brain and their extent
      - 1.3.4 The cerebrospinal fluid
      - 1.3.5 Midbrain and brain stem
      - 1.3.6 Peripheral nervous system
      - 1.3.7 Autonomic nervous system
      - 1.3.8 Cranial nerves, spinal nerves
   4. Cardio-Vascular System
      - 1.4.1 Blood vessels- arteries, veins, and capillaries
      - 1.4.2 Different parts of heart and its function
      - 1.4.3 Cardiac cycle
      - 1.4.4 Systemic circulation
      - 1.4.5 Pulmonary circulation
      - 1.4.6 Coronary circulation
      - 1.4.7 Aorta
      - 1.4.8 Inferior venacava (IVC) & Superior venacava (SVC)
   5. Lymphatic System
      - 1.5.1 Lymphatic System
      - 1.5.2 Lymph nodes
      - 1.5.3 Spleen
      - 1.5.4 Thymus gland
   6. Respiratory System
      - 1.6.1 Respiration, Alveolar respiration
      - 1.6.2 Lungs and Pleura
      - 1.6.3 Organs of the respiratory system, Respiratory passages (Nose, Pharynx, Larynx, Trachea, Bronchioles, Alveoli)
   7. Digestive System
      - 1.7.1 Organs of the digestive system, Mouth, Pharynx, Esophagus, Stomach, Small intestine, large intestine, rectum and anal canal Salivary glands
      - 1.7.2 Function of alimentary tract
      - 1.7.3 Pancreas, Liver, biliary tract and their function
      - 1.7.4 Metabolism of Carbohydrates, Protein and fat
   8. Urinary System
      - 1.8.1 Organs of urinary system: Kidneys, ureters, bladder, and urethra

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1.8.2 Kidneys-position, gross structure, cortex, medulla pelvis
1.8.3 Functional unit of kidney: nephron, function of kidneys
1.8.4 Formation of urine, water-electrolyte balances in body
1.8.5 Ureters: Position structure and function
1.8.6 Micturation-reflex control
1.8.7 Structure and function of the urinary bladder and urethra
1.8.8 Supra-renal glands, prostate gland

9. Reproductive System
1.9.1 Female Reproductive System & Breast
1.9.1.1External genitalia, Uterus, Ovaries: Position, structure functions
1.9.1.2 Menstrual cycle, Reproduction& menopause
1.9.1.3 Breast-Position, structure and its functions
1.9.1.4 Puberty
1.9.2 Male Reproductive System:
1.9.2.1 Position structure and functions of scrotum, testes, epididymis, deferent ducts, seminal vesicles, ejaculatory ducts and penis
1.9.2.2 Puberty

10. Special Senses
1.10.1 Skin- structure and function
1.10.2 The ear (external, middle & internal ear)-structure and function
1.10.3 The Eyes- structure & functions.
1.10.4 Nose- structure and functions
1.10.5 Tongue-structure, functions
1.10.6 Taste buds and Sense of taste

11. Endocrine System
1.11.1 Endocrine glands - pituitary gland, thyroid gland, parathyroid glands, adrenal gland, islets of langerhans, pineal gland, testis, ovaries, thymus
1.11.2 Endocrine glands - Position, structure, functions and hormone secretion

2. BASIC RADIATION PHYSICS

2.1 REVIEW OF ELECTRICITY
2.1.1 Electromagnetic induction and its laws
2.1.2 Self and mutual induction
2.1.3 A.C generator, Peak and effective values of AC
2.1.4 Concept of Reactance, Impedance & phase angle

2.2 TRANSFORMER
2.2.1 Theory, construction, Losses & Efficiency, Transformer ratings
2.2.2 Filament transformer
2.2.3 High-tension transformer
2.2.4 Autotransformer or variac transformer

2.3 THERMIONIC EMISSION AND RECTIFIERS
2.3.1 Diode - construction, principle & characteristics
2.3.2 Rectifiers: Self-rectification, Half-wave, Full-wave (two valves and four valves) and constant voltage rectifiers
2.3.3 The cold cathode gas filled diode and its use

2.4 ATOMIC STRUCTURE AND ELECTROMAGNETIC RADIATION
2.4.1 Electron, proton, neutron, mass number, and atomic number
2.4.2 Isotopes, isobars and isomers
2.4.3 Electron shells & energy levels

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2.4.4 Excitation and ionization
2.4.5 Emission of electromagnetic waves, spectra
2.4.6 Properties of electromagnetic waves
2.4.7 Concept of photon and quanta
2.4.8 Photoelectric effect, photocell

2.5 RADIOACTIVITY
2.5.1 Radioactive elements, radioactive disintegration
2.5.2 Properties of radioactive particles
2.5.3 Radioactive decay law, half-life, mean life
2.5.4 Artificial radioactivity: Radioactivity induced by neutron bombardment and proton bombardment
2.5.5 Nuclear binding energy, nuclear stability
2.5.6 Alpha, beta and gamma disintegration
2.5.7 Introduction to fission and fusion

2.6 X-RAYS
2.6.1 Historical background
2.6.2 X-ray tube
2.6.3 Mechanism of x-ray production
2.6.4 Properties of x-rays, intensity & quality of x-rays, continuous and characteristic spectra
2.6.5 Effects of variation of tube current and voltage, Brag's law for wavelength determination
2.6.6 X-ray control and indicating equipment: simple circuit diagram as illustration of sequence from mains supply to exposure control
2.6.7 Mains voltage circuit
2.6.8 Mains cables, Switches and fuses
2.6.9 Mains voltage compensation, earthing, insulation, voltage drops in cables
2.6.10 X-ray tube voltage control and indication
2.6.11 Exposure controls. Contactors and timers
2.6.12 X-ray tube current control and filament supply, mA compensation, Generator regulation

2.7 INTERACTION OF RADIATION WITH MATTER
2.7.1 Thompson scattering
2.7.2 Photoelectric interaction
2.7.3 Compton scattering
2.7.4 Pair production
2.7.5 Transmission of a homogenous and heterogeneous x-ray beam through matter
2.7.6 Effects of filtration
2.7.7 Relative amount of scatter from an x-ray beam during the passage through matter
2.7.8 Effects of collimation

2.8 RADIATION DETECTION AND MEASUREMENT
2.8.1 Principle of measurement
2.8.2 Ionization chamber, Electrometer
2.8.3 Scintillation counter
2.8.4 Gieger-muller counter
2.8.5 Thimble chamber
2.8.6 Condenser chamber

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2.9 RADIATION PROTECTION
- 2.9.1 Objective and principle of radiation protection
- 2.9.2 Radiation and Radiation units
- 2.9.3 Personnel monitoring
- 2.9.4 Protective materials
- 2.9.5 ICRP recommendations on dose limits

2.10 ULTRASOUND
- 2.10.1 Longitudinal waves
- 2.10.2 Principles of ultrasound, intensity, power and fields
- 2.10.3 Transmission of ultrasound
- 2.10.4 Velocity of ultrasound in different media
- 2.10.5 Ultrasonic interactions, absorption and scattering mechanism in tissue, refraction and reflection of ultrasound
- 2.10.6 Damping of ultrasound in media
- 2.10.7 Doppler effect

3. RADIOGRAPHIC TECHNIQUE

3.1 UPPER LIMB
- 3.1.1 Technique for whole hand, fingers, thumb, wrist joint, Radio ulnar joints
- 3.1.2 Supplementary technique: carpal tunnel, scaphoid, ulnar groove, head of radius
- 3.1.3 Supplementary views of elbow, humerus & Supra-condylar projection

3.2 SHOULDER GIRDLE AND THORAX
- 3.2.1 Technique for shoulder joint, acromio-clavicular joint, and scapula
- 3.2.2 Supplementary views: projection to show recurrent dislocation of shoulder, infero-superior projection of clavicle, sterno- clavicular joint, sternum, ribs

3.3 LOWER LIMB
- 3.3.1 Technique for whole foot, toes, great toe, calcaneum, talo-calcaneal joint, ankle joint, lower leg with ankle joint
- 3.3.2 Knee joint, patella, tibio-fibular joints
- 3.3.3 Supplementary technique for torn ligaments, flat feet, axial view of calcaneum, skyline view of patella, intercondylar notch view

3.4 VERTEBRAL COLUMN
- 3.4.1 Technique for cranio-vertebral joint, atlanto-occipital joint, first three cervical vertebra, odontoid peg view
- 3.4.2 Cervical spine for intervertebral joints and foramina, cervico thoracic vertebrae
- 3.4.3 Thoracic spine, thoraco-lumbar vertebrae
- 3.4.4 Lumber spine, intervertebral joints and foramina, lumbo-sacral joint, sacrum, coccyx
- 3.4.5 Supplementary techniques, to demonstrate scoliosis, kyphosis, spondylolisthesis

3.5 PELVIC GIRDLE AND HIP REGION
- 3.5.1 Technique for whole pelvis, ileum, ischium and pubic bones
- 3.5.2 Sacroiliac joints, symphysis pubis, hip joints, acetabulum, neck of femur
- 3.5.3 Supplementary projections: acetabulam view, judet view, Von-Rosen view and frog leg view for hip joint (CDH)

3.6 SKULL
- 3.6.1 Routine views of Skull, Towne's view, SMV, Emergency Skull radiography

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3.6.2 Technique for mastoids, styloid process, IAM
3.6.3 Routine views for facial bones, mandible, zygomatic arches, nasal bone, maxilla, temporo-mandibular joints
3.6.4 Optic foramina, macroradiography for optic foramina
3.6.5 Routine and special views for Paranasal sinuses

3.7 CHEST RADIOGRAPHY
3.7.1 Routine radiography of chest, High kV technique for Chest
3.7.2 Supplementary views: apicogram, lordotic and oblique views, lateral decubitus, diaphragmatic excursions double exposure technique

3.8 WARD AND OPERATION THEATRE RADIOGRAPHY
3.8.1 Knowledge of Electrical supply, radiation protection
3.8.2 Radiography of bed-ridden patients
3.8.3 Radiography in operation theatre

3.9 MAMMOGRAPHY
3.9.1 Soft tissue radiography
3.9.2 Principle and technique of mammography

3.10 MACRO-RADIOGRAPHY
3.10.1 Definition, principles and its applications
3.10.2 Magnification factors and uses of magnification radiography

Section (B): 50 %

4. SPECIAL RADIOLOGICAL PROCEDURES

4.1 FIRST AIDS AND EMERGENCY CARE
4.1.1 Introduction to Shock, emergency treatment, Cardio-Pulmonary resuscitation (CPR)
4.1.2 Introduction to Haemorrhage, primary management of haemorrhage

4.2 CONTRAST MEDIA
4.2.1 Introduction to contrast media
4.2.2 Definition, types and uses of contrast media
4.2.3 Properties of contrast media
4.2.4 Adverse effects of contrast media and their management
4.2.5 Emergency trolley setting
4.2.6 Lifesaving drugs and emergency trays

4.3 ALIMENTARY TRACT
4.3.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming & post procedure care for following investigations:
4.3.1.1 Barium swallow
4.3.1.2 Barium meal
4.3.1.3 Barium follow -through
4.3.1.4 Small bowel enema
4.3.1.5 Barium enema -single contrast, -double contrast
4.3.1.6 Loopogram

4.4 BILIARY TRACT
4.4.1 Definition, indications, contraindications, equipment required contrast media, preparation of the patient, technique / procedure, filming, post procedure care for following investigations:
4.4.1.1 Percutaneous transhepatic cholangiography (PTC)
4.4.1.2 Endoscopic retrograde cholangio-pancreatography (ERCP)

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4.4.1.3 Per operative cholangiography (POC)
4.4.1.4 T-tube cholangiography

4.5 URINARY TRACT
4.5.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:
4.5.1.1 Intravenous urography (IVU), Modification of IVU and additional techniques
4.5.1.2 Percutaneous nephrostomy (PCN)
4.5.1.3 Retrograde pyelography (RGP)
4.5.1.4 Micturating cysto-urethrography

4.6 REPRODUCTIVE SYSTEM
4.6.1 Definition, indications, contraindications, equipment required contrast media, preparation of the patient, technique/procedure, filming, post procedure care for Hysterosalpingography

4.7 CARDIO-VASCULAR SYSTEM
4.7.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:
4.7.1.1 Carotid angiography
4.7.1.2 Abdominal aortography
4.7.1.3 Portal venography
4.7.1.4 Peripheral and lower limb venography

4.8 MYELOGRAPHY
4.8.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:
4.8.1.1 Lumabr, Thoracic and Cervical Myelogrphy
4.8.1.2 Post Myelo-CT (CT Myelography)

4.9 ARTHROGRAPHY
4.9.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:
4.9.1.1 Knee Arthrography
4.9.1.2 Hip Arthrography

4.10 SINOGRAPHY
4.10.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique /procedure, filming, post procedure care for Sinography

4.11 SIALOGRAPHY
4.11.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for following investigations:
4.11.1.1 Parotid sialography
4.11.1.2 Sub-mandibular sialography

4.12 DACRYOCYSTOGRAPHY
4.12.1 Definition, indications, contraindications, equipment required, contrast media, preparation of the patient, technique/procedure, filming, post procedure care for Dacryocystography.

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5. EQUIPMENT FOR DIAGNOSTIC RADIOLOGY

5.1 X-RAY TUBES
- 5.1.1 Overview of production of x-rays, Historical background
- 5.1.2 Components of an x-ray tube: Cathode assembly, Anode assembly
- 5.1.3 Stationary and rotating anodes
- 5.1.4 Line focus principle, anode heel effect, Off-focus radiation
- 5.1.5 Glass envelope, tube shielding, care of x-ray tubes
- 5.1.6 X-ray tube faults
- 5.1.7 Modification and recent advances in x-ray tube

5.2 RADIOGRAPHIC COUCHES, STANDS AND TUBE SUPPORTS
- 5.2.1 X-ray tube supports
- 5.2.2 Radiographic couches
- 5.2.3 Chest stands and vertical bucky
- 5.2.4 Modern basic radiographic units

5.3 EXPOSURE TIMERS
- 5.3.1 Clockwork timer, synchronous motor and impulse timers
- 5.3.2 Electronic timers
- 5.3.3 Autotimers (photoelectric timer and ionization chamber timer)

5.4 BEAM CENTERING & BEAM LIMITING DEVICES
- 5.4.1 Cones and cylinders, Aperture diaphragms
- 5.4.2 Light beam diaphragms, Positive beam limitation

5.5 PORTABLE AND MOBILE RADIOGRAPHIC EQUIPMENTS
- 5.5.1 Main features of portable and mobile equipment
- 5.5.2 Mains dependent mobile equipment
- 5.5.3 Capacitor discharge equipment
- 5.5.4 Battery powered generators

5.6 CONTROL OF SCATTERED RADIATION
- 5.6.1 Significance of scattered radiation
- 5.6.2 Reduction in the amount of scatter radiation produced (field size, use of appropriate exposure factors, compression band)
- 5.6.3 Reduction in the amount of scatter radiation reaching to the film (metal backing of cassettes, filters, air-gap technique, cones and diaphragms, Grids)
- 5.6.4 Grid: construction, function, grid characteristics, grid types and patterns. Grid movement
- 5.6.5 Reduction in the effect of scatter (use of intensifying screens)

5.7 FLUOROSCOPIC EQUIPMENT
- 5.7.1 Conventional fluoroscopy
- 5.7.2 Mobile and specialised fluoroscopic units
- 5.7.3 Image intensified fluoroscopy
- 5.7.4 Image intensifier- construction and working principle
- 5.7.5 TV camera and TV monitor
- 5.7.6 Digital fluoroscopy

5.8 EQUIPMENT FOR DENTAL RADIOGRAPHY
- 5.8.1 A simple dental radiographic unit, Orthopantomography (OPG)

5.9 VASCULAR IMAGING EQUIPMENT
- 5.9.1 Generators and x-ray tubes
- 5.9.2 C-Arm/U-Arm assembly
- 5.9.3 Angiographic tables

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5.9.4 Automatic pressure injectors
5.9.5 Digital subtraction Angiography
5.10 MAMMOGRAPHIC EQUIPMENT
5.10.1 Mammography x-ray tube
5.10.2 Image receptors in mammography
5.10.3 Apparatus for magnification radiography in mammography
5.10.4 Digital mammography/ Digital Breast tomosynthesis
5.11 DIGITAL IMAGING
5.11.1 Introduction to digital imaging concepts and advantages of image digitization
5.11.2 Digital image structure
5.11.3 Digital radiography: Scanned projection radiography (SPR), Computed radiography (CR), Direct digital radiography (DR)
5.12 COMPUTED TOMOGRAPHY (CT)
5.12.1 Basic principles of CT
5.12.2 Generations of CT/ MDCT/Newer advances in CT
5.12.3 System components
5.12.4 Image characteristics & Image quality in CT
5.12.5 Artifacts in CT.
5.13 MAGNETIC RESONANCE IMAGING (MRI)
5.13.1 Fundamental concepts: magnetic moments, precession, resonance, nuclear magnetic resonance (NMR)
5.13.2 Introduction to MR Scanners: imaging magnets, RF transmitter and receiver coils, shim coils and gradient coils
5.13.3 Principal parameters of MRI: spin density, T1 relaxation time, T2 relaxation time
5.13.4 Basic principles of MR imaging and related parameters
5.13.5 Spin echo pulse sequence
5.13.6 Gradient echo pulse sequence
5.13.7 Artifacts in MRI
5.13.8 Advances in MR technology.
5.14 CT AND MRI TECHNIQUE
5.14.1 Technique for Brain
5.14.2 Technique for Head, Chest, Abdomen and other body parts
5.14.3 Technique for CTA and MRA
5.14.4 Technique for Spine and Joint

6. RADIOGRAPHIC PHOTOGRAPHY

6.1 PHOTOGRAPHIC PRINCIPLE
6.1.1 Photographic effect
6.1.2 Photosensitive materials
6.1.3 Photographic emulsion
6.1.4 Characteristic curve
6.1.5 Spectral sensitivity
6.1.6 Direct exposure film (x-ray sensitive)
6.1.7 Gurney-Mott theory of latent image formation
6.2 FILM MATERIALS
6.2.1 Construction of x-ray film
6.2.2 Film for medical imaging
6.2.3 Comparison between single coated and double coated x-ray films

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- 6.3 FILM STORAGE
  - 6.3.1 Different storage areas
  - 6.3.2 Ideal storage condition
  - 6.3.3 Stock control and film ordering methods
- 6.4 INTENSIFYING SCREENS
  - 6.4.1 Luminescence: fluorescence and phosphorescence
  - 6.4.2 Construction of Intensifying screen and their types
  - 6.4.3 Types of phosphors: calcium tungsten, rare earth and their comparison
  - 6.4.4 Detective Quantum efficiency (DQE)
  - 6.4.5 Quantum mottle
  - 6.4.6 Care, monitoring and cleaning of IF screen
  - 6.4.7 X-ray film cassettes
  - 6.4.8 Cassette function, construction, materials used, types and care of cassettes
- 6.5 RADIOGRAPHIC PROCESSING
  - 6.5.1 Manual and Automatic processing
  - 6.5.2 Processing cycles
  - 6.5.3 Processing chemical
  - 6.5.4 Care and maintenance of automatic processors
  - 6.5.5 The principle of dry silver imager
  - 6.5.6 Silver recovery
  - 6.5.7 Daylight processing
- 6.6 DESIGN AND CONSTRUCTION OF DARKROOM
  - 6.6.1 The layout of an ideal darkroom
  - 6.6.2 Darkroom location, size, radiation protection, floor, walls / ceiling, ventilation and heating, entrance, white lighting and safe light and its test, film hoppers loading bench and wet bench
- 6.7 THE RADIOGRAPHIC IMAGE
  - 6.7.1 Radiographic image quality
  - 6.7.2 Factors affecting radiographic image quality
  - 6.7.3 Image artifacts
- 6.8 IDENTIFICATION AND VIEWING OF RADIOGRAPHS
  - 6.8.1 Methods of film
- 6.9 Quality assurance in radiography

7. **General knowledge about Civil Service Hospital and its Bylaws**

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प्राविधिक सेवा, मेडिसिन समूह, क्लिनिकल जेनेटिक्स उपसमूह, रजिष्ट्रार पद, आठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :आ.व. २०७९/०८०

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Cytogenetics**
   - 1.1. Cell division
     - 1.1.1. Mitosis, meiosis
     - 1.1.2. Medical relevance of mitosis and meiosis
   - 1.2. Introduction to embryology and clinical teratology
     - 1.2.1. Human gametogenesis and fertilization
   - 1.3. Chromosomal Disorders
     - 1.3.1. Incidence and Mechanisms of Chromosomal disorder
     - 1.3.2. Chromosomal abnormalities.
     - 1.3.3. Types of chromosomes abnormalities.
     - 1.3.4. Chromosome abnormalities and malignancies.
     - 1.3.5. Chromosomal breakage studies and malignancies
   - 1.4. Human Karyotype
     - 1.4.1. Cytogenetic nomenclature
     - 1.4.2. Introduction of Cytogenetic methods.
     - 1.4.3. Indication of Cytogenetic analysis.
   - 1.5. Disorders of the Autosomes and Sex Chromosomes
   - 1.6. Genetic basis of cancer
   - 1.7. Applying Genomics to individualize Cancer Therapy
   - 1.8. Molecular cytogenetics
     - 1.8.1. Definition
     - 1.8.2. Types including FISH, Comparative Genomic Hybridization, Array CGH
2. **Molecular genetics**
   - 2.1. Gene
     - 2.1.1. Gene organization, structure and function
     - 2.1.2. DNA and RNA structure and function
   - 2.2. Fundamentals of gene expression
     - 2.2.1. Transcription, translation, proteomics, Integrative multi- 'omics'
   - 2.3. The Human Genome
   - 2.4. Gene structure and function
   - 2.5. Epigenetics and epigenomic aspects of gene expression
   - 2.6. Variation in gene expression and its relevance to medicine
   - 2.7. Genetic variation, inherited variation and polymorphism in DNA
   - 2.8. Mutations : Definition, types of mutations and their consequences, dynamic mutations
   - 2.9. Genotypes, phenotypes
     - 2.9.1. The Hardy –Weinberg Law
   - 2.10. Pattern of Single-Gene Inheritance : Pedigrees
   - 2.11. Inheritance : Pattern of Inheritance, Mendelian Inheritance, Types and Characteristics of Autosomal patterns of Mendelian Inheritance
   - 2.12. Gene mapping, gene identification, positional cloning.
   - 2.13. Sex- Linked Inheritance : Definition, Pseudo-autosomal Inheritance.
   - 2.14. Mosaicism and Chimerism.
   - 2.15. Pattern of origin effects on inheritance patterns.
   - 2.16. Genetics of complex disorder
     - 2.16.1. Qualitative and quantitative traits.
     - 2.16.2. Familial aggregation and correlation.

Civil Service Hospital

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2.16.3. Determining the relative contributions of genes and environment to complex disease
2.17. Techniques of DNA analysis and application, DNA cloning, Genome sequencing
2.18. Mitochondrial Genetics : Definition, types of diseases associated with mitochondrial genetics
2.19. Evolutionary /Human Developmental Genetics

3. Special topics

3.1. Pharmacogenetics
- 3.1.1. Biochemical modification and kinetics of drug metabolism
- 3.1.2. Pharmacogenomics- Definition and importance in medicine
- 3.1.3. Personalized medicine

3.2. Immunogenetics
- 3.2.1. Different types of immunity and related diseases
- 3.2.2. HLA polymorphism and disease association
- 3.2.3. Importance and relation of HLA in transplant genetics
- 3.2.4. Inherited immunodeficiency disorders

3.3. Blood grouping and molecular basis of blood grouping
- 3.3.1. Hemoglobin and structure of globin gene
- 3.3.2. Hemoglobinopathies- structure variants
- 3.3.3. Hemolytic anemias, Thalassemia and sickle cell anemias

3.4. Cancer genetics
- 3.4.1. Genetic and environmental factors in cancer.
- 3.4.2. Oncogenesis and identification of oncogenes, tumor suppressor genes and its functions
- 3.4.3. Epigenetics and cancer
- 3.4.4. Common genetic associated cancer like colorectal carcinoma, breast carcinoma, prostate carcinoma and ovarian carcinoma, etc
- 3.4.5. Genetic counseling in familial cancer
- 3.4.6. Screening in familial cancer

3.5. Community genetics
- 3.5.1. Genetic variation in population
- 3.5.2. Genotypes and phenotypes in population
- 3.5.3. Ethnic differentiation in the frequency of genetic diseases
- 3.5.4. Genetics and ancestry

3.6. Molecular microbiology and metagenomics : Introduction, importance, uses in disease diagnosis and its pitfalls
3.7. Human genome project : Introduction and importance of human genome project
3.8. Stem cell biology and regenerative medicine and genetic cloning : Introduction and applications in modern medicine
3.9. Synthetic biology : Introduction and its uses
3.10. Animal models of genetic diseases.

4. Screening for genetic diseases and carriers

4.1. Criteria for screening
4.2. Prenatal screening: Indications for prenatal testing, techniques used in prenatal diagnosis
4.3. Special problems in prenatal diagnosis
4.4. Neonatal screening

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4.5. Pre-symptomatic screening of adults
4.6. Ethical considerations in carrier detection and predictive testing

5. Congenital abnormalities, dysmorphology and learning disability
5.1. Incidence, Definition and classification of birth defects
5.2. Genetic causes of malformations
5.3. Environmental agents (teratogens) including drugs causing malformations
5.4. Malformations of unknown cause
5.5. Neurodevelopmental disabilities, global developmental delay,
5.6. Intellectual disability and autism

Section (B) – 50 Marks

6. Inborn errors of metabolism
6.1. Disorders of amino acid metabolism
6.2. Disorders of carbohydrate metabolism
6.3. Disorders of steroid metabolism
6.4. Disorders of lipid and lipoprotein metabolism
6.5. Lysosomal storage disorders
6.6. Peroxisomal disorders
6.7. Disorders of metabolism of purines and pyrimidines
6.8. Disorders of metabolism of fatty acid and ketone body metabolism
6.9. Disorders of metabolism of porphyrins and heme metabolism
6.10. Disorders of metabolism of trace elements and metals
6.11. Disorders of energy metabolism

7. Chromosomal abnormalities
7.1. Incidence of chromosomal abnormalities
7.2. Trisomies: (Down syndrome, Edward syndrome, Patau syndrome)
7.3. Disorders of sex chromosomes: (Klinefelter syndrome, Turner syndrome, Fragile X syndrome)
7.4. Chromosomal deletion and microdeletion syndromes: (Prader Willi syndrome, Angelman syndrome, Retinoblastoma, DeGearge syndrome)
7.5. Chromosomal breakage syndromes: (Fanconi anemia, Ataxia telangiectasia, bloom syndrome, Xeroderma pigmentosa)
7.6. Disorders of sexual differentiation: (True hermaphroditism, Male pseudo hermaphroditism, Female pseudo-hermaphroditism)
7.7. Indications for chromosomal analysis

8. Genetic counselling
8.1. Definition
8.2. Indications for genetic counselling
8.3. Establishing the diagnosis
8.4. Pedigree analysis and calculating and presenting risk
8.5. Discussing the options
8.6. Communication including breaking bad news, handling complaints and communication with colleagues and support
8.7. Directive or non-directive Genetic counselling
8.8. Ethical, legal and social consideration in genetic counselling
8.9. Outcomes in genetic counselling

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8.10. Special problems in genetic counselling: (Consanguinity, Incest, Adoption, Disputed paternity)

9. Reproductive genetics

9.1. Termination of pregnancy
9.2. Preimplantation genetic diagnosis
9.3. Assisted reproductive techniques and implications for genetic diseases
9.4. Assisted conception and the law
9.5. Prenatal treatment

10. Treatment of genetic diseases

10.1. Enzyme/Protein replacement therapy
10.2. Gene therapy
10.3. Drug therapy
10.4. Genetic engineering
10.5. Tissue transplantation/Stem cell therapy
10.6. Approach to diagnosis and treatment of genetic diseases
10.7. Basics of multidisciplinary management of genetic diseases

11. Ethical and legal issues in medical genetics

11.1. General principles
11.2. Ethical dilemmas in medical genetics
11.3. Ethical dilemmas in a wider context including ethical policies
11.4. Privacy of genetic information

12. Introduction to research methods

12.1. Scientific thinking, reading, critiquing including search and critical review of medical literature
12.2. Scientific writing
12.3. Bioinformatics tools for research
12.4. Information technology and the computer: Their role in research
12.5. Research designs including clinical trial.
12.6. Informed consent and confidentiality issues in conducting research
12.7. Planning experiments for appropriate statistical analysis
12.8. Statistical methods including genetic statistics and linkage analysis
12.9. Data presentation, clinical database and tools for clinicians
12.10. The ethics of use of human and animal subjects in research and related ethical dilemmas
12.11. Plagiarism and major research and publication misconducts
12.12. Detection of fraud and implication

13. Recent advances in clinical genetics

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

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२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व. २०७९/०८०

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject
Section (A) – 50 Marks

1. **Basic physiology of Haemopoetic system**

2. **Erythrocyte**
   - 2.1 Clinical manifestations & classification of erythrocyte disorders
   - 2.2 Aplastic Anaemia
   - 2.3 Pure red cell aplasia
   - 2.4 Anemia of chronic disease
   - 2.5 Paroxysmal Nocturnal hemoglobinuria (PNH)
   - 2.6 Iron deficiency anemia and iron overload
   - 2.7 Disorders of iron metabolism
   - 2.8 Thalassemias
   - 2.9 Sickle cell anemia
   - 2.10 Anemia of chronic disease, renal disease, endocrine disease,
   - 2.11 Megaloblastic anemias
   - 2.12 Haemolytic anemias
     - 2.12.1 Hereditary spherocytosis
     - 2.12.2 Hereditary elliptocytosis and related disorders
     - 2.12.3 Hereditary stomatocytosis
     - 2.12.4 Paroxysmal nocturnal hemoglobinuria
     - 2.12.5 Enzymatic defects
     - 2.12.6 Hemolytic anemias resulting from extracellular factors- immune haemolytic anemias, resulting from physical injury to RBCs, resulting from chemical & physical agents, resulting from infections & microorganisms etc
   - 2.13 Haemoglobinopathies
     - 2.13.1 Sickle cell disease/Sickle cell trait
     - 2.13.2 Hereditary methemoglobinemia
     - 2.13.3 Thalassemia syndromes
   - 2.14 Porphyria: Hematological aspects
   - 2.15 Polycythaemia (erythrocytosis)

3. **Pancytopaenias**
   - 3.1 Inherited Bone marrow failure syndromes with pancytopenia
   - 3.2 Acquired pancytopaenias
   - 3.3 Marrow infiltration disorders

4. **Disorders of different components of white blood cells**
   - 4.1 Neutrophil: Classification & clinical manifestations of neutrophil disorders, Neutropenia, Neutrophilia, Leukemoid reaction, Disorders of neutrophil function
   - 4.2 Eosinophil: Eosinophilia, Hypereosinophillic syndrome, Eosinophilic granulomatosis and polyangiitis, Other disorders of eosinophils
   - 4.3 Basophil: Basophilia, Other disorders of basophils and mast cells
   - 4.4 Lymphocyte: Classification & manifestations of lymphocyte & monocyte disorders, Lymphopenias, Lymphocytosis, Immunodeficiency disorders, Hematological aspects of HIV infection, Mononucleosis syndromes
   - 4.5 Monocyte: Classification & clinical manifestations of disorders of monocytes and macrophages, Monocytosis & monocytopaenia, Inflammatory & malignant histiocytosis

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5. **Splenomegaly, Hyposplenism, Hypersplenism, Splenic trauma and Splenectomy**

6. **Hematopoietic Cell Transplantation**
   - 6.1 Autologous Stem cell transplant
   - 6.2 Allogeneic Stem cell transplant

7. **Transfusion medicine**
   - 7.1 Red blood cell transfusions and erythropoietin therapy
   - 7.2 Platelet transfusions
   - 7.3 Neutrophil (granulocyte) transfusions
   - 7.4 Plasma transfusions
   - 7.5 Risks of blood transfusions

Section (B) - 50 Marks

8. **Hemorrhagic and thrombotic diseases**
   - 8.1 Classification & clinical manifestations of disorders of hemostasis
   - 8.2 Clinical and laboratory evaluation of hemostasis
   - 8.3 Hereditary clotting factor deficiencies (bleeding disorders)
     - 8.3.1 Factor VIII or Factor IX deficiency
     - 8.3.2 Factor XI deficiency
     - 8.3.3 Factor VII deficiency
     - 8.3.4 Factor X deficiency
     - 8.3.5 Prothrombin (Factor II) deficiency
     - 8.3.6 Factor V deficiency
     - 8.3.7 Combined deficiency of Factor V and VIII
     - 8.3.8 Fibrinogen (Factor I) deficiency
     - 8.3.9 Factor XIII deficiency
   - 8.4 von Willebrand disease
   - 8.5 Thrombotic disorders: DVT, Pulmonary & other thromboembolisms
   - 8.6 Essential thrombocythemia & thrombocytosis
   - 8.7 Acquired inhibitors of coagulation
   - 8.8 Disseminated intravascular coagulation
   - 8.9 Antiphospholipid syndrome
   - 8.10 Platelet and blood vessel disorders
     - 8.10.1 Autoimmune thrombocytopenic purpura
     - 8.10.2 Drug induced thrombocytopenia
     - 8.10.3 Nonimmune platelet destruction
     - 8.10.4 Thrombotic thrombocytopenic purpura
     - 8.10.5 Platelet function disorders
     - 8.10.6 Congenital and acquired disorders of platelet function

9. **Malignant Lymphoid diseases**
   - 9.1 Classification of malignant lymphoid disorders
   - 9.2 Acute lymphoblastic leukemia (ALL)
   - 9.3 Hodgkin's Lymphoma
   - 9.4 Chronic Lymphoblastic Lymphoma
   - 9.5 Marginal Zone Lymphoma
   - 9.6 Follicular Lymphoma

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9.7 Mantle Cell Lymphoma
9.8 DLBCL
9.9 Burkitt's lymphoma
9.10 Primary CNS lymphoma
9.11 T cell and NK cell lymphoma
9.12 MGUS
9.13 Multiple myeloma
9.14 Light chain amyloidosis
9.15 Waldenstorm macroglobulinemia
9.16 Large granular lymphocytic leukemia
9.17 Hairy cell leukemia
9.18 Other malignant diseases: Amyloidosis, Heavy chain diseases

10. **Malignant myeloid diseases**
10.1 Classification & clinical manifestations of clonal myeloid disorders
10.2 Polycythemia Vera
10.3 Essential Thrombosis
10.4 Primary myelofibrosis
10.5 Myelodysplastic Syndrome
10.6 Chronic myeloid Leukemia
10.7 Acute Myeloid Leukemia

11. **Therapeutic principles in hematology**
11.1 Pharmacology & toxicity of antineoplastic drugs
11.2 Treatment of infections in immunocompromised host
11.3 Principles of antithrombotic therapy
11.4 Principles of immune cell therapy
11.5 Principles of vaccine therapy
11.6 Principles of therapeutic apheresis
11.7 Pain management

12. **Hematological diseases during pregnancy**

13. **Hematological diseases during elderly**

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. **प्रथम चरण** (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis	3.00 hrs

२. **द्वितीय चरण** (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
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2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
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2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Skin Diseases/Disorders**
   - 1.1 Anatomy And Organization Of Human Skin
   - 1.2 Function Of The Skin In General and Specific Cutaneous Pathology
   - 1.3 Clinical Immunology and Allergy
   - 1.4 Prenatal Diagnosis Of Skin Diseases
   - 1.5 Cutaneous Signs and Diagnosis
   - 1.6 Dermatoses Resulting From Physical Factors
   - 1.7 Pruritus And Neurocutaneous Dermatoses
   - 1.8 Atopic Dermatitis, Eczema, and Noninfectious Immunodeficiency Disorders
   - 1.9 Contact Dermatitis and Drug Eruptions
   - 1.10 Erythema and Urticarial
   - 1.11 Dermatologic Surgery And Recent Advances Like Cosmetic Dermatology and Cutaneous Laser Surgery

2. **Venereology**
   - 2.1 Sexually transmitted infections (STI)
   - 2.2 HIV/ AIDS
   - 2.3 Syndromic approach to STI
   - 2.4 Recent advances

3. **Leprosy**
   - 3.1 Hansen's Disease
   - 3.2 WHO policies regarding Leprosy Control
   - 3.3 National Policies regarding Leprosy Control
   - 3.4 Recent advances in Leprosy management

Section (B) - 50 Marks

4. **Skin Diseases/Disorders**
   - 4.1 Connective Tissue Diseases
   - 4.2 Mucinoses
   - 4.3 Seborrhoeic Dermatitis, Psoriasis, Recalcitrant Palmoplantar Eruptions, Pustular Dermatitis and Erythroderma
   - 4.4 Pityriasis Rosea, Pityriasis Rubra Pilaris, and Other Papulosquamous And Hyperkeratotic Diseases
   - 4.5 Lichen Planus and Related Conditions
   - 4.6 Acne
   - 4.7 Bacterial Infections
   - 4.8 Diseases Resulting From Fungi and Yeasts
   - 4.9 Mycobacterial Diseases
   - 4.10 Viral Diseases
   - 4.11 Parasitic Infestations, Stings, and Bites
   - 4.12 Chronic Blistering Dermatoses
   - 4.13 Nutritional Diseases
   - 4.14 Diseases Of Subcutaneous Fat
   - 4.15 Endocrine Diseases
   - 4.16 Abnormalities Of Dermal Fibrous and Elastic Tissue

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4.17 Errors In Metabolism
4.18 Genetics , Genodermatoses and Congenital Anomalies
4.19 Dermal and Subcutaneous Tumors
4.20 Epidermal Nevi, Neoplasms, and Cysts
4.21 Melanocytic Nevi And Neoplasms
4.22 Macrophage/Monocyte Disorders
4.23 Cutaneous Lymphoid Hyperplasia, Cutaneous T-Cell Lymphoma, Other Malignant Lymphomas, and Allied Diseases
4.24 Diseases Of The Skin Appendages
4.25 Disorders Of The Mucous Membranes
4.26 Cutaneous Vascular Diseases
4.27 Disturbances Of Pigmentation

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फ्यामिलि मेडिसिन एण्ड इमर्जेन्सी समूह, फ्यामिलि मेडिसिन एण्ड इमर्जेन्सी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Applied Basic Sciences**
   - 1.1 Applied anatomy
   - 1.2 Applied Physiology
   - 1.3 Applied Pathology
   - 1.4 Applied Pharmacology
   - 1.5 Applied immunology
   - 1.6 Applied biostatics
   - 1.7 Applied research methods
   - 1.8 Applied Molecular biology and genetics

2. **Knowledge of outpatient department**
   - 2.1 Initial assessment with logical approach to undifferentiated illness.
   - 2.2 Impact of illness in the context of the family and community
   - 2.3 Sensitive to psychosocial issues related to presentation
   - 2.4 Follow- up management plans especially in chronic disease (e.g. diabetes, hypertension, asthma, COPD, APD ,anxiety/depression, growth and development)
   - 2.5 STD, antenatal and postnatal care, well women and men assessments
   - 2.6 Care of previously treated problems
   - 2.7 Coordination of care

3. **Medicine**
   - 3.1 Chest pain (acute and chronic)
   - 3.2 Palpitations
   - 3.3 Shortness of breath (acute, intermittent and chronic)
   - 3.4 Wheezing/Stridor
   - 3.5 Haemoptysis
   - 3.6 Cough
   - 3.7 Cyanosis
   - 3.8 Swelling of body parts
   - 3.9 Dyspepsia
   - 3.10 Reflux
   - 3.11 Haematemesis and malaena
   - 3.12 Upper and lower abdominal pain (acute and chronic)
   - 3.13 Diarrhoea
   - 3.14 Vomiting
   - 3.15 Abdominal distension
   - 3.16 Constipation
   - 3.17 jaundice
   - 3.18 Dysuria
   - 3.19 Haematuria
   - 3.20 Impotence
   - 3.21 Confusion
   - 3.22 Coma
   - 3.23 Headache
   - 3.24 Convulsions
   - 3.25 Syncope
   - 3.26 paralysis

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3.27 paraesthesia
3.28 Weakness
3.29 Fever
3.30 Anorexia
3.31 Fatigue
3.32 Myalgia
3.33 Itch
3.34 Rash
3.35 Abnormal bleeding
3.36 Swollen glands
3.37 Joint swelling
3.38 Joint pain
3.39 Thyroid disease
3.40 Diabetes
3.41 Tuberculosis
3.42 Drug related problem -iatrogenic, poisoning, or abuse including alcohol/smoking
3.43 Anaemia
3.44 Depression
3.45 Hypertension
3.46 Spinal dysfunction
3.47 Urinary tract infection
3.48 Holistic management of patients with HIV/AIDS
3.49 palliative care

4. **Paediatrics**

4.1 Neonatal Knowledge-Normal Newborn Care
- 4.1.1 Prematurity/Postmaturity
- 4.1.2 Birth trauma/Asphyxia
- 4.1.3 Respiratory distress
- 4.1.4 Jaundice
- 4.1.5 Sepsis
- 4.1.6 Congenital problems (cardiac, hip, cleftpalate, tracheo-oesophageal fistula, imperforate anus, diaphragmatic hernia)

4.2 Acute Life Threatening Problems
- 4.2.1 Stridor /Airway compromise (Croup/epiglottitis)
- 4.2.2 Respiratory distress and potential respiratory failure (severe ARI, Asthma)
- 4.2.3 Circulatory failure/shock including Sepsis and dehydration
- 4.2.4 Altered Sensorium including Meningitis/ encephalitis / encephalopathies (hepatic, uraemic, hypertensive)
- 4.2.5 Seizures and status epilepticus
- 4.2.6 Congestive heart failure
- 4.2.7 Supraventricular tachycardia
- 4.2.8 Acute renal failure
- 4.2.9 Tetanus
- 4.2.10 Poisoning
- 4.2.11 Drowning/near drowning
- 4.2.12 Bleeding disorders
- 4.2.13 Diabetic Ketoacidosis
- 4.2.14 Acute Abdominal Pain (distinguish medical and surgical causes)

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4.3 Feeding Problems: Understanding of Breastfeeding and Nutrition
4.4 Growth Disorders: Protein Calorie Malnutrition,failure to thrive,short stature
4.5 Common Febrile Illness
- 4.5.1 ARI (including Pertussis)
- 4.5.2 Diarrheal diseases (viral, bacterial,Parasitic)
- 4.5.3 Urinary Tract Infection
- 4.5.4 Septicemia/Bacteremia
- 4.5.5 Enteric fever
- 4.5.6 Malaria
- 4.5.7 Viral exanthema (measles ,mumps, etc)
- 4.5.8 Acute tonsilitis
- 4.5.9 Rheumatic fever/endocarditis
- 4.5.10 Tuberculosis (TB)
- 4.5.11 Infective hepatitis
- 4.5.12 Kala azar
- 4.5.13 PUO

4.6 Cough - including Asthma/Bronchitis/Bronchiolitis
4.7 Oedema-including renal (nephritic syndrome, nephritis), Kwashiorkor, cardiac
4.8 Chronic abdominal pain
4.9 Jaundice
4.10 Seizure disorders
4.11 Anemia and blood dyscrasias including Leukemias(recognize and refer)
4.12 Arthritis (septic arthritis, osteomyelitis,Juvenile Rheumatoid arthritis)
4.13 Skin disease/rashes(eg; scabies)
4.14 Common eye problems (eg, conjunctivitis)
4.15 Common ear problems(eg, otitis media)
4.16 Developmental delay/cerebral palsy/mental retardation
4.17 Visual/hearing/speech disorders(recognize and refer)
4.18 Dehydration
4.19 Certain diseases can present in different ways, so specifics attention should be paid to
- 4.19.1 Diabetes mellitus
- 4.19.2 Hypothyroidism
- 4.19.3 TB
- 4.19.4 HIV/AIDS

5. **Dermatology**

The general practice doctor will be able to manage the following common skin conditions:
5.1 Bacterial : Superficial bacterial infections, Skin TB ,Leprosy
5.2 Viral: Herpes simplex, Herpes Zoster, Wart, Molluscum contagiosum
5.3 Fungal: Dermatophyte, Candida, Tinea versicolor, Deep Fungal infection
5.4 Parasites: Scabies,Pediculosis,Leishmaniasis
5.5 Approach : Systemic Causes
- 5.5.1 Skin Causes – Infective (e.g. Scabies), Urticaria, Dermatitis Herpetiform, Lichen Planus

5.6 Common Skin Problems: Eczema/Dermatitis, Acne, Psoriasis, Drugeruption, Erythema multiforme, Erythema , Nodosum, Purpura, Bullous dieases
5.7 Skin Ulcers: Hair and Nail Disorders:
- 5.7.1 Alopecia, Onycholysis, Paronychia
- 5.7.2 Pigmented Skin Lesion including Melanoma.

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5.7.3 Common Lumps and Bumps including Skin Cancers:
5.7.4 Warts, Keratoacanthoma, Basal Cell, Squamous Cell, Carcinoma

5.8 Sexually transmitted disease
5.8.1 Non-specific urethritis/cervicitis, punctate balanoposthitis, candidiasis, trichomoniasis,condylomaaccuminata, syphilis, gonorrhea and chancroid
5.8.2 Sexual contact history, past history of STI, medications
5.8.3 Clinical examination and investigation to find other STDs
5.8.4 Contact tracing and treatment of contacts
5.8.5 Regular follow -up of STD cases

6. **Psychiatry**

6.1 Anxiety including Panic and phobic disorders
6.2 Depression
6.3 Conversion/Dissociative disorder
6.4 Psychosis
6.5 Bipolar mood disorder
6.6 Somatic presentations- including pseudo-seizures and multi- symptomatic patients
6.7 Substance Related Disorder
6.8 Childhood Mental Health Conditions
6.9 Concept of diagnostic classification: eg, DSM IV, WHO guidelines
6.10 Concept and simple practice of non -pharmacological approaches to mental health problems
6.11 Drug therapy
6.12 Legal and ethical issues regarding mental competence and detention and relationship with police (recognizing at present there are no laws in Nepal but there is a proposed National Mental Health Act)
6.13 Long term therapy, strategies for optimizing regime and getting compliance
6.14 Liaison with other health workers for management of long term cases
6.15 Practical approach to stabilizing cases before referral
6.16 Common conditions of Primary Care
6.16.1 Anxiety
6.16.2 Depression
6.16.3 Somatic Presentation of mental distress
6.16.4 Culture specific presentation of mental distress
6.16.5 Culture Specific presentation- dhatu, night fall, demon possession, new brides, perceptions about disease
6.16.6 Alcohol and substance misuse
6.16.7 Chronic Tiredness
6.16.8 Sleep disturbances
6.17 Health Promotion and support in chronic mental illness
6.17.1 Monitoring and follow- up in patient with chronic mental illness
6.17.2 Social support for patient and their family
6.17.3 Referral to appropriate specialist care
6.17.4 Work effectively with other workers for the management of people with mental health problems
6.18 Stage of life issues
6.18.1 Behavioral disorders in children
6.18.2 Intellectual disability
6.18.3 Childhood and family problems

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6.18.4 Adolescent depression and somatization disorders
6.18.5 Perinatal mental illness
6.18.6 At risk -drinking other dangerous behavior in young men and women
6.18.7 Mid-life crises, menopause,sexual problems
6.18.8 Adjustment disorders and chronic physical illness, disability
6.18.9 Dementia
6.18.10 Dying and bereavement

7. **Emergency Medicine**
7.1 Triage serious & non-serious problem.
7.2 Manage Major and minor Trauma
7.3 Manage life threatening medical, surgical, paediatric, gynaecological /obstetric emergencies
7.4 Describe concept of Disaster Plan & management
7.5 Manage Medico Legal Cases
7.6 Develops systematic approach to undifferentiable presentation (unconscious patients, chest pain; abdominal pain, dyspnea, etc.)
7.7 Organize and manage emergency services
7.8 Use emergency equipment and supplies available in Nepal
7.9 Develop knowledge about the Emergency Drugs particularly analgesia

Section (B) – 50 Marks

8. **Anaesthesia**
8.1 Cardiopulmonary resuscitation(basic and advanced cardiac life support)
8.2 Pre-operative assessment,including assessing ASA Physical status to know whether a GP anaesthetic is appropriate
8.3 Pre-anesthetic prescribing
8.4 General anesthetic prescribing
8.5 Local anesthesia and regional blocks
8.6 Post-operative recovery and monitoring
8.7 Pain management Intravenous fluid management(Pre and post surgery)
8.8 Airway management using facemask, oral airway and intubation
8.9 Regional anesthetic blocks, spinal, epidural and peripheral
8.10 Ketamine anesthetics(total intravenous anesthesia)
8.11 General anesthesia using draw- over technique
8.12 Ether anesthesia (EMO)

9. **Surgery**
9.1 **Skin and subcutaneous tissue**
9.1.1 Diagnosis and management of inflammatory condition of skin like cellulites, boils, carbuncle, etc.
9.1.2 Diagnosis and excision of sebaceous cysts, lipomas, etc
9.1.3 Diagnosis and management of squamous cell carcinoma, basal cell carcinoma and malignant melanoma
9.2 **Burns**
9.2.1 Initial resuscitation
9.2.2 management of fluid
9.2.3 Surgical Management -debridement and grafting

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9.3 **Lymph Nodes**
- 9.3.1 Describe the differential diagnosis of lymph node enlargement

9.4 **Arterial disorders**
- 9.4.1 Describe the feature of chronic limb ischaemia including Buergers' disease
- 9.4.2 Diagnose acute limb ischaemia
- 9.4.3 Diagnose and manage dry gangrene
- 9.4.4 Diagnose and manage DVT

9.5 **Salivary gland**
- 9.5.1 Diagnosis and management of parotid and submandibular abcess
- 9.5.2 Differential diagnosis of parotid and submandibular lump(biopsy is inappropriate)

9.6 **Thyroid**
- 9.6.1 Differential diagnosis of solitary thyroid nodule
- 9.6.2 Features of nodular goiter, its complications and indications for surgery
- 9.6.3 Features of thyrotoxicosis, its complications and indications for surgery
- 9.6.4 Management of hypothyroidism

9.7 **Breast**
- 9.7.1 Method of Breast self examination
- 9.7.2 Differential diagnosis of breast lump
- 9.7.3 Triple investigation
- 9.7.4 Principles of management of breast carcinoma
- 9.7.5 Differential diagnosis of nipple discharge and indication for surgery
- 9.7.6 Breast pain

9.8 **Upper GI Tract**
- 9.8.1 Dysphagia : differential diagnosis, Investigations required
- 9.8.2 Principle of management of oesophageal carcinoma,
- 9.8.3 Gastro-oesophageal reflux disease: medical management
- 9.8.4 Peptic ulcer disease: symptomatology,indications for endosocopy, medical management, complications and indications for surgery.
- 9.8.5 Management of Ulcer GI Bleeding
- 9.8.6 Management of Gastric carcinoma (Operative details not required)

9.9 **Hepatobiliary**
- 9.9.1 Jaundice : Pathophysiology, differential diagnosis
- 9.9.2 Liver abscess
- 9.9.3 Tumors of liver : differential diagnosis
- 9.9.4 Gallstone disease and its complications

9.10 **Pancreas**
- 9.10.1 Acute pancreatitis: aetiology, definitions of mild and severe pancreatitis, management, complications and indications for surgery
- 9.10.2 Chronic pancreatitis

9.11 **Small Intestine**
- 9.11.1 Features of small bowel obstruction, its differential diagnosis and management
- 9.11.2 Enteric fever and its complication
- 9.11.3 Appendicitis, appendicular mass and appendicular diagnosis abcess

9.12 **Large bowel/Rectum and Anal Canal**
- 9.12.1 Features of large bowel obstruction and its differential diagnosis
- 9.12.2 Ulcerative colitis
- 9.12.3 Bleeding per rectum, differential diagnosis
- 9.12.4 Hemorrhoids including complications
- 9.12.5 Perianal abscess

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9.13 **Hernia**
- 9.13.1 Inguinal and Femoral
- 9.13.2 Incisional hernia

9.14 **Urology**
- 9.14.1 Haematuria:differential diagnosis and investigation
- 9.14.2 Phimosis,paraphimosis
- 9.14.3 Stones in rental tract:indications for surgery
- 9.14.4 BHP
- 9.14.5 Acute urinary retention
- 9.14.6 Kidney Infection
- 9.14.7 Vasectomy
- 9.14.8 Scrotal swelling: differential diagnosis and investigation Undescendedtestis ,Diagnosis and Management of Testicular Torsion
- 9.14.9 Urethral Strictures

10. **Orthopaedics**

10.1 Traumatic condition: Recognition of what need to be done acutely and when referral may be more appropriate where possible
- 10.1.1 Injuries of the upper limb: (Manage/ Consider Referral if Possible)
- 10.1.2 Injuries of the lower limb and pelvis: (Manage/Refer)

10.2 Non- Traumatic condition:
- 10.2.1 Infective condition : Most important, Acute infection: Acute osteomyelitis; Acute septic arthritis; Chronic osteomyelitis; Tubercular infections including spine
- 10.2.2 Degenerative condition and office orthopaedics

10.3 Approach to diagnosis and conservative management where possible, with referral if possible and benefit from orthopedic consultation.
- 10.3.1 Osteoarthritis
- 10.3.2 Gout/Pseudogout
- 10.3.3 Acute and Chronic low back and cervical pain
- 10.3.4 Regional Musculo-skeletal condition Shoulder, Elbow, Wrist, Hip, Knee,Ankle

10.4 Other Rarer Condition
- 10.4.1 Congenital Deformities
- 10.4.2 Neoplastic condition
- 10.4.3 Metabolic and other condition
- 10.4.4 Auto-immune diseases

11. **Obstetrics & Gynaecology**

11.1 Antenatal period(normal and abnormal pregnancy)
- 11.1.1 Normal/ low risk pregnancy and High risk pregnancy

11.2 Labour and delivery

11.3 Postpartum(Normal puerperium/Abnormal puerperium)

11.4 Gynaecology(Local management/Referral)

11.5 Medical condition during Pregnancy
- 11.5.1 DM: Hypertension
- 11.5.2 Heart disease
- 11.5.3 Jaundice

12. **Family Planning**

12.1 Male and female reproductive anatomy physiology

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12.2 The current status of family planning and voluntary surgical contraception in Nepal, including legal status, cultural barriers, myths and prejudices
12.3 The rational for vasectomy and tubal ligation, their benefits and disadvantages.
12.4 Recognize eligible candidates for voluntary surgical contraception and provide information and counseling services to ensure informed client consent.
12.5 Follow the principles of infection prevention and control and preoperative management for vasectomy and/or the minilap
12.6 Demonstrate the use of aseptic technique, appropriate anaesthesia and analgesia
12.7 Demonstrate the basic surgical skills required for vasectomy and /or minilap.
12.8 Manage post- operative patients, including any complication related to anaesthesia, surgery and early and late complications.
12.9 Techniques for reversal of vasectomy of tubal ligation
12.10 Utilize the common methods of contraception including Depo-Provera, Norplant, Intra-uterine devices, Oral contraceptives
12.11 Follow up patient who accept various methods of contraception

13. **Ultrasound**

13.1 The different components of Ultrasound equipment and their function
13.2 Take proper care of the Ultrasound equipment including sterilization of transducers
13.3 Identify artifacts and their usefulness and those that degrade the ultrasounds image
13.4 The ultrasound orientation of the image, scanning techniques and preparation of the patients
13.5 Identify key obstetrics, medical and surgical condition on ultrasound

14. **Dentistry**

14.1 Prevent common dental diseases
14.2 Recognize and manage common dental problems
14.3 Manage dental emergencies
14.4 Recognize and manage acute dental and periodontal conditions.
14.5 Perform minor procedures.
14.6 Recognize conditions that need to be referred for further therapeutic measures.
14.7 Temporo- mandibular joint dislocation
14.8 Post dental extraction bleeding
14.9 Gingivitis
14.10 Syncope
14.11 Periodontitis
14.12 Dental caries
14.13 Precancerous condition

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, इन्टरनल मेडिसिन उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Anatomy**

1.1 **Neuro-Anatomy**

1.1.1 Neuron and its structure
1.1.2 Supportive cell type structure, cellular and myelin sheaths
1.1.3 Synapsis, neuro-effective junctions and receptors
1.1.4 Cerebrum: morphology, cerebral cortex, cortical neurons, cortical layers
1.1.5 Motorsystem: structure, corticospinal, rubrospinal,vestibulospinal and reticulospinal tracts
1.1.6 Basalganglia: structure
1.1.7 Cerebellum: morphology, cellular structure and organization
1.1.8 Brainstem: general organization
1.1.9 Spinal cord and ganglia: morphology, motor and sensory organization in the spinal cord

1.2 **Anatomy of neuro-muscular system**

1.2.1 LMN, structuring of voluntary muscles, motor units, types of muscle fibres
1.2.2 Muscle spindles and other muscles & tendon receptors
1.2.3 Sensory system
1.2.4 Reflex pathways: involving cranial nerves,and limb and trunk
1.2.5 Cranial nerves and special senses: pathways and structure of special sense organs
1.2.6 Anatomy of ventricular system and CSF production
1.2.7 Anatomy of meninges
1.2.8 Autonomic nervous system
1.2.9 Arterial and venous cerebral circulation
1.2.10 Blood brain barrier

1.3 **Pulmonology**

1.3.1 Gross anatomy of upper and lower respiratory tracts, lungs with lobes and fissureswith surface marking
1.3.2 Concept of bronch opulmonary segments and lobule or acinus aerated by aterminal bronchiole
1.3.3 Histology of alveolar lining cells
1.3.4 Pulmonary vascular bed
1.3.5 Pleura and pleural space, functions and histology
1.3.6 Media stinum and their structures
1.3.7 Thoracic cage and primary and secondary muscles of respiration
1.3.8 Thediaphragm its attachments, nerve supply and function
1.3.9 Lymphatic drainage of lungs and pleura
1.3.10 Innervation of the lungs
1.3.11 Thoracic receptors

1.4 **Cardiovascular system**

1.4.1 Gross anatomy of the heart and circulatory system
1.4.2 Histology of the cardiac muscles
1.4.3 Embryology of the heart and circulation
1.4.4 Coronary and pulmonary circulation

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1.5 **Gastrointestinal tract**
- 1.5.1 Gross anatomy of the gastrointestinal tract at different levels
- 1.5.2 Gross anatomy of the hepatobiliary system and pancreas
- 1.5.3 Histological aspects of GI tract at different levels
- 1.5.4 Blood supply and development aspects of GI tract and hepatobiliary system

1.6 **Kidney and urinary tract**
- 1.6.1 Gross anatomy of the kidney and urinary tract
- 1.6.2 Structure of nephron and function at different level
- 1.6.3 Development of kidney and urinary tract
- 1.6.4 Renal circulation

1.7 **Endocrinal organs**
- 1.7.1 Gross anatomy of different endocrinal organs and their development
- 1.7.2 Histology of different endocrinal organs

2. **Physiology**
- 2.1 Homeostatic behaviors of different fluid compartment in the body and implications during common clinical situations of burn, blood loss, diarrhea, vomiting, etc.
- 2.2 Role of pH in normal and in abnormal conditions e.g., diarrhea, vomiting, airway obstruction, medication, etc
- 2.3 Functions of micro/macro molecular, organelles and other structures of the cell
- 2.4 Nutritional requirements of normal people (different ages, male, female) and ill patients of all categories with their modality of supplement
- 2.5 Mechanisms of metabolic response to trauma and infection
- 2.6 Function of hemopoietic /R.E.system
- 2.7 Blood groups, methods of transfusion of blood & blood products & their hazards
- 2.8 Mechanism of haemostais, fibrinolysis & methods to control haemorrhage
- 2.9 Types of excitable tissues and methods of recording their activity e.g., EMG, EEG, ECG, etc
- 2.10 Cellular communication, chemical/neuronal/ electrical/synaptic transmission
- 2.11 Autonomic nervous system
- 2.12 Neuro transmitters, their synthesis and metabolism
- 2.13 Drugs affecting neurotransmitter activity
- 2.14 Cardiac and smooth muscles
- 2.15 Calcium metabolism
- 2.16 Pain and the mechanism of pain
- 2.17 Physiology of consciousness and sleep mechanism
- 2.18 Effect of injury to neurons
- 2.19 Different methods of monitoring of the heart functions
- 2.20 Drugs used for inotropic & chronotropic effects
- 2.21 Mechanism of blood pressure regulation
- 2.22 Physiology of circulation of different organ in the body
- 2.23 Pathophysiology of shock and principle of their management
- 2.24 Capillary exchange
- 2.25 Assess vascular functions
- 2.26 Respiration & cause of breathlessness
- 2.27 Measure blood flow
- 2.28 Measure/ assess blood gas
- 2.29 Mechanism of respiratory control
- 2.30 Mechanism of transport

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2.31 Use of oxygen as therapy
2.32 Mechanism of absorption from gut and physiology of gastrointestinal motility
2.33 Composition of GI and hepatobiliary secretions and methods for their assessment
2.34 Normal functions of the liver
2.35 Formation of urine
2.36 Mechanism of osmoregulation
2.37 Normal thermoregulation
2.38 Mechanism of hormone synthesis, secretion, metabolism

3. **Pathology**
3.1 Concept of cell injury, different types of degeneration & trauma
3.2 Principles of inflammation and the results of various types of inflammation
3.3 Acute and chronic inflammation
3.4 Tissue regeneration, wound healing and healing process
3.5 Various types of disorder of growth
3.6 Principles of neoplasia
3.7 Benign and malignant tumor
3.8 Mechanism of thrombosis, and embolism and their effects
3.9 Ischemia & infarction
3.10 Mechanism of blood clotting and different types of bleeding disorders
3.11 Principle of blood grouping system & complications of blood transfusion
3.12 Principle of shock
3.13 Principle of genetics and apply its concept in hereditary diseases
3.14 Principle of immune response
3.15 Humoral and cell mediated immunity
3.16 Principle of organ transplantation and causes of its rejection
3.17 Principle of Host Parasite relationship
3.18 Different types of micro-organism (Bacteria, Fungus, Parasite, and Virus)
3.19 Pathogenic and non-pathogenicmicro-organisms
3.20 Principle of asepsis & antisepsis, sterilization and disinfection
3.21 Principle of antibiotic and chemotherapy
3.22 Microbes that cause wound infection
3.23 Principle of Hospital infection (Nosocomial infection)

4. **Clinical Pharmacology**
4.1 **General clinical pharmacology**
4.1.1 Pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, drug use in childhood, pregnancy, lactation, and old age
4.1.2 Clinical trials
4.1.3 Rational drug use
4.2 **Neurosensory and musculoskeletal systems**
4.2.1 Parasympathomimetics and parasympatholytics, adrenergic and antiadrenergic drugs, narcotic and non-narcoticanalgesics, non-steroidalanti-inflammatory drugs, alcohol, sedative/hypnotics, anti-parkinsonism drugs, anesthetics (general and local), appetite suppressants
4.2.2 Drugs for psychiatric disorder, gout and rheumatoid arthritis, vertigo, and eye, ENT, and skin diseases
4.3 **Cardiovascular system**
4.3.1 Drugs for the treatment of heart failure, cardiac arrhythmias, angina pectoris,

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hypertension, shock, thromboembolic disorders, myocardial infarction, anemia
- 4.3.2 Hemostatics, anti-coagulants, and lipid-lowering drugs

4.4 **Gastrointestinal system**
- 4.4.1 Drugs for peptic ulcer, diarrhoea, constipation
- 4.4.2 Antispasmodics, antiemetics

4.5 **Respiratory system**
- 4.5.1 Drugs for bronchial asthma
- 4.5.2 Antihistamines and other antiallergic agents
- 4.5.3 Cough preparation, nasal decongestants, and respiratory stimulants

4.6 **Reproductive/Endocrine systems**
- 4.6.1 Anti-diabetics, thyroid and anti-thyroid drugs, corticosteroids, sex hormones and antagonists, hypothalamic and pituitary hormones
- 4.6.2 Drugs used in labor and puerperium

4.7 **Renal/Electrolyte system**
- 4.7.1 Drugs for edema, and fluid/electrolyte and acid/base disturbances

4.8 **Infections**
- 4.8.1 General principle of chemotherapy
- 4.8.2 Antibacterial, antiprotozoal, anthelminthic, antifungal, and antiviral drugs

4.9 **Miscellaneous drugs**
- 4.9.1 Drugs for malignant diseases and immunosuppression
- 4.9.2 Vaccines
- 4.9.3 Vitamins and minerals
- 4.9.4 Antidotes

5. **Recent Advances in Internal Medicine and Emergencies**

5.1 Recent advances in all disciplines of Internal Medicine

5.2 Cardiovascular emergencies: Cardiac arrest, Acute MI, Cariogenic shock, Cardiacarrhythmias, Pulmonary edema, Hypertensive crisis, Acute cardiac tamponade, DVT & pulmonary embolism

5.3 Respiratory emergencies: Hemoptysis, Acute respiratory failure, Pneumothorax, Statusasthmaticus, ARDS

5.4 Gastrointestinal emergencies: G.I. bleeding, Acute gastroenteritis and food poisoning, Acute pancreatitis, Hepatic failure, Acute abdomen

5.5 Neurological emergencies: CVA including SAH, Hypertensive encephalopathy, Meningitis, Encephalitis, Unconscious patient, Status epilepticus, Myastheniagravis

5.6 Endocrine and metabolic emergencies: DKA and coma, Hypoglycemia, Hyperosmolar non ketotic diabetic coma, Thyroid crisis, Myxoedema coma, Pheochromocytoma, Acuteadrenocorticalcrisis, Hypopituitarism

5.7 Hematological emergencies: Aplastic anaemia, Agranulocytosis, Acutethromocythpenicpurpur, Leukemia, Hemophiliaandallieddisorders

5.8 Renal emergencies: Renalcolic, Renalfailure, Hematuria

5.9 Miscellaneous emergencies:
- 5.9.1 Emergencies in fluid and electrolyte balance
- 5.9.2 Acute emergencies in infectious and tropicaldisease
- 5.9.3 Malaria
- 5.9.4 Septicemia
- 5.9.5 Tetanus
- 5.9.6 Snakebite
- 5.9.7 Dog bite & rabies

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5.9.8 Poisonings
5.9.9 Drowning
5.9.10 Electrocution
5.9.11 High altitude sickness

Section (B) – 50 Marks

6. **Principles and Practice of Internal Medicine**

6.1 **Gastroenterology**

6.1.1 Acid peptic diseases
6.1.2 Gastrointestinal bleeding: upper (nonvariceal/variceal) and lower
6.1.3 Gastroesophageal reflux disease (GERD)
6.1.4 Dysphagia in relation to malignancy and achalasia
6.1.5 Malabsorption syndrome
6.1.6 IBD: ulcerative colitis and Crohn's disease
6.1.7 Diverticular diseases
6.1.8 Irritable bowel syndrome
6.1.9 Acute abdomen
6.1.10 Ascites
6.1.11 Liver disorders
6.1.12 Hepatitis: acute and chronic
6.1.13 Cirrhosis with special reference
6.1.14 Hepatic cellular cancer
6.1.15 Jaundice: obstructive and non-obstructive
6.1.16 Liver failure: acute and chronic
6.1.17 Pancreas
6.1.18 Acute, recurrent & chronic pancreatitis
6.1.19 Pancreatic tumor (exocrine & endocrine)
6.1.20 Cystic fibrosis & other childhood disorder of the pancreas
6.1.21 Hereditary pancreatitis
6.1.22 Pancreatic transplantation

6.2 **Respiratory Medicine**

6.2.1 Anatomy and applied physiology of the respiratory system
6.2.2 Understanding of basic pathophysiology and be able to manage the disease processes mentioned below considering the relevant differential diagnosis:
6.2.2.1 Pneumonias
6.2.2.2 Lung abscess
6.2.2.3 Tuberculosis
6.2.2.4 Fungal infections
6.2.2.5 Bronchial asthma
6.2.2.6 Chronic bronchitis, emphysema and cor-pulmonale
6.2.2.7 Cystic fibrosis
6.2.2.8 Pulmonary eosinophilia
6.2.2.9 Bronchiectasis (including its postural drainage management)
6.2.2.10 Pulmonary oedema (cardiogenic and non-cardiogenic including ARDS)
6.2.2.11 Interstitial lung disease (including fibrosingalveolitis, extrinsical veolitis, lung fibrosis, sarcoidosis and pneumoconiosis)
6.2.2.12 Carcinoma lung and other neoplasms
6.2.2.13 Mediastinal masses
6.2.2.14 Pleural diseases (e.g.,drypleurisy, pleural effusion,empyema)

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6.2.2.15 Pneumothorax
6.2.2.16 Sleepapnoea syndrome
6.2.2.17 Acute and chronic respiratory failure

6.3 **Hematology**

6.3.1 Physiology and pathophysiology of bloodcell formation and haemostasis
6.3.2 Pathophysiology, causes and management of:
6.3.2.1 Anaemia: iron deficiency (with iron metabolism), megaloblastic, haemolytic anaemia and aplastic anaemia
6.3.2.2 Haemoglobinopathy and Polycythemia
6.3.2.3 Leukaemia: myeloid (acute and chronic) and lymphoid (acute and chronic)
6.3.2.4 Myeloproliferative diseases
6.3.2.5 PV(Polycythemia Vera)
6.3.2.6 Myelofibrosis
6.3.2.7 Essential thrombocytosis
6.3.2.8 Bleeding Disorders
6.3.2.9 Plateletes Disorders
6.3.2.10 Lymphomas: Hodgkin's and NonHodgkin's
6.3.3 Explain the underlying principles and complications of:
6.3.3.1 Blood Transfusion, Blood group and Rh factor, Principles of cross match, Hazards of transfusion, Blood–platelets component, Bone MarrowTransplantation
6.3.3.2 Infectious and Tropicaldiseases
6.3.4 Understanding of the following procedures:
6.3.4.1 Peripheral blood smear
6.3.4.2 Splenicaspiration
6.3.4.3 Z– N staining
6.3.4.4 Gram's staining
6.3.4.5 Bone marrow examination
6.3.4.6 Stool examination
6.3.4.7 Aldehyde test
6.3.4.8 Liver biopsy
6.3.5 Microbiological aspects of various infectious disease
6.3.6 Underlying pathogenesis of various infectious/tropical disorders
6.3.7 Basic pharmacokinetics of drugs used for treatment of tropical and infectious diseases
6.3.8 Diagnose and manage following emergencies:
6.3.8.1 Septicemia, septic shock
6.3.8.2 Cerebral malaria/black waterfever
6.3.8.3 Tetanus/gasgangrene
6.3.8.4 Acute viral encephalitis
6.3.8.5 Hepatic Encephalopathy
6.3.8.6 Enteric Encephalopathy
6.3.8.7 HIV&AIDS

6.4 **Rheumatology**

6.4.1 Common clinical presentations of rheumatic disease
6.4.2 Systemic perspective of rheumatic diseases in different systems
6.4.3 Genetics and rheumatic diseases
6.4.4 Inflammatory arthritides (RA, SpA, crystal arthritis and others)

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6.4.5 Infection and joints (Septic arthritis and others)
6.4.6 Connective tissue diseases (SLE, systemic sclerosis and others)
6.4.7 Vasculitides
6.4.8 Diseases of bones and cartilages (osteoarthritis, osteoporosis and others)
6.4.9 Regional musculoskeletal pain syndromes
6.4.10 Miscellaneous conditions (autoinflammatory diseases, sarcoidosis & others)
6.4.11 Bone marrow aspiration
6.4.12 Bone marrow biopsy
6.4.13 Z-N staining
6.4.14 Muscle biopsy
6.4.15 Skin biopsy
6.4.16 Arthrocentesis
6.4.17 Intra–articularinjections
6.4.18 Anatomicalandphysiologicalaspectsofjointsmuscleandbloodvesselsin relation to rheumatologic conditions
6.4.19 Basisofcellularandhumoralimmuneresponse,autoimmunityandgenetherapyin rheumatological disorders
6.4.20 Interpret the results of various tests such as LEcell, ANF, antids DNA, electrophoresis, complement system
6.4.21 Analysis of synovial fluid
6.4.22 Interpret the X-ray findings of bones and joints
6.4.23 Interpretation of the results of:
6.4.23.1 Muscle biopsy
6.4.23.2 Skin biopsy
6.4.23.3 Kidney biopsy
6.4.24 To diagnose and manage rheumatologic emergencies

6.5 **Endocrinology and metabolic diseases**

6.5.1 Understanding of the following procedures:
6.5.1.1 Arterial puncture for blood gas analysis
6.5.1.2 Use of glucometer and stripes for blood sugar
6.5.1.3 Urine examination for sugar, Ketones, Specific gravity
6.5.2 Interpret the findings of the followingprocedures/tests:
6.5.2.1 Arterial blood gas analysis
6.5.2.2 Pulse oximetry
6.5.2.3 Thyroid function tests
6.5.2.4 Pituitary function tests
6.5.2.5 Parathyroid function tests
6.5.2.6 Adrenal gland functiontests
6.5.2.7 G.T.T
6.5.2.8 Sex hormone analysis
6.5.2.9 Plain X-ray of various parts concerned
6.5.3 Interpret the finding of:
6.5.3.1 FNAC report of thyroid gland
6.5.3.2 CT scan reports of various endocrine organs
6.5.4 Diagnose and manage following emergencies:
6.5.4.1 D.K.A. and comaand hyperosmolarnon ketoticcoma
6.5.4.2 Hypoglycaemia
6.5.4.3 Thyroidcrisis
6.5.4.4 Myxoedemacoma

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6.5.4.5 Phaeochromocytoma
6.5.4.6 Hypopituitarism
6.5.4.7 Hypocalcaemia
6.5.4.8 Acuteadrenocorticalcrisis
6.5.4.9 Hypopituitarism

6.5.5 Explain the structural and functionalbasis:
6.5.5.1 Various endocrine glands, homeostatic control mechanism of hormone regulation, and the genetic basis of various endocrine disorders

7. **Cardiology**

7.1 Diagnose order and interpret appropriate investigations and manage the following clinical conditions:
7.1.1 Acute Rheumatic Fever
7.1.2 Valvular heart disease: rheumatic and non-rheumatic
7.1.3 Common congenital heart diseases
7.1.4 Hypertension and hypertensive heart disease
7.1.5 Ischaemic heart disease:
7.1.5.1 Stable and unstable angina
7.1.5.2 Acute myocardial infraction
7.1.6 Cardiomyopathies: dilated cadiomyopathy, hypertrophic cardiomyopathy, restrictive cardiomyopathy
7.1.7 Pericardial diseases: pericarditis, pericardial effusion and constrictive pericarditis
7.1.8 Diseases of great arteries: coarctation of aorta, aortitis,aneurysm
7.1.9 Deepveinthrombosis: thromboembolism & pulmonaryembolism
7.1.10 Arrhythmias
7.1.10.1 Bradyarrhythmia (SA, AVblocks)
7.1.10.2 Tachyarrhythmias (SVT, VT, VF, WPW, AF, AVF)
7.1.10.3 Infective Endocarditis

7.2 Interpret the investigative of following procedures:
7.2.1 ECG with various arrhythmias
7.2.2 Stress electrocardiomyopathy
7.2.3 Echocardiogram of common acquired and congenital heart disease
7.2.4 Cardiac enzymes, pericardial fluid analysis

7.3 Diagnose and manage
7.3.1 Pulmonary oedema and cardiogenic shock
7.3.2 Dyslipidaemias
7.3.3 Corpulmonale and pulmonaryarterioal hypertension
7.3.4 Electrolyte imbalance
7.3.5 Basic science applied to cardiology
7.3.6 Fetal circulation
7.3.7 Coronary circulation
7.3.8 Pulmonary circulation
7.3.9 Embryogenesis of congenital heart diseases
7.3.10 Valvularapparatus
7.3.11 Conduction system
7.3.12 Pharmacology of cardiac drugs
7.3.13 Exercisephysiology
7.3.14 Etiopathogenesis and pathophysiology of various cardiac diseases in relation to clotting system, lipid abnormalities, infectious diseases

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7.3.15 Hemodynamics (exercise, high altitude, metabolic and hormonal disorders, fetal circulation)

8. **Nephrology**
- 8.1 Diagnose, investigate and treatment of following renal emergencies:
  - 8.1.1 Acute renal failure
  - 8.1.2 Renal colic
  - 8.1.3 Haematuria
  - 8.1.4 Fluid, electrolyte and acid-basic imbalance
- 8.2 Diagnose, investigate and treatment of following common renal diseases:
  - 8.2.1 Acute glomerulonephritis
  - 8.2.2 Nephrotic syndrome
  - 8.2.3 Urinary tract infection
  - 8.2.4 Chronicrenal failure
  - 8.2.5 Adult polycystic kidney disease, Alperts syndrome
  - 8.2.6 Diabetic Nephropathy
  - 8.2.7 Renal tubular acidosis (RTA)
  - 8.2.8 Interstitial Nephropathy
  - 8.2.9 Toxic Nephropathy
  - 8.2.10 Lupus Nephritis
  - 8.2.11 Nephrocalcinosis and Nephrolithiasis
  - 8.2.12 Renal arterystenosis (RAS)
- 8.3 Interpret investigations of:
  - 8.3.1 Renal function test(RFT)
  - 8.3.2 Blood gas analysis
  - 8.3.3 Renal biopsy report
- 8.4 Basic principles of haemodialysis and peritoneal dialysis and their specific indications

9. **Neurology**
- 9.1 Perform following procedures independently:
  - 9.1.1 Lumbar puncture
  - 9.1.2 Intrathecal injection
  - 9.1.3 Administration of IV contrastagent
- 9.2 Understanding of the following procedures
  - 9.2.1 EEG, EMG, Nerve conduction studies
- 9.3 Interpretation of the findings of:
  - 9.3.1 CT scan / MRI scan of:
    - 9.3.1.1 Subdural haematoma
    - 9.3.1.2 Intracranial haemorrhage including subarachnoid haemorrhage
    - 9.3.1.3 Infarction
    - 9.3.1.4 Obstructive hydrocephalus
  - 9.3.2 Myelogram:
    - 9.3.2.1 Complete obstruction
    - 9.3.2.2 Intramedullary compression
    - 9.3.2.3 Extramedullary compression
  - 9.3.3 Interpretation of theresults of:
    - 9.3.3.1 Muscle biopsy
    - 9.3.3.2 Nerve biopsy
    - 9.3.3.3 EEG

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9.3.3.4 EMG
9.3.3.5 Nerve conduction study
9.3.3.6 Carotid and vertebral angiogram
9.3.3.7 CT myelography

9.4 Diagnose and management the following neurological emergency:
- 9.4.1 CVA including subarachnoid haemorrhage
- 9.4.2 Meningitis
- 9.4.3 Encephalitis
- 9.4.4 Unconscious patient
- 9.4.5 Status epilepticus
- 9.4.6 Myastheniagravis
- 9.4.7 Increased Intracranialpressure
- 9.4.8 Guillain–Barre syndrome
- 9.4.9 Hypoxicencephalopathy

10. **Oncology**
- 10.1 Etiopathogenesis of cancer
- 10.2 Epidemiology of cancer
- 10.3 Cancer prevention & screening
- 10.4 Diagnosis & diagnostic tools in cancer
- 10.5 Principles of cancer management
- 10.6 Common cancers: Oesophagus, stomach, colorectum, hepatocellular cancer, cancers of the biliary tree, pancreas, breast, lung, renal cell carcinoma, prostate, testicular, GIST, ovarian, endometrial, hematological & lymphoid malignancies, cancers of the endocrine system, HIV-associated cancers, tumors of the mediastinum etc
- 10.7 Oncological emergencies & paraneoplastic syndromes
- 10.8 Anticancer therapeutics

11. **Dermatology**
- 11.1 Scabies
- 11.2 Superficial mycoses
- 11.3 Superficial bacterial infections
- 11.4 Diagnosis and management of drug induced cutaneous eruptions

12. **Psychiatry**
- 12.1 Diagnose anxiety neurosis, depression and schizophrenia
- 12.2 Differentiate between functional and organic psychoses (simple and uncomplicated)
- 12.3 Treat cases of anxiety neurosis and depression
- 12.4 Diagnose and manage substance abuse

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Obsterics**

1.1 Anatomy: Knowledge of anatomy of abdomen and pelvis applied to surgical procedures undertaken by the obstetrician and gynaecologist.

1.2 Pathology: Infection, inflammation therapeutic intervention (especially by the use of irradiation, cytotoxic drugs and hormones), disturbances in blood flow, loss of body fluids and neoplasia. Knowledge about changes in haemostasis in health and disease of a pregnant women.

1.3 Pharmacology: Knowledge of those drugs used in obstetrics and gynaecology Hormonal contraceptives in pregnancy and gonadotrophins and drugs contraindicated in pregnancy.

1.4 Immunology: Immunological changes in pregnancy; fetal development of the immune system, with particular knowledge of rhesus and isoimmunisations.

1.5 Infectious diseases: Knowledge of infectious diseases affecting pregnant and non-pregnant woman and fetus in utero. Knowledge of epidemiology, diagnostic techniques, prophylaxis, immunization and the use of antibiotics and antiviral agents.

1.6 Epidemiology and statistics: Collect data apply methods of statistical analysis. Knowledge of setting up clinical trials and the ability to interpret data through commonly used terms and techniques, interpretation of results of research, investigations, clinical trials design and medical audit.

1.7 Diagnostic imaging: Understand the application of ultrasound, computerized tomographic scanning and magnetic resonance imaging.

1.8 Radiodiagnosis: Basic chest skull and abdominal radiography in different views. Contrast radiography of different organic like IVP, Ba-series, Hysterosalphingography. Radiology of bones and joints.

1.9 Recent advances in radiology like CT, MRI and radioisotope scanning, Genetics and embryology. Detailed knowledge of normal and abnormal karyotypes, of the inheritance of genetic disorders and of the genetic causes of early abortion to diagnosis fetal abnormality, intrauterine treatment of the fetus genetics and embryology. Demonstrate the ability to explain to patients and discuss its practical and ethical implications.

1.10 Normal pregnancy: Changes maternal and fetal physiology during normal pregnancy, antepartum care its, aim and methods changes of implementation, i.e. organization of intrapartum care, including obstetrical analgesia and anaesthesia and anaesthesia, and of the normal puerperium. Importance of Nutrition during pregnancy and puerperium. Understand the importance of breast feeding and postpartum contraception.

1.11 Abnormal pregnancy: Knowledge of all aspects of abnormality during pregnancy, labor and puerperium and their management. Understand effects of pre-existing disease (obstetrical, gynaecological medical or surgical) on pregnancy and demonstrate the ability to provide informative counseling before, during and after pregnancy. Knowledge of neonatal resuscitation and of the principles of neonatal management, Respiratory distress syndrome (RDS), prematutity and congenital abnormality.

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प्राविधिक सेवा, अबस्ट्रेटिक्स एण्ड गाइनेकोलोजी समूह, अबस्ट्रेटिक्स एण्ड गाइनेकोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Section (B) – 50 Marks

2. **Gynaecology**

2.1 Prepubertal gynaecology: Knowledge of normal and abnormal sexual development paediatric pathology and its management, normal puberty and its disorders and their management.

2.2 Adolescent gynaecology: Disorder of behaviour and sexual function counseling for safe living

2.3 Menstruation: Physiology of normal menstruation, pathophysiology of menstrual disorders their investigation and management. Menopause and its management.

2.4 Infertility: Causes of infertility, investigation and management of the infertile couple, techniques involved in assisted reproduction.

2.5 Infection: Sexually transmitted diseases including AIDS.

2.6 Abortion: Cause of abortion, its management, complication of therapeutic abortion and its legal aspects.

2.7 Contraception: Various method of permanent and temporary contraceptives, their uses and side effect.

2.8 Psychosexual medicine: Management of psychosexual problems including puerperal psychosis and the psycho social impact of violence against women

2.9 Urogynaecology: Surgical and non- surgical management urogynaecological problems.

2.10 Gynaecological oncology: Epidemiology and aetiology and the principles of carcinogenesis, tumor immunology and pathology. Diagnostic techniques and staging of gynaecological tumors. Treatment including surgery, radiotherapy, chemotherapy, and terminal care of patients dying due to gynaecological malignancy.

2.11 Breast: Problems of lactation and its management, Breast Lump and its management.

2.12 Obstetrical and Gynaecological surgery: Principle of obstetric and gynaecological (surgery) procedures preoperative assessment and post operative care.

2.13 Ethics and the law: Basic ethical and legal issues involved in contemporary obstetrical and gynecological practice, Introduction to ethical theories, medical ethics, Professional ethics, Ethics in research, Ethics in health policy.

2.14 Recent advances and subspeciality: Uro-gynaecology, Infertility, Gynaecology oncology,

2.15 Community obsterics and gynaecology:

2.15.1 Knowledge about basics community disease profile

2.15.2 Definitions and causes of maternal morbidity and mortality and perinatal mortality, neonatal mortality and infant mortality rate

2.15.3 Effect of socio cultural behavior in Reproductive health.

2.15.4 National Health Programmes related to Maternal and child health, continuing health services for maternal care and child health, organizing health care delivery and referral system.

2.15.5 Future vision to reduce maternal morbidity and mortality and perinatal mortality.

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, अर्थोपेडिक सर्जरी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, अर्थोपेडिक सर्जरी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, अर्थोपेडिक सर्जरी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **Applied Basic Sciences**
   - 1.1 Applied anatomy
   - 1.2 Applied Physiology
   - 1.3 Applied Pathology
   - 1.4 Applied Pharmacology
   - 1.5 Applied immunology
   - 1.6 Applied biostatics
   - 1.7 Applied research methods
   - 1.8 Applied Molecular biology and genetics

2. **Recent Advances**
   - 2.1 Arthroscopy
   - 2.2 Endoscopic surgery (Spine, Knee, etc)
   - 2.3 Illizarov external fixator
   - 2.4 Total joint replacement
   - 2.5 Limb sparing surgery
   - 2.6 Bone Banking, Laser surgery, etc.

3. **Emergencies: Orthopedics**
   - 3.1 Acute Osteomyelitis
   - 3.2 Septic Arthritis
   - 3.3 Compartmental Syndrome
   - 3.4 Cauda Equina Syndrome
   - 3.5 Necrotizing fasciitis

4. **Emergencies : Trauma**
   - 4.1 All fractures and dislocations
   - 4.2 Open fractures
   - 4.3 Crush injuries
   - 4.4 Hand injuries
   - 4.5 Spinal injuries

Section (B) – 50 Marks

5. **Principles and practice of : Orthopedic Surgery**
   - 5.1 General orthopedics
   - 5.2 Regional Orthopedics
   - 5.3 Pediatric Orthopedics
   - 5.4 Orthopedic Oncology
   - 5.5 Orthopedic Neurology

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5.6 Sports Medicine
5.7 Physical Medicine and Rehabilitation

6. **Principles and practice of : Trauma Surgery**
   6.1 General principles of Trauma including Pathophysiology
   6.2 General practice of Trauma: Early management of injured, Management of Polytrauma, Disaster, Mass casualty, and management of Neglected trauma
   6.3 Definite management of Musculoskeletal injuries; their operative treatment and rehabilitation

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अटोरिनोल्यारिङ्गोलोजी समूह, अटोरिनोल्यारिङ्गोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अटोरिनोल्यारिङ्गोलोजी समूह, अटोरिनोल्यारिङ्गोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अटोरिनोल्यारिङ्गोलोजी समूह, अटोरिनोल्यारिङ्गोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **EAR**
   - 1.1 Congenital & acquired deafness
   - 1.2 Glue ear
   - 1.3 Acute Otitis Media
   - 1.4 CSOM
   - 1.5 Otosclerosis
   - 1.6 Meniere's disease
   - 1.7 Facial palsy
   - 1.8 C.P. angle tumors
   - 1.9 Malignant tumors of ear
   - 1.10 Glomus jugulars
   - 1.11 Otitic Barotrauma
   - 1.12 Management of the swelling of the pinna of ear

2. **NOSE**
   - 2.1 Epistaxis
   - 2.2 Sinusitis
   - 2.3 # of nose
   - 2.4 Le forte's #
   - 2.5 C.S.F. Rhinirrhoes
   - 2.6 Malignant tumors of nose & Para nasal sinuses
   - 2.7 Nasal Polyps
   - 2.8 Angiofibromia
   - 2.9 Management of Infestations of leech & maggotts of nose

3. **THROAT**
   - 3.1 Infection of oral cautry
   - 3.2 Stridor
   - 3.3 Foreign body oesophagus
   - 3.4 Foreign body Larynx & Bronchus
   - 3.5 Tracheostomy/Oesaphagoscopy/Bronchoscopy
   - 3.6 Laryngeal Tumors
   - 3.7 Salivary gland Tumors
   - 3.8 Iodine Deficiency Disorders
   - 3.9 Hyperthyroidism
   - 3.10 Thyroid tumors
   - 3.11 Total laryngectomy
   - 3.12 Total maxillectomy
   - 3.13 Radical Neck Dissection

Section (B) : - 50 Marks

4. **GENERAL MEDICINES**
   - 4.1 Bleeding Disorders
   - 4.2 Otogenic Neurological Diseases
   - 4.3 Cavernous Sinus Thrombosis
   - 4.4 HIV manifestations in ENT
   - 4.5 Disorder of Cranial Nerves

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5. **INVESTIGATION**
   - 5.1 X-Ray Ear, Nose and Throat
   - 5.2 C.T.Scan
   - 5.3 MRI
   - 5.4 Hematological Investigations
   - 5.5 Flexible Endoscopy
   - 5.6 U.S.G.
   - 5.7 FNAC
   - 5.8 Thyroid Scan

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, ट्रान्सफ्युजन मेडिसिन उपसमूह, रजिष्ट्रार पद, आठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व. २०७९/०८०

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प्राविधिक सेवा, प्याथोलोजी समूह, ट्रान्सफ्युजन मेडिसिन उपसमूह, रजिष्ट्रार पद, आठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Anatomy and Physiology**
   - 1.1 General introduction of various systems of human body.
   - 1.2 Basic physiology of Haemopoetic system

2. **Erythrocyte**
   - 2.1 Clinical manifestations & classification of erythrocyte disorders
   - 2.2 Aplastic Anaemia
   - 2.3 Pure red cell aplasia
   - 2.4 Anemia of chronic disease
   - 2.5 Paroxysmal Nocturnal hemoglobinuria (PNH)
   - 2.6 Iron deficiency anemia and iron overload
   - 2.7 Disorders of iron metabolism
   - 2.8 Thalassemias
   - 2.9 Sickle cell anemia
   - 2.10 Anemia of chronic disease, renal disease, endocrine disease,
   - 2.11 Megaloblastic anemias
   - 2.12 Haemolytic anemias
     - 2.12.1 Hereditary spherocytosis
     - 2.12.2 Hereditary elliptocytosis and related disorders
     - 2.12.3 Hereditary stomatocytosis
     - 2.12.4 Paroxysmal nocturnal hemoglobinuria
     - 2.12.5 Enzymatic defects
     - 2.12.6 Hemolytic anemias resulting from extracellular factors- immune haemolytic anemias, resulting from physical injury to RBCs, resulting from chemical & physical agents, resulting from infections & microorganisms etc
   - 2.13 Haemoglobinopathies
     - 2.13.1 Sickle cell disease/Sickle cell trait
     - 2.13.2 Hereditary methemoglobinemia
     - 2.13.3 Thalassemia syndromes
   - 2.14 Porphyria: Hematological aspects
   - 2.15 Polycythaemia (erythrocytosis)

3. **Pancytopaenias**
   - 3.1 Inherited Bone marrow failure syndromes with pancytopenia
   - 3.2 Acquired pancytopaenias
   - 3.3 Marrow infiltration disorders

4. **Disorders of different components of white blood cells**
   - 4.1 Neutrophil: Classification & clinical manifestations of neutrophil disorders, Neutropenia, Neutrophilia, Leukemoid reaction, Disorders of neutrophil function
   - 4.2 Eosinophil: Eosinophilia, Hypereosinophillic syndrome, Eosinophilic granulomatosis and polyangiitis, Other disorders of eosinophils
   - 4.3 Basophil: Basophilia, Other disorders of basophils and mast cells
   - 4.4 Lymphocyte: Classification & manifestations of lymphocyte & monocyte disorders, Lymphopenias, Lymphocytosis, Immunodeficiency disorders, Hematological aspects of HIV infection, Mononucleosis syndromes

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4.5 Monocyte: Classification & clinical manifestations of disorders of monocytes and macrophages, Monocytosis & monocytopaenia, Inflammatory & malignant histiocytosis

5. **Splenomegaly, Hyposplenism, Hypersplenism, Splenic trauma and Splenectomy**

6. **Hematopoietic Cell Transplantation**
   - 6.1 Autologous Stem cell transplant
   - 6.2 Allogeneic Stem cell transplant

7. **Immunophenotyping**
   - 6.3 Principle and practice of flow cytometry
   - 6.4 Interpretation and clinical significance of flow cytometry data in leukemias, lymphomas and other hematological disorders

Section (B) – 50 Marks

8. **Transfusion Medicine**
   - 8.1 History of Transfusion Medicine
   - 8.2 Indications for blood and component transfusion
   - 8.3 Donor registration, donor selection, blood collection from donors, adverse donor reaction, predonation counselling, bleeding of the donor, post donation care, post donation counseling
   - 8.4 Blood collection room equipment, their principles, and use, emergency medicines,
   - 8.5 Details of Anticoagulants used to store blood, their mechanism of action and composition, preservation of donated blood, types of blood bag, mechanism of action and composition of blood preservation solution &additive solutions, changes occurringin the stored blood
   - 8.6 Blood components –Indications, preparation of blood components, Selection of blood bags for component preparation, preparation of red Cell concentrate, Fresh Frozen plasma, platelet concentrate, cryoprecipitate, washed red cells, frozen red cells. Component Testing, Labeling, Transportation and storage of blood components, Metabolic changes in blood components during storage
   - 8.7 Blood groups and genetics, Principles of immune system central to transfusion medicine, Immunology of red blood cells, Different major and minor blood groups and their importance
   - 8.8 Red cell allo-and autoantibody formation and function
   - 8.9 Platelets and leucocytes antigen and antibodies, their importance
   - 8.10 Blood grouping and Compatibility testing –Major, minor, Coomb'scross match,Factorsinfluencingthe results of blood grouping
   - 8.11 Coomb's test –application–DCT, ICT, Rh antibody titre
   - 8.12 Gel testing for antibody screening and identification
   - 8.13 Hazards of blood transfusion, Strategies to prevent transfusion reactions
   - 8.14 Pathophysiology, clinical signs and symptoms, and Laboratory Investigation for hemolytic transfusion reactions
   - 8.15 Investigation of ABO, Rh and other immunohaemolytic diseases of thenewborn
   - 8.16 Practical aspects in the selection of blood for neonatal exchange transfusion, Hemolytic disease of the new born and exchange transfusion
   - 8.17 Management of Blood Bank Issue Counter, Criteria for acceptanceof requisitionform, inspection of blood component prior to issue

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8.18 Screening of blood units for TTI, ELISA, rapid and other tests for diagnosis of transfusion transmitted infections
8.19 Nucleic acid testing
8.20 Hemapheresis-definition, typesof pheresis,machines andtechniques
8.21 Basics of Tissue banking & Cord blood banking
8.22 Disposal of wastes and biologically hazardous substance in the blood bank
8.23 Medico legal aspects of blood transfusion
8.24 Quality control of blood grouping reagents, QCof anti-human globulin reagent, bovine albumin, Normal saline
8.25 Quality control in blood banking, Quality control of bags and differentblood bank components, sterility test on component
8.26 Calibration, validation and maintenance of blood bank equipment, QC of blood bank techniques, external and internal quality assessment
8.27 Hemovigilance in blood banking
8.28 Automation in Blood Banking

9. **Bone marrow Transplant:**

9.1 Donor selection, HLA typing and, screening of Donor
9.2 Conditioning regimens, principles of their use in different disorders and complications
9.3 Harvesting and manipulation of the bone marrow. Bone marrow collection, red cell or plasma reduction, peripheral blood stem cell, mobilization and collection, cryopreservation, Transfusion of marrow. Purging of marrow –T cell depletion
9.4 Stem cell processing and storage for transplantation
9.5 Classes of MHC, different methods of HLA typing, Procedure of HLA matching for bone marrow transplant
9.6 Procedure of chimerism testing/engraftment analysis after bone marrow transplant
9.7 Transplantation immunology, Histocompatibility, graft versus host disease –diagnosis and management, Immune reconstitution following transplantation
9.8 Management of post-transplant patient

10. **General Pathology**

10.1 Cellular adaptation, injury and death: cellular response to injury, growth and differentiation, Morphology of cell injury and necrosis, apoptosis, intracellular accumulations, calcification
10.2 Acute and chronic inflammation: general features, cells and chemical mediators involved, events, outcome
10.3 Tissue repair and renewal: Normal cell proliferation and tissue growth, their control, mechanism of tissue regeneration, repair by healing , scar and fibrosis, healing by first and second intention, factors effecting wound healing,
10.4 Hemodynamic disorders: Normal hemostasis, thrombosis and embolism, Infarction, Shock, Disseminated intravascular coagulation
10.5 Genetic diseases: Mutations, Mendelian disorders, Karyotyping, Diagnosis of genetic diseases
10.6 Diseases of immunity: Types of immunity, cell involved, cytokines, Histocompatibilty molecules, Hypersensitivity reaction and types, Autroimmune diseases, Immunological immunodeficiency syndromes, AIDS, Amyloidosis
10.7 Neoplasia: Definition, nomenclature, biology of tumor growth, cell cycle, Molecular basis of cancer, Carcinogenic agents, paraneoplastic syndrome, tumor

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markers, clinical features of tumors, grading and staging, laboratory diagnosis of cancer

10.8 Environmental and nutritional pathology: Common environmental and occupational hazards, food safety, nutrition deficiencies.

10.9 Infectious disease: General principle of microbial pathogenesis, Agents of bio-terrorism, Infections in immunocompromised host, Special techniques in diagnosing infectious agent

11. **Laboratory management:**

11.1 Fundamental of Total Quality management
11.2 Statistical process in quality control
11.3 Element of quality assurance program
11.4 Concept of Evidence based medical practice
11.5 Concept of critical values and alert values in laboratory practice
11.6 The laboratory information system
11.7 Concept of reference laboratory
11.8 Implementation of reference system in laboratory medicine
11.9 Standard operating procedure and their preparation
11.10 Errors and identification of the source of error in hematology laboratory
11.11 Internal and External quality control and proficiency testing
11.12 Preparation of quality policy manual
11.13 Laboratory Accreditation, Key component of accreditation, ISO 15189 and others laboratory related accrediting bodies
11.14 Quality control in procedure, equipment, NEQAS, EQAS
11.15 Ethics in medicine
11.16 Health and Safety measures (Physical/Chemical/Biological/Radiation)
11.17 Waste disposal
11.18 Management of under resourced laboratory

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निजामती कर्मचारी अस्पताल

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व. २०७९/०८०

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प्राविधिक सेवा, प्याथोलोजी समूह, साइटोजेनेटिक्स उपसमूह, रजिष्ट्रार पद, आठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Cytogenetics**
   - 1.1. Cell division
     - 1.1.1. Mitosis, meiosis
     - 1.1.2. Medical relevance of mitosis and meiosis
   - 1.2. Introduction to embryology and clinical teratology
     - 1.2.1. Human gametogenesis and fertilization
   - 1.3. Chromosomal Disorders
     - 1.3.1. Incidence and Mechanisms of Chromosomal disorder
     - 1.3.2. Chromosomal abnormalities.
     - 1.3.3. Types of chromosomes abnormalities.
     - 1.3.4. Chromosome abnormalities and malignancies.
     - 1.3.5. Chromosomal breakage studies and malignancies
   - 1.4. Human Karyotype
     - 1.4.1. Cytogenetic nomenclature
     - 1.4.2. Introduction of Cytogenetic methods.
     - 1.4.3. Indication of Cytogenetic analysis.
   - 1.5. Disorders of the Autosomes and Sex Chromosomes
   - 1.6. Genetic basis of cancer
   - 1.7. Applying Genomics to individualize Cancer Therapy
   - 1.8. Molecular cytogenetics
     - 1.8.1. Definition
     - 1.8.2. Types including FISH, Comparative Genomic Hybridization, Array CGH
2. **Molecular genetics**
   - 2.1. Gene
     - 2.1.1. Gene organization, structure and function
     - 2.1.2. DNA and RNA structure and function
   - 2.2. Fundamentals of gene expression
     - 2.2.1. Transcription, translation, proteomics, Integrative multi- 'omics'
   - 2.3. The Human Genome
   - 2.4. Gene structure and function
   - 2.5. Epigenetics and epigenomic aspects of gene expression
   - 2.6. Variation in gene expression and its relevance to medicine
   - 2.7. Genetic variation, inherited variation and polymorphism in DNA
   - 2.8. Mutations : Definition, types of mutations and their consequences, dynamic mutations
   - 2.9. Genotypes, phenotypes
     - 2.9.1. The Hardy –Weinberg Law
   - 2.10. Pattern of Single-Gene Inheritance : Pedigrees
   - 2.11. Inheritance : Pattern of Inheritance, Mendelian Inheritance, Types and Characteristics of Autosomal patterns of Mendelian Inheritance
   - 2.12. Gene mapping, gene identification, positional cloning.
   - 2.13. Sex- Linked Inheritance: Definition, Pseudo-autosomal Inheritance.
   - 2.14. Mosaicism and Chimerism.
   - 2.15. Pattern of origin effects on inheritance patterns.
   - 2.16. Genetics of complex disorder
     - 2.16.1. Qualitative and quantitative traits.
     - 2.16.2. Familial aggregation and correlation.

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2.16.3. Determining the relative contributions of genes and environment to complex disease
2.17. Techniques of DNA analysis and application, DNA cloning, Genome sequencing
2.18. Mitochondrial Genetics : Definition, types of diseases associated with mitochondrial genetics
2.19. Evolutionary /Human Developmental Genetics

3. **Special topics**
   3.1. Pharmacogenetics
      3.1.1. Biochemical modification and kinetics of drug metabolism
      3.1.2. Pharmacogenomics- Definition and importance in medicine
      3.1.3. Personalized medicine
   3.2. Immunogenetics
      3.2.1. Different types of immunity and related diseases
      3.2.2. HLA polymorphism and disease association
      3.2.3. Importance and relation of HLA in transplant genetics
      3.2.4. Inherited immunodeficiency disorders
   3.3. Blood grouping and molecular basis of blood grouping
      3.3.1. Hemoglobin and structure of globin gene
      3.3.2. Hemoglobinopathies- structure variants
      3.3.3. Hemolytic anemias, Thalassemia and sickle cell anemias
   3.4. Cancer genetics
      3.4.1. Genetic and environmental factors in cancer.
      3.4.2. Oncogenesis and identification of oncogenes, tumor suppressor genes and its functions
      3.4.3. Epigenetics and cancer
      3.4.4. Common genetic associated cancer like colorectal carcinoma, breast carcinoma, prostate carcinoma and ovarian carcinoma, etc
      3.4.5. Genetic counseling in familial cancer
      3.4.6. Screening in familial cancer
   3.5. Community genetics
      3.5.1. Genetic variation in population
      3.5.2. Genotypes and phenotypes in population
      3.5.3. Ethnic differentiation in the frequency of genetic diseases
      3.5.4. Genetics and ancestry
   3.6. Molecular microbiology and metagenomics : Introduction, importance, uses in disease diagnosis and its pitfalls
   3.7. Human genome project : Introduction and importance of human genome project
   3.8. Stem cell biology and regenerative medicine and genetic cloning : Introduction and applications in modern medicine
   3.9. Synthetic biology : Introduction and its uses
   3.10. Animal models of genetic diseases.

4. **Screening for genetic diseases and carriers**
   4.1. Criteria for screening
   4.2. Prenatal screening: Indications for prenatal testing, techniques used in prenatal diagnosis
   4.3. Special problems in prenatal diagnosis
   4.4. Neonatal screening

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4.5. Pre-symptomatic screening of adults
4.6. Ethical considerations in carrier detection and predictive testing

5. **Chromosomal abnormalities**
   5.1 Incidence of chromosomal abnormalities
   5.2 Trisomies: (Down syndrome, Edward syndrome, Patau syndrome)
   5.3 Disorders of sex chromosomes: (Klinefelter syndrome, Turner syndrome, Fragile X syndrome)
   5.4 Chromosomal deletion and microdeletion syndromes: (Prader Willi syndrome, Angelman syndrome, Retinoblastoma, DeGearge syndrome)
   5.5 Chromosomal breakage syndromes: (Fanconi anemia, Ataxia telangiectasia, bloom syndrome, Xeroderma pigmentosa)
   5.6 Disorders of sexual differentiation: (True hermaphroditism, Male pseudo hermaphroditism, Female pseudo-hermaphroditism)
   5.7 Indications for chromosomal analysis

6. **Ethical and legal issues in medical genetics**
   6.1 General principles
   6.2 Ethical dilemmas in medical genetics
   6.3 Ethical dilemmas in a wider context including ethical policies
   6.4 Privacy of genetic information

Section (B) – 50 Marks

7. **General Pathology**
   7.1 Cellular adaptation, injury and death: cellular response to injury, growth and differentiation, Morphology of cell injury and necrosis, apoptosis, intracellular accumulations, calcification
   7.2 Acute and chronic inflammation: general features, cells and chemical mediators involved, events, outcome
   7.3 Tissue repair and renewal: Normal cell proliferation and tissue growth, their control, mechanism of tissue regeneration, repair by healing , scar and fibrosis, healing by first and second intention, factors effecting wound healing,
   7.4 Hemodynamic disorders: Normal hemostasis, thrombosis and embolism, Infarction, Shock, Disseminated intravascular coagulation
   7.5 Genetic diseases: Mutations, Mendelian disorders, Karyotyping, Diagnosis of genetic diseases
   7.6 Diseases of immunity: Types of immunity, cell involved, cytokines, Histocompatibilty molecules, Hypersensitivity reaction and types, Autroimmune diseases, Immunological immunodeficiency syndromes, AIDS, Amyloidosis
   7.7 Neoplasia: Definition, nomenclature, biology of tumor growth, cell cycle, Molecular basis of cancer, Carcinogenic agents, paraneoplastic syndrome, tumor markers, clinical features of tumors, grading and staging, laboratory diagnosis of cancer
   7.8 Environmental and nutritional pathology: Common environmental and occupational hazards, food safety, nutrition deficiencies.
   7.9 Infectious disease: General principle of microbial pathogenesis, Agents of bio-terrorism, Infections in immunocompromised host, Special techniques in diagnosing infectious agent

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8. **Cytopathology**
   - 8.1 Role of Diagnostic Cytology
   - 8.2 Structure and function of cells, morphological features of dysplasia
   - 8.3 Basic Cytogenetics and the Role of Genetics in Cancer Development
   - 8.4 Chromosomal aberration in cancer
   - 8.5 Clinical application of conventional cytogenetics and molecular methods in cytology
   - 8.6 Evaluation of various samples in conventional smearsand liquid based preparations
   - 8.7 Cell blocks and its use in cytological diagnosis
   - 8.8 Immunochemistry and Molecular Biology in Cytological Diagnosis
   - 8.9 Digital Analysis of Cells and Tissues
   - 8.10 Flow Cytometry
   - 8.11 Advanced techniques in diagnostic cytopathology

9. **Histopathology**
   - 9.1 Tissue processing techniques
   - 9.2 Different stains used in bone marrow trephine biopsies and lymph node biopsies
   - 9.3 Interpretation of bone marrow trephine biopsies and lymph node biopsies
   - 9.4 Use of immunohistochemistry in bone marrow and lymph nodes for diagnosis of leukemias and lymphomas and other disorders

10. **Histo/cyto techniques**
   - 10.1 Organization of Histopathology/cytopathology logy Laboratory
   - 10.2 Various Histological equipment, their uses and care
   - 10.3 Reception and recording of specimen
   - 10.4 Theory of routine (H/E, Pap)and special stains and their practical implication
   - 10.5 Preparation, reagent preparation, procedure and quality control of all routine andspecial stains used in Histopathology/cytopathology
   - 10.6 Grossing technique of various surgical specimens
   - 10.7 Technique of processing various tissues including bone for histological studies, Errors in sectioning and remedies
   - 10.8 Frozen section and their uses, processing tissue for frozen section and its interpretation
   - 10.9 Demonstration of pigments and minerals (malarial, mercury, bile, lipofuscin, calcium, iron, copper)
   - 10.10 Demonstration of neuron, neuroglia, myelin and axon
   - 10.11 Stains for bacteria, AFB, fungi, amoeba in tissue
   - 10.12 Preparation of cell blocks and their interpretation
   - 10.13 Mailing of slides
   - 10.14 Fine needle aspiration techniques involved in preparation of smear and staining
   - 10.15 Different types of cytology specimens, their preservation and transport, processing of various cytology specimens, smear preparation and staining
   - 10.16 Liquid based cytology; principle, instruments,procedure advantage, disadvantage
   - 10.17 Cytocentrifuge and itsuses in diagnostic cytopathology
   - 10.18 Immunochemistry: Principle, procedure, uses, quality control, Immunohistochemical markers of various neoplasms
   - 10.19 Use of microwaves in histopathology/cytopathology
   - 10.20 Principle and use of flow cytometry in cytopathology

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10.21 Preparation and Quality control of various stains, reagents and methods used in histopathology/ cytology
10.22 Molecular methods in histopathology and cytopathology
10.23 Principle, method and use of In-situ Hybridization, recent methods in hybridization techniques
10.24 Enzyme histochemistry: principle, reagent and specimen preparation, procedure and application
10.25 Electron microscopy
10.26 Histometry, analysis of proliferation
10.27 Tissue culture techniques, HLA typing
10.28 X ray microanalysis
10.29 Methods, procedures, and interpretation of standard karyotyping analysis
10.30 Principle and use of fluorescent in situ hybridization and more specialized techniques
10.31 Cytogenetics of myeloid, lymphoid and plasma cell disorders, their use in prognosis and therapy monitoring
10.32 Recent advances, emerging techniques and technologies in cytogenetics

11. **Laboratory management:**
11.1 Fundamental of Total Quality management
11.2 Statistical process in quality control
11.3 Element of quality assurance program
11.4 Concept of Evidence based medical practice
11.5 Concept of critical values and alert values in laboratory practice
11.6 The laboratory information system
11.7 Concept of reference laboratory
11.8 Implementation of reference system in laboratory medicine
11.9 Standard operating procedure and their preparation
11.10 Errors and identification of the source of error in hematology laboratory
11.11 Internal and External quality control and proficiency testing
11.12 Preparation of quality policy manual
11.13 Laboratory Accreditation, Key component of accreditation, ISO 15189 and others laboratory related accrediting bodies
11.14 Quality control in procedure, equipment, NEQAS, EQAS
11.15 Ethics in medicine
11.16 Health and Safety measures (Physical/Chemical/Biological/Radiation)
11.17 Waste disposal
11.18 Management of under resourced laboratory

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प्राविधिक सेवा, प्याथोलोजी समूह, जनरल प्याथोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, जनरल प्याथोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

Civil Service Hospital

निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, जनरल प्याथोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **General Pathology**
   - 1.1 Cellular adaptation, injury and death: cellular response to injury, growth and differentiation, Morphology of cell injury and necrosis, apoptosis, intracellular accumulations, calcification
   - 1.2 Acute and chronic inflammation: general features, cells and chemical mediators involved, events, outcome
   - 1.3 Tissue repair and renewal: Normal cell proliferation and tissue growth, their control, mechanism of tissue regeneration, repair by healing , scar and fibrosis, healing by first and second intention, factors effecting wound healing,
   - 1.4 Hemodynamic disorders: Normal hemostasis, thrombosis and embolism, Infarction, Shock, Disseminated intravascular coagulation
   - 1.5 Genetic diseases: Mutations, Mendelian disorders, Karyotyping, Diagnosis of genetic diseases
   - 1.6 Diseases of immunity: Types of immunity, cell involved, cytokines, Histocompatibilty molecules, Hypersensitivity reaction and types, Autroimmune diseases, Immunological immunodeficiency syndromes, AIDS, Amyloidosis
   - 1.7 Neoplasia: Definition, nomenclature, biology of tumor growth, cell cycle, Molecular basis of cancer, Carcinogenic agents, paraneoplastic syndrome, tumor markers, clinical features of tumors, grading and staging, laboratory diagnosis of cancer
   - 1.8 Environmental and nutritional pathology: Common environmental and occupational hazards, food safety, nutrition deficiencies.
   - 1.9 Infectious disease: General principle of microbial pathogenesis, Agents of bio-terrorism, Infections in immunocompromised host, Special techniques in diagnosing infectious agent

2. **Surgical Pathology**
   - 2.1 Components Surgical pathology Report, Limitation of Histological diagnosis
   - 2.2 Information system in surgical pathology, Digital pathology and Tele-pathology
   - 2.3 Automated surgical pathology
   - 2.4 Legal aspects of surgical pathology
   - 2.5 Gross techniques in surgical pathology: Gross room, handling of specimens, general principles, photography, radiography, Guidelines for handling common specimens
   - 2.6 WHO classification of tumors of various systems, their grading and staging
   - 2.7 Synoptic reporting system

3. **Cytopathology**
   - 3.1 Role of Diagnostic Cytology
   - 3.2 Structure and function of cells, morphological features of dysplasia
   - 3.3 Basic Cytogenetics and the Role of Genetics in Cancer Development
   - 3.4 Chromosomal aberration in cancer
   - 3.5 Clinical application of conventional cytogenetics and molecular methods in cytology
   - 3.6 Evaluation of various samples in conventional smearsand liquid based preparations
   - 3.7 Cell blocks and its use in cytological diagnosis
   - 3.8 Immunochemistry and Molecular Biology in Cytological Diagnosis
   - 3.9 Digital Analysis of Cells and Tissues

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Civil Service Hospital

3.10 Flow Cytometry
3.11 Advanced techniques in diagnostic cytopathology

4. **Gynecological Cytopathology**
4.1 Anatomy, Histology and Cytology
4.2 Normal Female Genital Tract
4.3 Bethseda system for reporting cervical cytology
4.4 Inflammations, bacterial and viral infections of cervic
4.5 Benign proliferative reaction, intraepithelial neoplasia and invasive cancers
4.6 Cytologic Evaluation of Menstrual Disorders and Hormonal Abnormalities
4.7 Proliferative Disorders and Carcinoma of the Endometrium
4.8 Diseases of the Vagina, Vulva, Perineum
4.9 Tumors of the Ovary and Fallopian Tube
4.10 Effects of Therapeutic Procedures on cytology of the Female Genital Tract
4.11 Effects of Therapeutic Procedures on the Epithelia of the Female Genital Tract

5. **Non-gynecological cytopathology:**
5.1 Normal findings in different cytological specimens of upper and lower respiratory tract
5.2 Cytology of bronchogenic carcinomas in sputum, bronchial brushing and Broncho-alveolar lavage
5.3 Sampling of Oral Cavity, Larynx, Trachea, Nasopharynx, and Paranasal Sinuses
5.4 Benign, reactive and malignant lesion of Oral Cavity, Larynx, Trachea, Nasopharynx, and Paranasal Sinuses
5.5 Different cytology samples of upper and lower urinary tract and normal findings in them
5.6 Nipple discharge cytology
5.7 Tumors of the Urinary Tract in Urine and Brushings
5.8 Non-neoplastic findings in samples of urinary tract
5.9 Different cytology samples of gastrointestinaltract, including hepatobilliary tract and pancreas and normal their cytological findings
5.10 Cytology non neoplastic lesion of gastrointestinal tract, hepatobilliary tract and pancreas
5.11 Cytology of tumors of gastrointestinal tract, hepatobilliary tract and pancreas
5.12 Various types of effusions and their normal findings
5.13 Non neoplastic lesions in effusions
5.14 Neoplastic lesions in effusion, including cytology of CSF in leukemia
5.15 Cytology of central nervous system tumors in squash preparation
5.16 Circulating cancer cells

6. **Fine needle aspiration cytology**
6.1 Techniques of Fine Needle Aspiration, Smear Preparation, and Principles of Interpretation
6.2 Imaging methods for guidance of aspiration cytology
6.3 Diagnostic pitfalls in FNA diagnosis of various lesions
6.4 FNAC diagnosis anddifferential diagnosis of different lesions of head and neck, including salivary gland
6.5 FNAC diagnosis and differential diagnosis ofdifferent lesions in lymph node. FNAC findings of different lymphomas
6.6 Reporting FNAC of thyroid nodules. FNAC findings invarious thyroid lesions.

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6.7 Cytology reporting categories of breast nodules. FNAC diagnosis of various non-neoplastic and neoplastic lesions of breast
6.8 FNAC diagnosis of various lesions of lung, mediastinum, chest wall pleura
6.9 FNAC diagnosis of various lesions of kidney, adrenal and retroperitoneum
6.10 FNAC diagnosis of bone and soft tissue lesions
6.11 Evaluation of FNAC of testes for male infertility
6.12 FNAC diagnosis and differential diagnosis of testicular tumors and other lesions of male genital tract

7. **Autopsy**
7.1 Types of autopsy, its purpose, procedure of various types of autopsy
7.2 Collection of various organs and specimens for forensic pathology
7.3 Use of Conventional and special stains and immunohistochemical procedure in forensic pathology
7.4 Gross and microscopy of organs in alcoholism and drug abuse
7.5 Pathological investigations of hypothermia induced changes in the human body
7.6 Thrombosis and embolism
7.7 Gross and microscopic findings in aspiration and inhalation of various substances
7.8 Evaluation ofatherosclerosis, aneurysm, MyocardialInfarction, Myocarditis, Cardiomyopathy, Coronary Anomalies, other cardiac vascular anomalies as cause of death
7.9 Post mortem findings in Lethal Infections, Sepsis, and Shock
7.10 Forensic pathology findings in Endocrine organ dysfunction
7.11 Forensic evaluation of Pregnancy-Related Death, Death in Newborns, and Sudden Infant Death Syndrome
7.12 Forensic Neuropathology
7.13 Cytological diagnosis in sexual offenses
7.14 Histothanatology: Autolysis, Putrefaction, Mummification
7.15 Forensic-Histological Diagnoses of Species, Gender, Age, and Identity

8. **Histo/cyto techniques**
8.1 Organization of Histopathology/cytopathology logy Laboratory
8.2 Various Histological equipment, their uses and care
8.3 Reception and recording of specimen
8.4 Theory of routine (H/E, Pap)and special stains and their practical implication
8.5 Preparation, reagent preparation, procedure and quality control of all routine andspecial stains used in Histopathology/cytopathology
8.6 Grossing technique of various surgical specimens
8.7 Technique of processing various tissues including bone for histological studies, Errors in sectioning and remedies
8.8 Frozen section and their uses, processing tissue for frozen section and its interpretation
8.9 Demonstration of pigments and minerals (malarial, mercury, bile, lipofuscin, calcium, iron, copper)
8.10 Demonstration of neuron, neuroglia, myelin and axon
8.11 Stains for bacteria, AFB, fungi, amoeba in tissue
8.12 Preparation of cell blocks and their interpretation
8.13 Mailing of slides
8.14 Fine needle aspiration techniques involved in preparation of smear and staining

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8.15 Different types of cytology specimens, their preservation and transport, processing of various cytology specimens, smear preparation and staining
8.16 Liquid based cytology; principle, instruments,procedure advantage, disadvantage
8.17 Cytocentrifuge and itsuses in diagnostic cytopathology
8.18 Immunochemistry: Principle, procedure, uses, quality control, Immunohistochemical markers of various neoplasms
8.19 Use of microwaves in histopathology/cytopathology
8.20 Principle and use of flow cytometry in cytopathology
8.21 Preparation and Quality control of various stains, reagents and methods used in histopathology/ cytology
8.22 Molecular methods in histopathology and cytopathology
8.23 Principle, method and use of In-situ Hybridization, recent methods in hybridization techniques
8.24 Enzyme histochemistry: principle, reagent and specimen preparation, procedure and application
8.25 Electron microscopy
8.26 Histometry, analysis of proliferation
8.27 Tissue culture techniques, HLA typing
8.28 X ray microanalysis

9. **Histopathology**
9.1 Tissue processing techniques
9.2 Different stains used in bone marrow trephine biopsies and lymph node biopsies
9.3 Interpretation of bone marrow trephine biopsies and lymph node biopsies
9.4 Use of immunohistochemistry in bone marrow and lymph nodes for diagnosis of leukemias and lymphomas and other disorders

10. **Cytogenetics, Molecular Pathology and Immunopathology**
10.1 Methods, procedures, and interpretation of standard karyotyping analysis
10.2 Principle anduse of fluorescent in situ hybridization and more specialized techniques
10.3 Cytogenetics of myeloid, lymphoid and plasma cell disorders, their use in prognosis and therapy monitoring
10.4 Basic concepts in molecular biology and pathology
10.5 Basic gene structure and function
10.6 Principle, brief procedure and interpretation of Molecular pathology tests pertinent to hematopathology: Southern blot, PCR and its different types, restriction fragment length polymorphism, Real-time PCR
10.7 DNA & RNA extraction techniques
10.8 Separation of lymphocytes using density gradient and centrifugation
10.9 HLA typing, microlymphocytoxicity test and its application in HLA typing, cross-matching and antibody screening
10.10 Recent advances and other emerging techniques and technologies in hematopathology

11. **Laboratory management:**
11.1 Fundamental of Total Quality management
11.2 Statistical process in quality control
11.3 Element of quality assurance program
11.4 Concept of Evidence based medical practice

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11.5 Concept of critical values and alert values in laboratory practice
11.6 The laboratory information system
11.7 Concept of reference laboratory
11.8 Implementation of reference system in laboratory medicine
11.9 Standard operating procedure and their preparation
11.10 Errors and identification of the source of error in hematology laboratory
11.11 Internal and External quality control and proficiency testing
11.12 Preparation of quality policy manual
11.13 Laboratory Accreditation, Key component of accreditation, ISO 15189 and others laboratory related accrediting bodies
11.14 Quality control in procedure, equipment, NEQAS, EQAS
11.15 Ethics in medicine
11.16 Health and Safety measures (Physical/Chemical/Biological/Radiation)
11.17 Waste disposal
11.18 Management of under resourced laboratory

Section (B) – 50 Marks

12. **Systemic pathology**

12.1 Gross anatomy, relevant physiology and histology of specimens and tissues of gastrointestinal, cardiovascular, respiratory systems, genitourinary system, male and female reproductive system, Endocrine system, central nervous system, peripheral nervous system, Musculoskeletal system and neurosensory system
12.2 Skin: Inflammatory diseases, dermatoses, vesiculobullous diseases, degenerative diseases, tumors and tumors like conditions
12.3 Oral cavity and oropharynx: Congenital anomalies, inflammatory and non-neoplastic diseases, Tumors and tumor like conditions of surface epithelium, odontogenic epithelium , disease of temporomandibular joints. Tumors and tumor like lesions of salivary gland of Salivary gland
12.4 Respiratory system & mediastinum: Inflammations, cysts, neoplastic diseases of larynx and trachea. Pleuritis, tumors of pleura, Non neoplastic diseases of lung. Lung tumors. Cyst in mediastinum, mediastinal tumors
12.5 Endocrine system;Congenital anomalies, inflammatory lesions, tumors and tumor like conditions of thyroid, parathyroid, adrenal glands and paraganglia, pituitary , hypothalamus
12.6 Urinary tract:Congenital anomalies, cystic diseases of kidney, Glomerular lesion associated with nephrotic and nephritic syndrome, vascular lesions, Hereditary diseases, pyelonephritis,interstitial nephritis, Renal transplant rejection , lithiasis. Tumors, tumor like conditions
12.7 Male Reproductive system: Congenital anomalies, cryptorchidism, atrophy and infertility, Tumors of testes and paratesticular tissue, hydrocele, Prostatitis, Prostatic, hyperplasia, Tumors of prostate
12.8 Female reproductive system: Inflammatory and other non-neoplastic disease of vulva and vagina, Pelvic inflammatory diseases, Lesions of cervix. Cervical intraepithelial neoplasia, Tumors of cervix,Menstrual cycle,Endometrialdating, Non neoplastic and neoplastic lesions of uterus. Abortion, ectopic pregnancy, endometriosis. Lesion of ovary, polycystic ovarian diseases, ovarian tumors, Gestational trophoblastic diseases, lesions of placenta, Neoplastic and non-neoplastic disease of fallopian tubes, Inflammatory, other non neoplastic and neoplastic disease of breast

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12.9 Gastrointestinal tract: Congenital anomalies of GIT, Reflux and other esophagitis, tumors and tumor like conditions of esophagus Gastritis and Peptic ulcers, Polyps of stomach and intestine, tumors and tumor like conditions of stomach , Gastrointestinal stromal tumors, Malabsorption,Diseases associated with malabsorption, inflammatory bowel disease, Intestinal obstruction, AIDS related inflammatory diseasesof intestine, tumors and tumor like conditions of intestine, infections, hemorrhoids, rectal prolapse, diseasesof peritoneum and retroperitoneum

12.10 Hepatobiliary System: Viral hepatitis, Cirrhosis,Alcohol, drug and toxin induced liver injury, Cholestatasis,disorders of metabolism, vascular disorders, Liver diseases in pregnancy , Liver involvement in systemic illness, Liver pathology in organ transplant, tumors and tumor like conditions of liver, Cholelithiasis, cholecystitis, Tumors of gall bladder and intra as well as extrahepatic bile ducts, Pancreatitis, tumors and tumor like conditions pancrease, Ampullary carcinoma

12.11 Cardiovascular system: congenital anomalies, Myocardial infarction, atherosclerosis, vasculitis and other vascular disorders, Hypertension,Tumors of heart and pericardium, Rheumatic heart diseases, infective endocarditis, valvular anomalies, myocarditis and cardiomyopathies, blood vessels tumors,

12.12 Musculoskeletal system:Histochemistry of Muscle biopsy, Muscle diseases, atrophies, neuromuscular junction disorders, myopathies Fractures, Osteomyelitis, Pagets disease, osteopetrosis, tumors and tumor like lesions of bone Non neoplastic diseases of joints, gout, rheumatoidarthritis, osteoarthritis, tumors and tumor like lesions of joints, histopathological evaluation of bonemarrow biopsies

12.13 Neurosensory system; Congenital anomalies, cerebrovascular accidents, inflammatory and infectious diseases of CNS, meningitis, Tumors of brain and meninges, Neuropathies, Diseasesof peripheral nerves,Inflammatory and infectious disease of eye and ear, tumors and tumor like lesions of eye and ear

12.14 Lymphoreticular system: Lymph node evaluation, patterns of hyperplasia, Inflammatory/hyperplastic disease of lymph node, malignant lymphomas, metastatic tumors, Congenital anomalies of spleen, neoplastic and non-neoplastic diseases of spleen, Hypersplenism.

13. **Basic Hematology**

13.1 Morphology, physiology and biochemistry of blood, marrow, lymphatic tissue and spleen

13.2 Basic morphology and basic concepts of hematopoiesis

13.3 Normal hemostatic mechanism, pathophysiology of blood coagulation and thrombosis

13.4 Development of Immune system

13.5 Cell Cycle and Carcinogenesis

13.6 Principles of chemotherapy

13.7 Effects of other systemic disorders on the blood, blood - forming organs and lymphatic tissue

13.8 Genetic aspects of hematology

13.9 Relevant drugs, their mechanisms of actions, pharmacokinetics and clinical indications and limitations, including effects, toxicity, and interactions

13.10 Infections and hematological problems

13.11 Cluster of differentiation antigens (CD markers) relevant to hematological diseases, their distribution, detection and use in diagnosis

13.12 Use of radioisotopes in hematology

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14. **Clinical Hematology and Hemato-pathology**

14.1 Erythrocytes:

14.1.1 Production, composition, destruction of erythrocytes
14.1.2 Clinical manifestations and classification of erythrocyte disorders
14.1.3 Definition and classification of anemia
14.1.4 Iron metabolism. Vitamin B12 and folic acid metabolism
14.1.5 Causes, clinical features laboratory diagnosis of iron deficiency anemia, megaloblastic anemia, anemia resulting from other nutritional deficiencies, anemia of chronic diseases
14.1.6 Etiopathogenesis, clinical features, diagnosis and treatment of congenital dyserythropoetic anemia
14.1.7 Etiopathogenesis, clinical features, diagnosis and treatment of congenital paroxysmal nocturnal hemoglobinuria
14.1.8 Acquired and inherited aplastic anemia and pure red cell apalsia: etiopathogenesis, clinical and laboratory findings, diagnosis, management
14.1.9 Anemia in systemic disorders, endocrine disease and associated with marrow infiltration
14.1.10 Red blood cell membrane disorders: hereditary spherocytosis, elliptocytosis and related disorders
14.1.11 Disorders of red cell resulting from enzyme abnormalities
14.1.12 Thalassemia and hemoglobinopathies: epidemiology, etiopathogenesis, classification, genetic mechanism, clinical and hematological features, complications, laboratory diagnosis, antenatal diagnosis, management
14.1.13 Sickle cell anemia and related abnormalities; epidemiology, etiopathogenesis, classification, genetic mechanism, clinical and hematological features, complications, laboratory diagnosis, management
14.1.14 Classification, etiology, clinical and laboratory diagnosis of hemolytic anemias and Hemolytic anemias due top physical, chemical, microbial causes and immune mechanisms
14.1.15 Red cell disorders in the newborn
14.1.16 Hemolytic disease of newborn: Basis, diagnosis, clinical and laboratory features
14.1.17 Porphyrias: types, etiopathiogenesis, diagnosis, clinical and laboratory features
14.1.18 Hereditary and acquired sideroblastic anemias; etiopathiogenesis, diagnosis, clinical and laboratory features, management
14.1.19 Primary and secondary polycythemias: etiopathogenesis, clinical and hematological features, complications, laboratory diagnosis,management
14.1.20 Red cell disorders in pregnancy

14.2 Leucocytes:

14.2.1 Morphology, composition, production, function, distribution and fate of different WBCs
14.2.2 Classification, clinical manifestations and diagnosis of qualitative and quantitative disorders of neutrophils
14.2.3 Production, function, morphology and disorders of eosinophils, masts cells and basophils,
14.2.4 Classification, clinical manifestations and diagnosis of monocytes and macrophages, Inflammatory and malignant histiocytosis, etiopathogenesis, clinical and laboratory features, diagnosis

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14.2.5 Lipid storage disorders; Types, genetic basis, etiopathogenesis, clinical and laboratory features, complications, management
14.2.6 Hematological manifestation of AIDS
14.2.7 Production, morphology and functions of lymphocytes. Lymphocytosis and lymphocytopenia.
14.2.8 Etiopathogenesis, classification,clinical features, diagnosis,treatment,genetic and molecular evaluation, prognostic markers and complications of acute and chronicmyeloid and lymphoid leukemias
14.2.9 Leucocyte cytochemistry
14.2.10 Etiopathogesnesis, classification, clinical features, diagnosis, treatment, genetic and molecular evaluation,prognostic markers and complications of variousmyeloproliferative disordersand Molecular diagnosis, Monitoring response to therapy in CML
14.2.11 Hodgkin and Non Hodgkin Lymphomas: pathophysiology, classification, clinical and laboratory findings, diagnosis, prognosis
14.2.12 2Plasma cell disorders: Etiopathogenesis, classification, clinical features, diagnosis, treatment

14.3 Hemostasis and Thrombosis:
14.3.1 Overview of megakaryopoesis
14.3.2 Biochemistry, morphology and function of platelets
14.3.3 Various coagulation factors, their molecular biology and biochemistry
14.3.4 Pathophysiology of blood coagulation and thrombosis, pathways of hemostasis
14.3.5 Classification, clinical manifestation, evaluation, treatment of disorders of hemostats
14.3.6 Etiopathogenesis, clinical and laboratory features, treatment and prognosis of Hereditary and acquired qualitative disorders of platelets, effect of drugs on platelet function.
14.3.7 Hematological and systemic disorders associated with abnormal platelet function
14.3.8 Thrombocytopenia, their causes, clinical and laboratory features, diagnosis and treatment,pathophysiologyofITP,neonatalthrombocytopenia, spurious thrombocytopenia
14.3.9 Thrombocytosis, causes, clinical and laboratory features,reactivethrombocytosis
14.3.10 the vascular pupuras: etiopathogenesis, clinical and laboratory features, diagnostic approach
14.3.11 Hemophilia a & B: etiopathogenesis, genetics, clinical and laboratory features, complications,Management, course and prognosis
14.3.12 Etiopathogenesis, clinical and laboratory features, complications,management of inherited deficiency of other coagulation factors, combined deficiency of factors
14.3.13 Hemostatic dysfunction related to liver disease
14.3.14 Von willebrand disease; etiopathogenesis, genetics, types, clinical and laboratory features, complications,management, course and prognosis
14.3.15 Disseminated intravascular coagulation: Etiopathogenesis, clinical and laboratory features, complications,management
14.3.16 Hereditary Thrombophilia: Etiopathogenesis,major types, clinical and laboratory features, management

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14.3.17 the antiphospholipid antibody syndrome: Etiopathogenesis, clinical and laboratory features, complications,management
14.3.18 venous thrombosis: Causes, approach to diagnosis, management
14.3.19 Fibrinolysis and thrombolysis: concept of fibrinolysis system, fibrinolytic agents, inhibitors, thrombolytic therapy, antifibrinolytic agents and their clinical use
14.3.20 Pediatric issues in thrombosis
14.3.21 Thrombosis and pregnancy
14.3.22 Thromboticthrombocytopenic purpura and Heparin induced thrombocytopenia: Etiopathogenesis, clinical and laboratory features, complications,management
14.3.23 Anticoagulant monitoring

15. **Laboratory Hematology**

15.1 Proper use and care of common instruments such as light microscope,centrifuge,water baths, freezers, weighing balance, etc. used in hematology laboratory
15.2 Blood collection, different methods, sample collection, anticoagulants, containers, effects ofdelay in processing and storage
15.3 Preparation of blood films and CSF, staining of peripheral/blood films and CSF cytospin slides With Ramanowsky and other dyes
15.4 Determinationof peripheral blood counts (Hemoglobin, Hematocrit, RBC,and Total WBC and platelets) manually and calculation of red cell indices
15.5 Use of automated blood cell counters including principles and practice
15.6 Interpretation of peripheral blood counts and abnormal flags
15.7 Performance of WBC differential counts; subjective assessment of plateletcounts and diagnostic interpretation of abnormal counts
15.8 Review of normal and abnormal blood films with emphasis on morphologyof red cells, white cells and platelets
15.9 Supravital staining of reticulocytes, counting of reticulocytes
15.10 Limitations and uses of automated WBC differentials
15.11 Interpretation of RBC indices to characterize anemias
15.12 Preparation and staining of thick and thin blood films for Hemoparasites
15.13 Identification of different hemoparasites in blood and marrow
15.14 Measurement and significance of ESR and plasma viscosity
15.15 Indication, instruments, procedure of bone marrow aspiration; trephine needle biopsy, splenic aspiration
15.16 Preparation of smear of bone marrow aspirates and biopsy (touch) imprints. Staining and diagnostic evaluation of bone marrow aspirates in adult as well as pediatric patients
15.17 Interpretation ofiron profile, indications and interpretation of ferrokinetic studies
15.18 Principle and procedure of serum vitamin B12, serum folate and red cell folate testing
15.19 Principle, procedure and interpretation of sickling test, HbS solubility test, osmotic fragility
15.20 Test, HAMS test, G6PD deficiency
15.21 Screening for unstable hemoglobin, supravital staining of Hb H inclusions
15.22 Principles,procedure and practice of separation and identification of normal and abnormal hemoglobins by electrophoresis and chromatography, interpretation of electrophoresis and HPLC data
15.23 Quantitation of HbF by alkali denaturation and cellular distribution of HbF

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15.24 Kleihauer acid elution technique,
15.25 Heinz body preparation and identificationscreeningfor G6PD deficiency and quantitative estimation of G6PD andother red cell enzymes
15.26 Direct and indirect Coomb's test, warm and cold autoantibody titres
15.27 Miscellaneous biochemical test on red cell, plasma and urine for diagnosis of hemolytic anemias: plasma bilurubin and Haptoglobin, methaemalbumin, methaemoglobin and sulphaehemoglobin; urine for Hb, red cells, hemosiderin, urobilinogen and bilurubin
15.28 Screening for cryoglobins, principles of immunoglobin estimationand immune electrophoresis,
15.29 Different Enzyme cytochemical stains,their principle, uses and interpretation: Myleloperoxidase, specific and non-specificesterases, acid phosphatase. Periodic acid Schiff and iron staining, Leucocyte alkaline phosphatase
15.30 Interpretation ofquantitativeimmunoglobulin levels,serum proteinelectrophoretic strips and immunoelectrophoresis patterns
15.31 Principle, procedure and interpretation of routine tests : PT, PTT, thrombin time, reptilase time, bleeding time, platelet count
15.32 Workup of abnormal PTT and PT results
15.33 Understandingof platelet kinetics, study of platelet morphology
15.34 Principles, practice and interpretation of platelet aggregometry tests
15.35 Study of Plateletassociated immunoglobulin (PAIgG) and circulating antiplatelet antibodies
15.36 Laboratory approach to inherited and acquired coagulation factor deficiencies
15.37 Correction studies with normal plasma, adsorbed plasma, aged serum andfactor deficiency plasmas.
15.38 Principle,procedure and interpretation of tests for FDP and D-Dimers
15.39 Assays of clotting factors particularly factors VIII and IX
15.40 Urea solubility test for factor XIII, Euglobulin Iysis time and other relevant tests of plasma fibrinolytic activity, laboratory work up of DIC
15.41 Thrombophilia work up: Assays of plasma AT III, protein C, protein S, Factor V Leiden
15.42 Screening for lupus anticoagulant and activated protein C resistance ; principles of screening tests and interpretation of results
15.43 Anticoagulant monitoring in laboratory

16. **Immunophenotyping**
16.1 Principle and practice of flow cytometry
16.2 Interpretation and clinical significance of flow cytometry data in leukemias, lymphomas and other hematological disorders

17. **Transfusion Medicine**
17.1 History of Transfusion Medicine
17.2 Indications for blood and component transfusion
17.3 Donor registration, donor selection, blood collection from donors, adverse donor reaction, predonation counselling, bleeding of the donor, post donation care, post donation counseling
17.4 Blood collection room equipment, their principles, and use, emergency medicines,
17.5 Details of Anticoagulants used to store blood, their mechanism of action and composition, preservation of donated blood, types of blood bag, mechanism of action

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and composition of blood preservation solution &additive solutions, changes occurringin the stored blood

17.6 Blood components –Indications, preparation of blood components, Selection of blood bags for component preparation, preparation of red Cell concentrate, Fresh Frozen plasma, platelet concentrate, cryoprecipitate, washed red cells, frozen red cells. Component Testing, Labeling, Transportation and storage of blood components, Metabolic changes in blood components during storage

17.7 Blood groups and genetics, Principles of immune system central to transfusion medicine, Immunology of red blood cells, Different major and minor blood groups and their importance

17.8 Red cell allo-and autoantibody formation and function

17.9 Platelets and leucocytes antigen and antibodies, their importance

17.10 Blood grouping and Compatibility testing –Major, minor, Coomb'scross match,Factorsinfluencingthe results of blood grouping

17.11 Coomb's test –application–DCT, ICT, Rh antibody titre

17.12 Gel testing for antibody screening and identification

17.13 Hazards of blood transfusion, Strategies to prevent transfusion reactions

17.14 Pathophysiology, clinical signs and symptoms,andLaboratory Investigationforhemolytictransfusion reactions

17.15 Investigation of ABO, Rh and other immunohaemolytic diseases of thenewborn

17.16 Practical aspects in the selection of blood for neonatal exchange transfusion, Hemolytic disease of the new born and exchange transfusion

17.17 Management of Blood Bank Issue Counter, Criteria for acceptanceof requisitionform, inspection of blood component prior to issue

17.18 Screening of blood units for TTI, ELISA, rapid and other tests for diagnosis of transfusion transmitted infections

17.19 Nucleic acid testing

17.20 Hemapheresis-definition, typesof pheresis,machines andtechniques

17.21 Basics of Tissue banking & Cord blood banking

17.22 Disposal of wastes and biologically hazardous substance in the blood bank

17.23 Medico legal aspects of blood transfusion

17.24 Quality control of blood grouping reagents, QCof anti-human globulin reagent, bovine albumin, Normal saline

17.25 Quality control in blood banking, Quality control of bags and differentblood bank components, sterility test on component

17.26 Calibration, validation and maintenance of blood bank equipment, QC of blood bank techniques, external and internal quality assessment

17.27 Hemovigilance in blood banking

17.28 Automation in Blood Banking

18. **Bone marrow Transplant:**

18.1 Donor selection, HLA typing and, screening of Donor

18.2 Conditioning regimens, principles of their use in different disorders and complications

18.3 Harvesting and manipulation of the bone marrow. Bone marrow collection, red cell or plasma reduction, peripheral blood stem cell, mobilization and collection, cryopreservation, Transfusion of marrow. Purging of marrow –T cell depletion

18.4 Stem cell processing and storage for transplantation

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18.5 Classes of MHC, different methods of HLA typing, Procedure of HLA matching for bone marrow transplant
18.6 Procedure of chimerism testing/engraftment analysis after bone marrow transplant
18.7 Transplantation immunology, Histocompatibility, graft versus host disease –diagnosis and management, Immune reconstitution following transplantation
18.8 Management of post-transplant patient

19. **Medical oncology, radiotherapy and Nuclear medicine**

19.1 Principles of management of different solid tumors, otherhematological malignancies such as NHL, Hodgkin's disease, multiple myeloma
19.2 Principles of radiotherapy, the use of various radioisotopes
19.3 Basic knowledge of use of nuclear medicine in diagnosis of both oncologic and non-oncological hematological disorders

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प्राविधिक सेवा, पेडीयाट्रीक्स समूह, पेडीयाट्रीक्स उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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प्राविधिक सेवा, पेडीयाट्रीक्स समूह, पेडीयाट्रीक्स उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Growth development and behavior**
   - 1.1 Physical and psychosocial growth and development of normal child
   - 1.2 Disorders of growth
   - 1.3 Delay and deviations of development
   - 1.4 Assessment of growth and development
   - 1.5 Disorders of psychological development
   - 1.6 Common behavioral problems of preschool children
   - 1.7 Common speech disorders
   - 1.8 Common Paediatric Behavioural and Psychiatric disorders

2. **Nutrition, Fluid and Electrolytes**
   - 2.1 Normal nutrition in infancy and childhood
   - 2.2 Common nutritional disorders in childhood
   - 2.3 Nutrition supplementation programs
   - 2.4 Acid base balance
   - 2.5 Maintenance and replacement therapy of fluid and electrolytes

3. **Preventive pediatrics**
   - 3.1 Immunizations
   - 3.2 Prevention and management of common disorders of childhood
   - 3.3 Prevention and management of poisonings and accidents

4. **Social pediatrics**
   - 4.1 School health services
   - 4.2 National health programmes related to maternal and child health
   - 4.3 Community health services for the maternal and childhood
   - 4.4 Organizing health care delivery and referral systems for children

5. **Genetics**
   - 5.1 Genetic and chromosomal disorders
   - 5.2 Inborn errors of metabolism
   - 5.3 Genetic counseling including antenatal diagnosis
   - 5.4 Gene therapy

6. **Neonatology**
   - 6.1 Management of normal, high risk and sick neonates
   - 6.2 Monitoring and ventilatory support of the sick neonates
   - 6.3 Foetal disorders
   - 6.4 Perinatology
   - 6.5 Preventive neonatology

Section (B) - 50 Marks

7. **Adolescent Medicine**
   - 7.1 Adolescent development
   - 7.2 Adolescent health problems

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8. **Infectious diseases**
   - 8.1 Diagnosis and management of common infectious diseases (bacterial, viral, parasitic, fungal) in the pediatric age group and their management principles

9. **Immunity, allergy and rheumatic disorders of Paediatric age group**

10. **System based pediatrics**
    - 10.1 Diagnosis and management of common diseases/ disorders affecting Gastro intestinal, hepatobiliary, cardiovascular, respiratory, endocrine, blood and lymphoreticular, genitourinary, nervous and musculoskeletal systems

11. **Eye, ear, nose and throat**
    - 11.1 Diagnosis and management of common disorders of eye, ear, nose and throat in the pediatric age group

12. **Paediatric Dermatology**
    - 12.1 Common dermatological problems in Children
    - 12.2 Sexually transmitted diseases, AIDS

13. **Paediatric Surgery**
    - 13.1 Diagnosis and supportive management of common surgical disorders of neonates, infants and children and appropriate referral

14. **Pediatric Emergencies**
    - 14.1 Diagnosis and management of common pediatric emergencies such as coma, convulsions, shock, acute severe asthma, cyanotic spells, poisonings, accidents etc. Pediatric advance life support skills, cardiovascular support and stabilization

15. **Neoplastic disorders and tumors**
    - 15.1 Epidemiology, principles of diagnosis and treatment of common Paediatric neoplastic disorders (leukaemias, lymphomas, neuroblastoma, soft tissue sarcoma, retinoblastoma) and benign tumors

16. **Radio diagnosis**
    - 16.1 Interpretation of :
      - 16.1.1 Basic chest and abdominal and abdominal radiography in different views
      - 16.1.2 Contrast radiography of different organs - IVP, MCU, Ba-series and myelogram
      - 16.1.3 Radiology of bones and joints
      - 16.1.4 Ultrasonography of brain, abdomen and other organs
      - 16.1.5 Echocardiography
    - 16.2 Recent advances in radiology - CT, MRI, USG, radioisotope scanning and PET

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प्राविधिक सेवा, मेडिसिन समूह, रेडिएसन अंकोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, रेडिएसन अंकोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, रेडिएसन अंकोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 60 Marks

1. Radiation Physics

1.1 **Atom and Particles:** Definition; structures-nucleus, orbital shells, energy levels, binding energy; atomic number, atomic weight, isotope, isomer, isobar, proton, neutron, electron and positron

1.2 **Photon Interaction:** Coherent scattering, photoelectric effect, compton scattering, pair production, annihilation radiation and photonuclear reactions

1.3 **Attenuation:** Process of attenuation, exponential attenuation, coefficients of attenuation, energy transfer and absorption

1.4 **Electron Interactions:** Ionisation, excitation, heat production; radioactive interaction (bremsstrahlung), relative rate of energy loss and directional changes through collisional and radioactive processes; stopping power, range, scattering power, linear energy transfer

1.5 X-ray and basic principles of X-ray production

1.6 **Principles of Image Production and Use in Radiation Therapy:** CT Scan, Plain film, Fluoroscopy, MRI, Ultrasonography, Nuclear medicine imaging including PET, Imaging techniques used to verify treatment accuracy e.g. port films, electronic portal imaging, cone beam CT

1.7 **External Photon Beam Radiation Therapy**

- 1.7.1 Radiotherapy machines (Betatron, Van De Graff generator, Cobalt, Linear accelerator): constructions and process of photon production
- 1.7.2 Alteration of the beam aperture using Cerrobend blocking, multileaf collimators and independent jaws
- 1.7.3 Design and function of multileaf collimators including awareness of issues created by rounded leaf edges
- 1.7.4 Types of wedge filters
- 1.7.5 Characteristics of kV and MV photon beams:
- 1.7.6 Measurements of an external photon beam, including choice of suitable radiation detector:
  - 1.7.6.1 Beam measurement: radiation quality, output & inverse square law
  - 1.7.6.2 Measurement protocols i.e. IAEA megavoltage absolute dosimetry protocol for megavoltage photon beams
  - 1.7.6.3 Dose distribution - kV and MV beam profiles, depth dose curves, construction of isodose charts
- 1.7.7 Dose distribution in tissue produced by external beam photon radiation:
  - 1.7.7.1 Radiation components i.e. primary and scattered radiation
  - 1.7.7.2 Descriptors of dose distribution: percentage depth dose, beam profile, isodose charts, flatness and symmetry, penumbra, surface dose and skin sparing, terms used to calculate dose
  - 1.7.7.3 Factors affecting dose distribution and beam output: effects of field size and shape, source-skin distance, beam quality or energy and beam modifying devices on dose distribution and beam output
  - 1.7.7.4 Effects of tissue heterogeneity and patient irregularity: effects on dose distribution of patient contour, bone, lung, air cavities and prostheses; dose within bone cavities, interface effects, effects of electronic disequilibrium
  - 1.7.7.5 Effects on dose distribution of irregular or offset fields and associated clinical implications of changes in beam aperture: use of Cerrobend blocking, multileaf collimators and independent jaws

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1.7.7.6 Dose modification techniques: methods of compensation for patient contour variation and/or tissue inhomogeneity including wedging and compensating filters; shielding of dose-limiting tissues; the use of bolus and build-up material

1.7.7.7 Physical aspects of the treatment techniques: Fixed SSD and isocentric techniques; Simple techniques: parallel opposed fields, multiple fields; Complex techniques: rotation therapy (full or partial), conformal therapy, IMRT, VMAT, IGRT

1.8 **Electron Beam Radiation Therapy**

1.8.1 Process of generation of electron beam from a linear accelerator

1.8.2 Characteristics of an electron beam – energy spectra, energy specification, variation of mean energy with depth, photon contamination

1.8.3 Dose distribution in tissue from an electron beam:

1.8.3.1 Percentage depth dose, beam profiles, isodose charts, flatness and symmetry, penumbra, surface dose

1.8.3.2 Effects of field size and shape, source-skin distance, energy, beam collimation on dose distribution and beam output

1.8.3.3 Effects of heterogeneity and patient irregularity i.e. effect on dose distribution of surface obliquity, air gaps, lung, bone, air filled cavities, external and internal shielding

1.8.3.4 Methods of field shaping for different beam energies and effect on surface dose

1.8.3.5 Beam measurement: radiation quality, output, measurement protocols i.e. IAEA megavoltage dosimetry protocol for mega electron volt (MeV) electron beams

1.9 **Proton Beam Radiotherapy**

1.9.1 Production of proton beams for clinical use

1.9.2 Key principles and advantages of the cyclotron and synchrotron

1.9.3 Dose distribution in tissue produced by proton beam radiation:

1.9.3.1 Beam profile and percentage depth dose

1.9.3.2 Clinical modification of Bragg peak and beam collimation

1.9.3.3 Beams produced by passive scattering foils and active scanning

1.10 **Treatment Planning and Delivery for Photon and Electron Beams**

1.10.1 Different equipment and methods for patient simulation; Processes of 2D and 3D planning; principles of intensity modulated radiation therapy and inverse treatment planning

1.10.2 Methods of determining body contour, location of internal structures including critical tissues and target volume including comparison of CT, MRI and PET

1.10.3 Choice of beam energy, field size, beam arrangement and the use of bolus

1.10.4 Use of field junctions in terms of: Photon-photon junctions, Photon-electron junctions, Electron-electron junctions

1.10.5 Dose calculation algorithms, superposition/convolution, Monte Carlo and pencil beam methods, their comparative advantages and limitations

1.10.6 Accuracy of treatment planning and delivery:

1.10.6.1 Methods of patient monitoring and ensuring reproducibility of patient positioning throughout treatment and planning

1.10.6.2 Image-guided radiation therapy

1.10.6.3 Accuracy of calibration, stability of beam parameters, accuracy of isodose calculation

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1.10.6.4 Determination of mechanical and radiation accuracy of treatment machines and simulators
1.10.6.5 Systematic and random errors
1.10.6.6 Avoidance and detection of dose delivery errors
1.10.6.7 Potential errors arising from computer control of set up and treatment machine operation
1.10.6.8 In-vivo dosimetry techniques

1.11 **Radiation Measurement Devices**

1.11.1 Ionisation chambers, semi-conductor detectors and optically stimulated luminescence dosimeters (TLD and OSL)
1.11.2 Photographic film, radiochromic film, Geiger-Muller counters, scintillation counters, chemical dosimeters
1.11.3 Use of radiation phantoms and dedicated dosimetry tools for fixed SSD and isocentric patient treatments

1.12 **Radioactivity**

1.12.1 Activity, apparent activity, specific activity, air-kerma rate constant and reference air-kerma rate
1.12.2 Radionuclide decay processes: alpha, beta, positron, gamma, electron capture, internal conversion
1.12.3 Radionuclide production: natural and artificial radioactivity
1.12.4 Exponential radioactive decay: decay constant, half life (physical, biological, effective), mean life, daughter products, radioactive equilibrium

1.13 **Sealed Source Radionuclides**

1.13.1 Source construction including filtration
1.13.2 Properties: spectra of radiation emitted, half-life, usual specific activity
1.13.3 Measurement of source activity and dose rates, choice of suitable detectors and calibration
1.13.4 Radionuclides: caesium-137, iridium-192, iodine-125, palladium-106, strontium-90, radium-226, cobalt-60, yttrium-90
1.13.5 Management: handling, cleaning, inspection, storage and transport
1.13.6 Sealed source brachytherapy:
1.13.6.1 Types of procedures - surface applications, eye plaques, interstitial implants, intracavitary techniques
1.13.6.2 Source dose rate and dose distributions
1.13.6.3 Delivery techniques: remote afterloading machines, manual afterloading
1.13.6.4 ICRU dose specification system: current ICRU recommendations for interstitial and gynecological treatment specifications
1.13.6.5 Current dosage systems: Paris system, production of conformal dose distributions using a single, stepping source
1.13.6.6 Procedures for beta emitters: surface and ophthalmic applications, intravascular techniques, techniques of delivery – unique applicators and methods of use

1.14 **Unsealed Source Radionuclides**

1.14.1 Concepts of uptake, distribution and elimination
1.14.2 Physical, biological and effective half life
1.14.3 Methods of dose estimation: Medical Internal Radiation Dose (MIRD) and other methods of estimating dose to target tissues and critical organs
1.14.4 Management: safe handling, storage, transport, clean up of spills

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1.15 **Radiation Protection**

1.15.1 ALARA principle, radiation incident and radiation accident
1.15.2 International Commission on Radiation Protection (ICRP) recommendations and national radiation protection standards
1.15.3 Practical dose minimization practices and procedures
1.15.4 Typical environmental dose levels and doses from diagnostic medical exposures
1.15.5 Medical exposure in contrast to exposure of the public and occupational exposure (justification, optimization and dose limits)
1.15.6 Minimization of dose to patients, staff and general public including safety procedures for staff, control of areas and radiation sources, personal monitoring, area monitoring, construction of rooms to house sources and radiation generators
1.15.7 Recommended dose limits for fetal exposure and human data from which these have been derived
1.15.8 Documentation and reporting requirements relating to radiation incidents and accidents

2. Radiation Biology

2.1 Law of Bergonie and Tribondeau
2.2 Evolution of fractionated treatment :The ram's testis experiment, evolution of standard fractionation schedules, treatment protraction and adverse effects of protraction
2.3 Cell: Normal cell structure; structure of eukaryotic genes e.g. open reading frame, untranslated regions, introns, exons, regulatory elements; chromosome packaging; DNA replication and the importance of maintaining genomic integrity; RNA transcription and translation; epigenetic effects on gene expression
2.4 Cell Cycle: Phases and functions; Check points and their molecular controls; Major cell cycle regulators e.g. pRB, p53, cyclins, cyclin-dependent kinases; Cell cycle kinetic parameters; Extra cellular agents affecting cell growth e.g. growth factors, hormones; Growth factor receptors; Signal transduction e.g. MAPK/ERK, RAS, RAF pathways
2.5 Mechanism of malignant cell transformation and progression
2.5.1 Activation of oncogenes/loss of tumor suppressor genes: Mechanisms including point mutations, insertions, deletions, translocations, and amplifications; stable and unstable aberrations; Methods of quantification including comparative genomic and in-situ hybridization, spectral karyotyping
2.5.2 Knudson's 2-hit hypothesis
2.5.3 Epigenetic and telomeric changes: Global demethylation, promoter hyper-methylation
2.5.4 Aberrant histone acetylation
2.5.5 Tumor angiogenesis and vasculogenesis
2.6 Tumor Growth: Gompertzian growth of untreated cancers including the concepts of tumour doubling time and potential doubling time; determinants of tumour growth rate including cell cycle time, growth fraction, cell loss factor; effect of tumour microenvironment on growth rate
2.7 Radiation Induced Cellular Damage
2.7.1 Evidence for DNA being the clinically relevant target for cell killing and other targets of radiation damage
2.7.2 Types of DNA lesions caused by ionizing radiation including double strand breaks (DSB), single strand breaks (SSB), cross links and base damage
2.7.3 DNA damage repair mechanisms including sub-lethal damage and potentially lethal damage

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2.7.4 Assays for DNA damage including: gamma-H2AX, Comet assay, pulsed field electrophoresis, plasmid based assay, micronucleus assay and chromosomal aberrations
2.7.5 Radiation sensitivity in different phases of the cell cycle
2.7.6 Modes of cell death including timing of cell death and relative importance following ionizing radiation including: mitotic catastrophe, apoptosis, radiation-induced senescence, necrotic death, autophagy
2.7.7 Concepts of reproductive death and clonogenicity; Bystander effect
2.7.8 Titration of radiation dose according to tumour cell 'burden' including macroscopic versus microscopic disease

2.8 DNA double strand break repair
2.8.1 Sensing DNA DSB
2.8.2 Cell cycle arrest
2.8.3 Histone modifications
2.8.4 Recruitment of DNA DSB repair proteins
2.8.5 DNA DSB repair pathway
2.8.6 Homologous recombination and Non-homologous end-joining
2.8.7 The genetic diseases that affect DNA repair/ clinically apparent radio-sensitivity (e.g. ataxia telangectasia)

2.9 Quantification of cell survival following irradiation
2.9.1 Concept of cell survival curves
2.9.2 In-vitro and in-vivo techniques to generate survival curves
2.9.3 Dose rate effects on cell survival
2.9.4 The linear quadratic formula in terms of: The biophysical basis of α and β in the linear quadratic formula, clinically derived α/β ratios for different types of cancer, acute and late responding normal tissues; limitations of linear quadratic formula
2.9.5 Relationship between dose/fraction and tissue α/β ratio

2.10 Fractionations and "Rs" of radiobiology
2.10.1 Conventional, hyper, hypo and accelerated fractionation
2.10.2 Intrinsic Radiosensitivity, Repair, Reoxygenation, Redistribution, Repopulation

2.11 Biological Effective Dose

2.12 Hypoxia and the Oxygen effect
2.12.1 Modification of radiation induced DNA damage by oxygen
2.12.2 Oxygen enhancement ration (OER)
2.12.3 Tumor hypoxia: clinical significance
2.12.4 Methods used to overcome the effect of tumour hypoxia including their rationale: e.g. fractionation, hypoxic cell sensitizers, hypoxic cell cytotoxins, hyperbaric oxygen, high LET radiation, and hyperthermia
2.12.5 Consequences of molecular responses to hypoxia including: angiogenesis, increased propensity for metastasis and genetic instability

2.13 Radiation quality
2.13.1 Types of ionizing radiation; Linear Energy Transfer (LET) and its relationship to direct and indirect DNA damage, free radicals and free radical scavengers

2.14 Dose response
2.14.1 Dose response curve: shape, determinants of steepness of curve
2.14.2 Therapeutic ratio: concept and significance
2.14.3 Radiocurability and radioresponsiveness
2.14.4 Factors influencing tumor control: physical factors including dose, dose rate, radiation quality, temperature; chemical factors including oxygen, radio-

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sensitizers and radio-protectors; biological Factors including cell type and radiosensitivity, clonogen number, host factors; technical Factors including geographic miss; tumour control probability curves

2.15 Effects of radiation on normal tissues: Acute, sub-acute and late toxicity from radiation; meaning of latency with regard to normal tissue effects; functional sub-units of tissues/organs; flexible and hierarchical kinetic models; abscopal effect; post radiation regeneration of normal tissues; concept of normal tissue/organ tolerance; mechanism of effect and consequences of radiation on: parenchymal tissues, connective tissues, vascular systems and immune system

2.16 Acute syndromes following high doses of total body radiation

2.16.1 Acute radiation syndrome: prodormal period, latent period, critical phase (manifestation of disease) and recovery or death

2.16.2 Cerebrovascular syndrome

2.16.3 Hematological syndrome

2.16.4 Gastrointestinal syndrome

2.16.5 Methods of biological dosimetry for unplanned / uncontrolled radiation exposure including: blood counts, chromosome aberrations in peripheral blood lymphocytes (dicentric assay, translocation assay), gamma-H2AX, mitotic index, micronucleus and comet assays

2.17 Effects of radiation on human embryo and fetus

2.17.1 Major phases of fetal development, including CNS growth and corresponding gestational age; Nature of and reasons for effects caused in utero; Factors influencing effect type and risk including dose and stage of gestation; Definition of doubling dose

2.18 Quantification of radiation effects on normal tissues

2.18.1 Principles of toxicity scoring systems used in current clinical practice including selection of appropriate endpoints and quantification

2.18.2 Examples of toxicity scoring systems used in current clinical practice e.g. RTOG, Common Toxicity Criteria, LENT/SOMA

2.18.3 Tolerance doses of normal tissues/organs including the QUANTEC data and its limitations

2.19 Radiation carcinogenesis

2.19.1 Concept of stochastic and deterministic effects

2.19.2 The shape of the dose-response curve for this effect including the peak for leukaemias

2.19.3 Relevance of integral dose in radiotherapy to second cancer induction risk

2.20 Re-irradiation

2.20.1 Re-irradiation tolerance of normal tissues derived from experimental and clinical studies for both early and late effects

2.20.2 Time interval between therapy courses and concept of forgotten dose

2.20.3 The radiobiological principles for consideration of re-treatment including initial radiotherapy dose, volume, volume of overlap and technique used

2.20.4 Effect of radiation modifiers used in treatment of the first tumour e.g. concurrent chemotherapy

2.21 Radiobiological principles in brachytherapy, stereotactic ablative radiotherapy, radiosurgery, tomotherapy, IMRT and particle therapy

2.22 Molecular analysis

2.22.1 Nucleic acid hybridization including Northern and Southern analysis, DNA microarrays, competitive genomic hybridization

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2.22.2 Protein analysis: Western analysis, immunoprecipitation, immune-histochemistry, proteomics (2-dimensional gels, mass spectrometry)
2.22.3 PCR (polymerization chain reaction), quantitative RT-PCR
2.22.4 DNA sequencing
2.22.5 Detection of single nucleotide polymorphisms, mutations in tumors
2.22.6 Knockout, knockin and transgenic mice
2.22.7 RNA interference (RNAi)
2.22.8 Tissue microarrays (TMAs)
2.22.9 In-situ hybridization

2.23 Oncopathology
2.23.1 Major histological types of cancer
2.23.2 Typical cytological features of malignant cells
2.23.3 Typical biological behaviour of benign and malignant neoplasms
2.23.4 Neoplasia, differentiation, anaplasia, aneuploidy
2.23.5 Cancer stem cells and cancer cell lineages, monoclonality
2.23.6 Tumour heterogeneity
2.23.7 Pathways of spread
2.23.8 Molecular basis of cancer and cancer genetics
2.23.9 Mechanisms of cell death
2.23.10 Tumour immunology

Section (B) – 40 Marks

3. Haematological Malignancies

3.1 **Mylodysplastic Syndrome:** Classification, French-American-British classification, WHO, Myelodysplastic syndrome, unclassified signs and symptoms, pathophysiology, genetics 5q- syndrome

3.2 **Acute and Chronic Leukemia**: Pathology, genetic abnormalities, infective precursors, investigation and evaluate relevant diagnostic tests, including molecular and cytogenetic studies e.g. indicating Ph+ disease; significance of minimal residual disease and the duration of disease remission; uses of radiation therapy, including indications for cranial, craniospinal or total body irradiation in both myeloablative and non myeloablative transplants and total marrow irradiation

3.3 **Hodgkin's Lymphoma:** Pathology, WHO classification system, appropriate staging investigations including the role of PET; contemporary combined modality therapy and the historical changes in the role of radiation therapy in the curative treatment of HL; involved field and involved nodal radiation

3.4 **Non-Hodgkins Lymphomas**: Pathology, WHO classification, appropriate staging investigations (including PET, bone marrow biopsy), stratify patients according to contemporary prognostic groupings, involved field radiation therapy, treatment principles for extranodal lymphomas, indications and techniques for applying fields extending beyond "involved field" radiation therapy, including subtotal nodal irradiation, total nodal irradiation and TBI, role of chemotherapy, molecularly targeted agents and radioimmunotherapy

3.5 **Plasma Cell Dyscrasias:** Pathology, Monoclonal Gammopathy of Undetermined Significance (MGUS), solitary plasmacytoma in both osseus and extraosseus sites and multiple myeloma. diagnostic tests including serum IgG and IgA, creatinine, calcium, urinary protein excretion, and radiology (skeletal survey, CT, and MRI), differences in PTV and prescription for solitary plasmacytoma compared to multiple myeloma, use of

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hemi-body radiation therapy, use of chemotherapy as the primary treatment modality, including the most effective regimens, timing of interventions with systemic therapies

3.6 **Myeloproliferative Disorders:** Classification, causes, diagnosis chronic myelogenous leukemia, essential thrombocythemia, polycythemia vera, primary myelofibrosis, treatment

3.7 **Stem cell Transplant: N**ormal haematopoiesis and stem cell biology, principles and practice of HSCT, indications and principles of stem cell transplant, sources of stem cells preparative regimen, principles of conditioning radiotherapy, procedure, complications, prognosis

3.8 **Palliative Care:** Introduction, WHO definition; definition and types of pain, pain assessment, use of different pain scales; Palliative measures for other symptoms including: respiratory tract, gastrointestinal tract, neurological symptoms, cutaneous and mucosal symptoms, anorexia, cachexia; Ethical issues in Palliative care; Psycho social issues; Palliative Radiotherapy

4. Principles and Practice of Radiation Oncology

4.1 Anatomy

4.2 Diagnostic work up: Radiological, Cyto-Histopathological, Biochemical, Tumor markers, Radio nuclear imaging

4.3 Tumor Classifications and Staging Systems (TNM, FIGO)

4.4 Management of malignant diseases: Treatment protocols, Sequalae of treatment

4.5 Cancers of various organs

4.6 System wise disease management

- 4.6.1 Eye and orbit
- 4.6.2 Head and neck tumors
- 4.6.3 CNS tumors
- 4.6.4 Thoracic tumors
- 4.6.5 Breast

4.7 Pre treatment verification protocols

4.8 Treatment delivery protocols

4.9 Radiation therapy treatment originating in various sites: treatment for Overall cancer management of various solid tumors

- 4.9.1 Cancer of Head and neck
- 4.9.2 Cancer of Lung and Mediastinun
- 4.9.3 Cancer of Gastro Intestinal Track
- 4.9.4 Cancer of Genito Urinary System
- 4.9.5 Cancer of the Breast
- 4.9.6 Cancer of Endocrine System
- 4.9.7 Sarcomas of Soft Tissues & Bone
- 4.9.8 Benign & Malignant Mesotheliomas
- 4.9.9 Cancer of skin
- 4.9.10 Malignant Melanoma
- 4.9.11 Neoplasms of CNS
- 4.9.12 Cancers of childhood
- 4.9.13 Lymphomas
- 4.9.14 Leukemias and other Haematological Malignancies
- 4.9.15 Paraneoplastic Synddromes
- 4.9.16 Cancers of unknown primary site
- 4.9.17 AIDS – related malignancies

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4.9.18 Oncological Emergencies
4.9.19 Treatment of Metastatic Cancers
4.9.20 Gynaecological Cancers

4.10 Radiotherapy Treatment protocols for treating cancers of various sites
- 4.10.1 Pre Treatment verification protocols
- 4.10.2 Importance of Imaging with Computed tomography, MR imaging and PET – CT In radiation Therapy
- 4.10.3 Saggital, coronal and axial planes of body
- 4.10.4 Identification of normal anatomic plane in the Body
- 4.10.5 Topographic anatomy to locate internal organs of the body
- 4.10.6 Image formation and orientation for CT, MR, PET and Fusion concepts of various modalities
- 4.10.7 Basic Principles of Digital imaging
- 4.10.8 Image acquisition (Simulation, Portal imaging, Online image Guidance)
- 4.10.9 Digital reconstruction DRR
- 4.10.10 Patient positioning and dynamic target localization
- 4.10.11 Image extraction
- 4.10.12 Quality control of Imaging
- 4.10.13 Computed Tomographic Imaging in radiation oncology
- 4.10.14 Data acquisition (raw data, Beams Eye view)
- 4.10.15 Anatomical structures (artifacts, contrast resolution, windows, distortion, spatial resolution)
- 4.10.16 Image reconstruction
- 4.10.17 Image backup and storage

4.11 Radiotherapy Treatment Delivery Protocols for malignant diseases of various sites
4.12 Techniques of Radiotherapy delivery
4.13 Treatment approaches for Metastatic Disease and palliation
- 4.13.1 Common sites of metastases, detection, therapeutic approach
- 4.13.2 Role and scope of radiation oncology
- 4.13.3 Newer Treatment approaches

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियो डाइग्नोसिस एण्ड इमेजीङ उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Physics in radiology**
   - 1.1 Production of x-rays
   - 1.2 Interaction of x-rays with metals
   - 1.3 X-ray tube
   - 1.4 Radiation protection
   - 1.5 Basic physics and advances in fluoroscopy/ imaging intensifier
   - 1.6 Basic physics and advances in CR/DR system
   - 1.7 Basic physics and advances in CT
   - 1.8 Basic physics and advances in MRI
   - 1.9 Basic physics and advances in USG
   - 1.10 Introduction to nuclear medicine

2. **Sectional and Imaging anatomy**
   - 2.1 Cross-sectional & imaging anatomy of brain
   - 2.2 Cross-sectional and imaging anatomy of chest
   - 2.3 Cross-sectional and imaging anatomy of Abdomen
   - 2.4 Anatomy of orbits and its bones
   - 2.5 Vascular anatomy of brain/head
   - 2.6 Vascular anatomy of abdominal aorta and its branches
   - 2.7 Vascular anatomy of upper and lower limbs
   - 2.8 Relevant Embryology

3. **Nervous system**
   - 3.1 Craniocerebral Trauma
   - 3.2 Imaging of non-traumatic SAH
   - 3.3 Imaging of non-traumatic ICH
   - 3.4 Imaging of stroke
   - 3.5 Cerebral ischemia
   - 3.6 Brain tumors and tumor like processes
   - 3.7 Extra-axial Tumors
   - 3.8 Imaging of sellar tumours
   - 3.9 Non-neoplastic and neoplastic spinal cord pathologies

4. **Head & Neck**
   - 4.1 Radiological imaging of diseases and conditions related to Ear, Nose, Throat
   - 4.2 Radiological imaging of diseases of thyroid, salivary gland and other soft tissue neck

5. **Paediatric imaging**
   - 5.1 Imaging of the kidneys and urinary tract in children
   - 5.2 Imaging of congenital CNS malformations
   - 5.3 Respiratory Distress

6. **Recent advances in radiology and imaging**
   - 6.1 Teleradiology, Radiology Information System & PACS
   - 6.2 Newer advances in CR/ DR system, Fluoroscopy and Mammogram
   - 6.3 Newer advances in CT and MRI

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Section (B) – 50 Marks

7. **CVS & Interventional**
   - 7.1 Radiological imaging of aortic and peripheral arterial diseases
   - 7.2 Radiologic approach to pulmonary thromboembolism
   - 7.3 Heart and pericardium
   - 7.4 Congenital and acquired heart disease
   - 7.5 Image guided radiological procedures and contrast media

8. **Musculoskeletal System**
   - 8.1 Skeletal trauma
   - 8.2 Radiological imaging of bone tumors
   - 8.3 Radiological imaging of large and small joints
   - 8.4 Haemopoietic bone disorder
   - 8.5 Osteomyelitis and septic arthritis

9. **Thoracic / respiratory system**
   - 9.1 Radiological imaging of Chest
   - 9.2 Chest trauma

10. **Gastrointestinal & hepatobiliary system**
    - 10.1 Imaging of non-neoplastic / neoplastic esophageal pathology
    - 10.2 Imaging of gastric pathology
    - 10.3 Liver neoplasms
    - 10.4 Inflammatory bowel disease
    - 10.5 Imaging and interventions in GI bleed
    - 10.6 Imaging of pancreatic neoplasm

11. **Genito-urinary system**
    - 11.1 Renovascular disease
    - 11.2 Gentiurinary trauma
    - 11.3 Genito-urinary tumor
    - 11.4 Urinary bladder & Prostate imaging

12. **Breast and diagnostic ultrasound**
    - 12.1 Breast imaging
    - 12.2 Role of USG in IUGR
    - 12.3 Diagnostic ultrasound

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, जनरल सर्जरी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, जनरल सर्जरी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **Basic & Applied**
   - 1.1 **Applied Surgical Anatomy**
     - 1.1.1 Required to have acknowledge of the structure and function of all system of the body (where applicable to common clinical conditions in surgery)
     - 1.1.2 Knowledge of histology to understand the function to tissue and organs as well as growth, degeneration and repair
     - 1.1.3 Embryological basis of common congenital anomalies
   - 1.2 **System**
     - 1.2.1 Nervous system
     - 1.2.2 Respiratory system
     - 1.2.3 Cardiovascular system
     - 1.2.4 Digestive system
     - 1.2.5 Endocrine system
     - 1.2.6 Musculoskeletal system
     - 1.2.7 General – e.g. Acid-base balance, fluid and electrolyte balance, nutrition, metabolic response to trauma and sepsis, etc.

2. **Applied Physiology**

3. **Surgical Pathology**
   - 3.1 Knowledge of the surgical pathology and microbiology in the context of surgery including inflammation, infection, neoplasm, response on the tissues to injury, disturbance of growth, degeneration processes, repair and regulation
   - 3.2 Immunology and Genetics
   - 3.3 Neoplastic diseases
   - 3.4 Gross and histopathology of common surgical conditions
   - 3.5 Nervous system
   - 3.6 Respiratory system
   - 3.7 Cariovascular system
   - 3.8 Genito-urinary system
   - 3.9 Gastrointestinal system
   - 3.10 Muscleskeletal system

4. **Critical Care**
   - 4.1 Basics of pathophysiology, approach and management of critical surgical situation e.g. Trauma, shock, sepsis, organfailure
     - 4.1.1 Clinical pictures
     - 4.1.2 Investigation
     - 4.1.3 Diagnosis confirmation
     - 4.1.4 Management–use of equipments
     - 4.1.5 Monitoring–complications
     - 4.1.6 Counseling – communication
     - 4.1.7 Follow-up

5. **Recent advance**
   - 4.2 Research-inside country
   - 4.3 Recent advance–international

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4.4 Not published research work
4.5 Future national vision

Section (B) – 50 Marks

6. **Surgical Management**
   - 6.1 Principle of management of common general surgical conditions
     - 6.1.1 Clinical practice (History and examinations)
     - 6.1.2 Investigation
     - 6.1.3 Provisional Diagnosis and differentials
     - 6.1.4 Treatment-Conservative, operative, palliative
     - 6.1.5 Monitoring
     - 6.1.6 Follow-up–of the patients with general surgical condition of following systems
       - 6.1.6.1 Nervous system
       - 6.1.6.2 Respiratory system
       - 6.1.6.3 Cardiovascular system
       - 6.1.6.4 Gastrointestinal system
       - 6.1.6.5 Genitourinary system
       - 6.1.6.6 Endocrine and breast
       - 6.1.6.7 Musculo-skeletal system and soft tissue
       - 6.1.6.8 Trauma/Polytrauma

7. **Principles of Surgery**
   - 7.1 Knowledge of the General principle and practice of Surgery
     - 7.1.1 Imaging techniques/interventional Radiology
     - 7.1.2 Endoscopy/Laparoscopy
     - 7.1.3 Surgery at extremes of life
     - 7.1.4 Theatre techniques
       - 7.1.4.1 Aseptic techniques–sterilization
       - 7.1.4.2 Anesthesia in general, maintenance of homeostasis
       - 7.1.4.3 Basic techniques–suturing material dressing plaster
       - 7.1.4.4 Diathermy and electrosurgical devices
       - 7.1.4.5 Tourniquet
     - 7.1.5 Wound healing, dehiscence, scar, contractures
     - 7.1.6 Post operative complication and management
     - 7.1.7 Sepsis's surgery
       - 7.1.7.1 Acute and Chronic, inflammation
       - 7.1.7.2 Wound infection and septicemia
       - 7.1.7.3 TB, Leprosy, AIDS, Bacterial infection
       - 7.1.7.4 Antiseptic, Antibiotic policies

8. **OperationSurgery**
   - 8.1 **Nervous System**
     - 8.1.1 Exposure to extradural haematoma
     - 8.1.2 Skull traction
     - 8.1.3 Nerve repair and transplant
     - 8.1.4 Trauma–skull, strive
   - 8.2 **Respiratory System**
     - 8.2.1 F.B. in respiratory tract
     - 8.2.2 Tracheostomy, cricothyroidotomy

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8.2.3 Chest Drainage
8.2.4 Thoractomy
8.2.5 Chesttrauma (variety of injuries)

8.3 **Cardiovascular**
8.3.1 Cardiac Tamponade
8.3.2 Exposure to artery and vein,embolectomy
8.3.3 Amputations

8.4 **Gastrointestinal System**
8.4.1 All type of GI Surgery of all magnitude and types
8.4.2 Different combination of operation
8.4.3 Except-transplantation

8.5 **Genitourinary system**
8.5.1 Suprapublic bladder drainage
8.5.2 Cystocscopy
8.5.3 Exposure of kidney, calculus, obstructive uropathy
8.5.4 Perinephric abscess
8.5.5 Scrotal/testicular operation
8.5.6 Ectopic pregnancy/otherpelvicsurgery

8.6 **Endocrine and breast**
8.6.1 Thyroid/parathyroid
8.6.2 Breast surgery (noreconstruction)

8.7 **Musculoskeletal and soft tissue**
8.7.1 Simple skeletal traction
8.7.2 Compartmental syndrome
8.7.3 Bone infection

8.8 **Plastic**
8.8.1 Simple ceftlip repair
8.8.2 Skin grafting /flaps
8.8.3 Skin lesion
8.8.4 Lymph node and biopsy

8.9 **Other**
8.9.1 Venesection centralline
8.9.2 Laryngoscope, E Tintubation
8.9.3 FNAC /tru-cut needle biopsy
8.9.4 Defibrillation

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, एनेस्थेसियोलोजी समूह, एनेस्थेसियोलोजी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
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2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. Anesthetic Physiology

1.1 Autonomic Nervous system
1.2 Cardiac physiology
1.3 Cerebral physiology and the effects of anesthetic drugs
1.4 Gastrointestinal physiology and pathophysiology
1.5 Hepatic physiology and pathophysiology
1.6 Neuromuscular physiology and pharmacology
1.7 Renal physiology, pathophysiology and pharmacology
1.8 Respiratory physiology and pathophysiology

2. Anesthetic Pharmacology

2.1 Basic Principles of Pharmacology
2.2 Inhaled Anesthetics: Mechanism of Action, Pharmacokinetics - uptake, distribution, metabolism and toxicity
2.3 Inhaled Anesthetics: Pulmonary Pharmacology, Cardiovascular Pharmacology
2.4 Inhaled Anesthetics: Delivery system- Anesthesia machines, circuits and Physics
2.5 Intravenous Anesthetics
2.6 Opioids Analgesia and Nonopioid Pain Medication
2.7 Pharmacology of Neuromuscular Blocking Drugs and Antagonism of Neuromuscular Blockade
2.8 Local Anesthetics

3. Anesthesia Management

3.1 Airway management
3.2 Preoperative Evaluation
3.3 Cardiovascular monitoring and management: Perioperative Echocardiography, Electrocardiography, Perioperative Ischemia and Myocardial Infarction, Implantable Cardiac Pulse Generators- Pacemakers and Cardioverter –Defibrillators
3.4 Respiratory monitoring and management
3.5 Renal monitoring and management
3.6 Hepatic monitoring and management
3.7 Neurology monitoring: Monitoring Brain State During General Anesthesia and Sedation
3.8 Patients positioning and associated risk
3.9 Risk of Anesthesia
3.10 Perioperative Acid Base Balance
3.11 Perioperative Fluid and Electrolyte therapy
3.12 Blood management: Coagulation and Transfusion therapy
3.13 Depth of anesthesia monitoring: Bispectral index (BIS), EEG, Neuromuscular blockade monitor
3.14 Supra glottis airway devices
3.15 Airway algorithm

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Section (B): 50 Marks

4. Subspecialty Management

4.1 Anesthesia for Cardiac Surgical procedures -Thoracic and Vascular surgery
4.2 Anesthesia and ICU management for Cardiac Arrhythmias cardiovascular emergency
4.3 Anesthesia for Renal and Genitourinary System
4.4 Anesthesia for Renal Transplant and ICU management
4.5 Anesthesia for Hepatobiliary system, Transplant and ICU management
4.6 Anesthesia for Organ Procurement (Renal/Liver/Cardiac/Pancreas and other): Management of organ donors before procurement (pulmonary/ cardiovascular/ temperature/hormones/steroids/electrolytes)
4.7 Donor management goals, management of donors after brain stem death
4.8 Anesthesia and pre hospital emergency: BLS and ACLF (Recent Guideline)
4.9 ICU management- Sepsis and multisystem organ failure (Recent guideline), Post-transplant Infection, Acute Graft Rejection/Shock- cardiogenic/hypovolumic/ septic/Anaphylactic
4.10 ICU management - ARDS, TRALI, Transfusion complication, Peumothorax / Pneumohydrothorax, Acute liver Failure, Acute Renal failure, VAP, Catheter related Bloodstream infection.
4.11 Remote Anesthesia: Endoscopy, Angiogram, Radio ablation, CT.
4.12 Use of Ultrasonography for: Echocardiography and Regional anesthesia

5. WHO surgical checklists

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, डेन्टिष्ट्री समूह, डेन्टल सर्जरी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. **प्रथम चरण** (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. **द्वितीय चरण** (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व. २०७९/०८०

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, डेन्टिष्ट्री समूह, डेन्टल सर्जरी उपसमूह, रजिष्ट्रार पद, आठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 % Marks

1. General Principle of Surgery

1.1 Evolution and History of Oral and Maxillofacial Surgery

1.2 Diagnosis, history taking, clinical examination, investigations

1.3 Informed consent/medico-legal issues

1.4 Concept of essential drugs and rational use of drugs in oral and maxillofacial surgery

1.5 Communication skills with patients- understanding, clarity in communication, compassionate explanations and giving emotional support at the time of suffering and bereavement

1.6 Principles of surgical audit - understanding the audit process and outcome

1.7 Principles of surgery- developing a surgical diagnosis, basic necessities for surgery, aseptic/sterilization technique, incisions, flap designs, tissue handling, hemostasis, dead space management, decontamination and debridement, suturing, edema control, patient general health and nutrition

1.8 Medical emergencies - Prevention and management of altered consciousness, hyper sensitivity reaction, chest discomfort, respiratory difficulty

1.9 Pre-operative workup - Concept of fitness for surgery; basic medical work up; work up in special situation like diabetes, renal failure, cardiac and respiratory illness; risk stratification

1.10 Surgical sutures, Properties of suture materials, appropriate use of sutures and drains, different types in OMFS

1.11 Post-operative care- concept of recovery room care, Airway management, Assessment of Wakefulness, management of cardio vascular instability in this period, Criteria for shifting to the ward, pain management

1.12 Wound management- Types, Wound healing, factors influencing healing, basic surgical techniques

1.13 Surgical Infections - Asepsis and antisepsis, Microbiological principles, Rational use of antibiotics, special infections like Synergistic Gangrene and Diabetic foot infection, Hepatitis, tuberculosis and HIV infection and cross infection

2. Assessment and Diagnosis

2.1 Airway obstruction/management - Anatomy of the airway, principles of keeping the airway patent, mouth to mouth resuscitation, Oropharyngeal airway, endotracheal intubation, Cricothyroidectomy, Tracheostomy

2.2 Assessment of trauma-multiple injuries patient, closed abdominal and chest injury penetrating injuries, pelvic fractures, urological injuries, vascular injuries

2.3 Maxillofacial trauma - basic principles of treatment, primary care, diagnosis and management of hard and soft tissue injuries of Maxillofacial region including Mandible, Maxilla, Middle third ZMC, Frontal bone, Comprehensive management of poly trauma patients

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2.4 Aesthetic facial surgery - detailed knowledge of structures of face & neck including skin an underlying soft tissues, diagnosis and treatment planning of deformities and condition affecting facial skin, underlying facial muscles, bone, eyelids, external ear etc., surgical management of post acne scaring, face lift, blepharoplasty, otoplasty, facial bone recountouring

2.5 Maxillofacial radiology/radio diagnosis - Various diagnostic methods and imaging techniques. Use of ct scan,mri, ultrasound,sialography and arthrogram in OMFS

3. Surgery (Cranio-facial Deformities, Laser Surgery, Cryosurgery)

3.1 Orthognathic surgery - Embryology and surgical anatomy of the oro-facial region. Normal and abnormal growth and development of the face and jaws. Investigation, diagnosis and surgical management of dento-facial deformity including the use of grafts. Understanding of the principles of orthodontic treatment and the joint management of dento-facial deformity with the orthodontists. Various osteotomy techniques for correction of dentofacial deformities

3.2 Laser surgery - The application of laser technology in the surgical treatment of various Maxillofacial lesions

3.3 Distraction osteogenesis for correction of maxillofacial deformities

3.4 Cryosurgeries - Principles, the application of cryosurgery in the surgical management of lesion amenable to such surgeries

3.5 Cleft lip and palate surgery- detailed knowledge of the development of the face, head and neck diagnosis and treatment planning, Current concepts in the management of cleft lip and Palate deformity, knowledge of nasal endoscopy and other diagnostic techniques in the evaluation (speech and hearing, concept of multi disciplinary team management)

3.6 Craniofacial surgery - basic knowledge of developmental anomalies of face, head and neck basics concept in the diagnosis and planning of various head and neck anomalies including facial cleft, craniosynostosis, syndromes, etc., Current concepts in the management of craniofacial anomalies

Section (B) – 50 % Marks

4. Reconstructive and Therapeutic Techniques (Maxillofacial Pathology, Oncosurgery and Reconstructive surgery)

4.1 Tissue grafting - Understanding of the biological mechanisms involved in autogenous and heterogeneous tissue grafting

4.2 Reconstructive oral and maxillofacial surgery – Oral and Maxillofacial reconstruction with various techniques involving hard and soft tissue

4.3 Odontogenic and non odontogenic Cyst and tumors of head and neck region and their management - including principles of tumor surgery, giant cell lesion of jaw bones, fibro osseous lesions of jaw

4.4 Head and neck oncology – Molecular biology and understanding of the principles of management of head and neck oncology

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4.5 Micro vascular surgery- basic principles and techniques for reconstruction of head and neck region

4.6 Disorders of the salivary glands- The investigation and treatment of diseases of the minor and major salivary glands. Obstructive and inflammatory condition, Infections and Tumours

4.7 Maxillary Sinus pathology - A thorough understanding of the sinus diseases of odontogenic and non-odontogenic origin including tumour, Management of sinus disorders, in particular oroantral communications related to dental procedures

4.8 Oral Medicine and Therapeutics- Oral mucosal lesions and oral manifestations of systemic diseases. Precancerous diseases of oral cavity

5. Patient Management (Local and general Anesthesia, Implantology and Minor oral surgery)

5.1 Local anaesthesia – Types ,composition , techniques and complications in OMFS

5.2 General Anesthesia - stages of Anesthesia, pharmacology of inhalation, intravenous and regional anesthetics, muscle relaxants, conscious sedation

5.3 General patient management - competence in physical assessment of patients of surgery, competence in evaluation of patients presenting with acute injury, particularly to maxillofacial region. Competence in the evaluation of management of patients for Anesthesia

5.4 All aspects of dento alveolar surgery and its complications – Exodontia, apicoectomy, transplantation , impaction, surgical exposure of impacted teeth

5.5 Pre-prosthetic surgery - wide range of surgical reconstructive procedures involving their hard and soft tissues of the edentulous jaws

5.6 Implantology –Rationale, diagnosis, treatment planning principles, surgical procedures for insertion of various types of implants. Complications and their management

6. Other disorders and infections (Myofacial pain, Nerve Injuries and Maxilofacial infections)

6.1 Facial pain; Facial palsy, neuralgia and nerve injuries. Pain control- acute and chronic pain, cancer and non-cancer pain

6.2 Temporomandibular joint disorders - TMJ disorders, TMJ ankylosis – bony and TMJ ankylosis tissue and their sequelae , therapeutic arthroscopic surgery procedures

6.3 Neurological disorders of maxillofacial region-diagnosis and management of Trigeminal Neuralgia, MPDS, Bells palsy, Frey's syndrome

6.4 Head and Neck Infections- Fascia of head and neck. General and anatomical considerations in the spread of odontogenic space infection with emphasis on the management of pericoronitis, abscess, dry socket, cellulitis (Ludwig Angina), osteomyelitis, and various head and neck potential space infections

7. Recent advances in Oral and Maxillofacial Surgery

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, वरिष्ठ नर्सिङ्ग सुपरभाईजर पद, आठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :आ.व. २०७९/०८०

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
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   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
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     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
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     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
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   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
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   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, नर्सिङ्ग समूह, नर्सिङ्ग उपसमूह, वरिष्ठ नर्सिङ्ग सुपरभाईजर पद, आठौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **Basic Nursing**
   - 1.1 Nursing process ad its steps: Nursing assessment, nursing diagnosis, planning, implementation and evaluation of nursing care
   - 1.2 Assessment of the client's health status: History taking, physical examination, measurement of height, weight and vital signs
   - 1.3 Meeting safety needs
   - 1.4 Promotion of comfort, rest and sleep
   - 1.5 Meeting hygiene needs
   - 1.6 Meeting nutritional and elimination needs
   - 1.7 Infection prevention and control measures: Hand hygiene, universal precaution, disinfection and sterilization of equipment and hospital waste management
   - 1.8 Emergency conditions and their first aid management: Chocking, burn, fracture, hemorrhage, shock and poisoning

2. **Nursing Concepts and Principles**
   - 2.1 Stress and crisis and their management
   - 2.2 Pain management: Physiology, assessment and management
   - 2.3 Communication and its role in nurse–client relationship
   - 2.4 Nursing theories of Florence Nightingale, Orem, Roy, Virginia Henderson & Faye Abdullah
   - 2.5 Nursing Process : Steps of Nursing process
   - 2.6 Concept of holistic health/ alternative therapies: Therapeutic touch, bio- feedback relaxation, meditation and yoga
   - 2.7 Concept of rehabilitation and rehabilitation process
   - 2.8 Rights of patients
   - 2.9 Ethical and legal aspects in nursing

3. **Behavioral Science and Psychology Applied in Nursing**
   - 3.1 Major cultural groups and their health seeking behaviour
   - 3.2 Factors affecting health of the people
   - 3.3 Psychology applied to Nursing

4. **Education Science in Nursing**
   - 4.1 Teaching and Learning Principles
   - 4.2 Factors which affect Teaching / Learning
   - 4.3 Teaching Methods and Media
   - 4.4 Components of Curriculum Development
   - 4.5 Evaluation: Types, Characteristics of evaluation tools

5. **Applied Health Sciences**
   - 5.1 Anatomy and physiology of :
     - 5.1.1 Cardiovascular System
     - 5.1.2 Respiratory system
     - 5.1.3 Digestive system
     - 5.1.4 Muscular skeletal system
     - 5.1.5 Nervous system

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5.1.6 Special senses
5.1.7 Reproductive system
5.1.8 Endocrine system

5.2 Pharmacology
5.2.1 Principles of pharmacy kinetics and pharmacy dynamic
5.2.2 Important Drugs and their actions
5.2.3 List of essential Drugs ass specified by WHO/ DDA (Department of Drug
5.2.4 Administration)
5.2.5 Life saving drugs

5.3 Patho- physiology
5.3.1 General concepts of necrosis
5.3.2 Inflammation
5.3.3 Thrombosis
5.3.4 Embolism
5.3.5 wound – healing oedema
5.3.6 Neoplasms
5.3.7 Antigens and antibodies

5.4 Microbiology
5.4.1 Classification of Micro – organism
5.4.2 Microbial Morphology and the process of :
5.4.3 Drug sensitivity testing
5.4.4 Important terminologies
5.4.5 Opportunistic infections
5.4.6 Pathogens
5.4.7 Bacterial toxins

5.5 Sterilization
5.5.1 Different methods and Types

5.6 Biochemistry
5.6.1 Digestion and absorption of carbohydrate, protein and fat
5.6.2 Malabsorption
5.6.3 Classifications of vitamins and requirement of different age group

5.7 Nutrition
5.7.1 Assessment of Nutrition status
5.7.2 Therapeutic diet in various medical conditions
5.7.3 Menu planning & calculation of calorie for different age group
5.7.4 Food belief & practice
5.7.5 Common Nutritional deficiency diseases

Section (B): 50 %

6. Adult Nursing

6.1 Developmental needs and tasks of young adult and middle aged adult
6.2 Life style of young adult and middle aged adult
6.3 Common health problem of young and middle aged adult and their management: Respiratory, GI, urinary, cardio-vascular, endocrine, musculo-skeletal , neurological, eye ENT gynae problems
6.4 Preoperative , operative and post-operative care
6.5 Nursing role in promotion and maintenance of the health of young and middle-aged adults

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7. Geriatric Nursing

7.1 Physiological changes and common health problems of elderly people: Arteriosclerosis, myocardial infarction, hypertension, COPD, asthma, diabetes mellitus, senile cataract, glaucoma, osteoporosis and gout
7.2 Health promotion activities of elderly clients
7.3 Common cancers of elderly clients and their treatment therapies
7.4 Geriatric emergencies and their management: Chest pain, syncope, GI bleeding and hypothermia

8. Child Health Nursing

8.1 Concept of growth and development and assessment of children
8.2 Growth of body systems at different age groups from infancy, toddlerhood, pre- school, school age to adolescence
8.3 Developmental milestones and tasks
8.4 Promotion of optimum growth and developments of children
8.5 Care of new born: Immediate and subsequent care
8.6 Common health problems of children using system approach
8.7 Common psycho-social and behavioral problems of children
8.8 Role of nurse in the care of sick children
8.9 Stress of illness and hospitalization

9. Psychiatric Nursing

9.1 Mental health assessment: History taking and mental status examination
9.2 Treatment modalities for mental illnesses
9.3 Thought and mood disorders: Schizophrenia, depression
9.4 Neurotic and stress-related disorders
9.5 Psychiatric emergencies: Panic attacks, attempted suicide, hysterical attacks, alcohol withdrawal syndrome
9.6 Substance and alcohol related disorders
9.7 Psychiatric emergency
9.8 Common Mental Health problems in Nepal
9.9 Mental Health Policy in Nepal

10. Midwifery

10.1 Trends and issues in midwifery
10.2 Concept of Family and reproductive health and related policies and strategies
10.3 Prenatal/antenatal care
10.4 Assessment of fetal wellbeing
10.5 Minor and major disorders of pregnancy
10.6 Medical diseases associated with pregnancy: Cardiac disease, diabetes, anemia and TORCH infection
10.7 Health education/counseling of pregnant women
10.8 Pain relief measures during labor
10.9 Management of first, second, third and fourth stage of labor
10.10 Malpresentations including their diagnosis and management: Breech, shoulder, cord presentation, placenta previa and multi-fetal pregnancy
10.11 Obstetric emergencies and their life saving management: Intrapartum and post-partum hemorrhage, cord prolapsed and retained placenta
10.12 Normal puerperium and care of postnatal mother

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10.13 Minor discomfort and major disorders of puerperium
10.14 Menstral cycle & its disorders
10.15 Gynaecological disorder of adolescence & childhood

11. Community Health Nursing

11.1 Concept of community and community health
11.2 Family and reproductive health
11.3 Community health assessment and diagnosis
11.4 Primary health care: principles and elements
11.5 Concept of disease causation and epidemiological approach in solving health problems
11.6 Levels of diseases prevention and modes of intervention
11.7 Family planning program and nursing responsibilities
11.8 National immunization policy and program
11.9 Nutrition program in Nepal: Major nutritional problems, food hygiene and food act
11.10 Diarrheal disease control program and nursing responsibilities

12. Professionalism in Nursing

12.1 Code of ethics, code of professional conduct
12.2 Professional organization: NAN, NNC, ICN
12.3 Educational and career opportunities in nursing
12.4 Role of nursing education and research in professional advancement

13. Nursing Practice Issues

13.1 Alternative system of health and complementary therapies including USANi, ayurvedic and homeopathy
13.2 Models of illness prevention and health promotion, rehabilitation and referral
13.3 Family nursing and home health care/ family centered nursing approach
13.4 Disaster nursing management
13.5 Evidence based practice and its important in work place

14. Leadership and Management

14.1 Principles of leadership and management
14.2 Concept of authority, power, responsibility and accountability
14.3 Change process
14.4 Management of resources including human resource management
14.5 Health management information system (HMIS)
14.6 Process and tools of supervision
14.7 Management of budget
14.8 Management of disaster /emergency situation and preparation of hospital for disaster management (pre, during, and post)

15. Nursing Research

15.1 Purpose and Significance of research in Nursing
15.2 Research process
15.3 Principles, purposes and components of research proposal
15.4 Principles and components of a research report
15.5 Basic statistics in research: Graphic presentation of data, Frequency distribution, measures of central tendency and measures of variability

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, क्लिनिकल हेमाटोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Basic physiology of Haemopoetic system**

2. **Erythrocyte**
   - 2.1 Clinical manifestations & classification of erythrocyte disorders
   - 2.2 Aplastic Anaemia
   - 2.3 Pure red cell aplasia
   - 2.4 Anemia of chronic disease
   - 2.5 Paroxysmal Nocturnal hemoglobinuria (PNH)
   - 2.6 Iron deficiency anemia and iron overload
   - 2.7 Disorders of iron metabolism
   - 2.8 Thalassemias
   - 2.9 Sickle cell anemia
   - 2.10 Anemia of chronic disease, renal disease, endocrine disease,
   - 2.11 Megaloblastic anemias
   - 2.12 Haemolytic anemias
     - 2.12.1 Hereditary spherocytosis
     - 2.12.2 Hereditary elliptocytosis and related disorders
     - 2.12.3 Hereditary stomatocytosis
     - 2.12.4 Paroxysmal nocturnal hemoglobinuria
     - 2.12.5 Enzymatic defects
     - 2.12.6 Hemolytic anemias resulting from extracellular factors- immune haemolytic anemias, resulting from physical injury to RBCs, resulting from chemical & physical agents, resulting from infections & microorganisms etc
   - 2.13 Haemoglobinopathies
     - 2.13.1 Sickle cell disease/Sickle cell trait
     - 2.13.2 Hereditary methemoglobinemia
     - 2.13.3 Thalassemia syndromes
   - 2.14 Porphyria: Hematological aspects
   - 2.15 Polycythaemia (erythrocytosis)

3. **Pancytopaenias**
   - 3.1 Inherited Bone marrow failure syndromes with pancytopenia
   - 3.2 Acquired pancytopaenias
   - 3.3 Marrow infiltration disorders

4. **Disorders of different components of white blood cells**
   - 4.1 Neutrophil: Classification & clinical manifestations of neutrophil disorders, Neutropenia, Neutrophilia, Leukemoid reaction, Disorders of neutrophil function
   - 4.2 Eosinophil: Eosinophilia, Hypereosinophillic syndrome, Eosinophilic granulomatosis and polyangiitis, Other disorders of eosinophils
   - 4.3 Basophil: Basophilia, Other disorders of basophils and mast cells
   - 4.4 Lymphocyte: Classification & manifestations of lymphocyte & monocyte disorders, Lymphopenias, Lymphocytosis, Immunodeficiency disorders, Hematological aspects of HIV infection, Mononucleosis syndromes
   - 4.5 Monocyte: Classification & clinical manifestations of disorders of monocytes and macrophages, Monocytosis & monocytopaenia, Inflammatory & malignant histiocytosis

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5. **Splenomegaly, Hyposplenism, Hypersplenism, Splenic trauma and Splenectomy**

6. **Hematopoietic Cell Transplantation**
   - 6.1 Autologous Stem cell transplant
   - 6.2 Allogeneic Stem cell transplant

7. **Transfusion medicine**
   - 7.1 Red blood cell transfusions and erythropoietin therapy
   - 7.2 Platelet transfusions
   - 7.3 Neutrophil (granulocyte) transfusions
   - 7.4 Plasma transfusions
   - 7.5 Risks of blood transfusions

Section (B) - 50 Marks

8. **Hemorrhagic and thrombotic diseases**
   - 8.1 Classification & clinical manifestations of disorders of hemostasis
   - 8.2 Clinical and laboratory evaluation of hemostasis
   - 8.3 Hereditary clotting factor deficiencies (bleeding disorders)
     - 8.3.1 Factor VIII or Factor IX deficiency
     - 8.3.2 Factor XI deficiency
     - 8.3.3 Factor VII deficiency
     - 8.3.4 Factor X deficiency
     - 8.3.5 Prothrombin (Factor II) deficiency
     - 8.3.6 Factor V deficiency
     - 8.3.7 Combined deficiency of Factor V and VIII
     - 8.3.8 Fibrinogen (Factor I) deficiency
     - 8.3.9 Factor XIII deficiency
   - 8.4 von Willebrand disease
   - 8.5 Thrombotic disorders: DVT, Pulmonary & other thromboembolisms
   - 8.6 Essential thrombocythemia & thrombocytosis
   - 8.7 Acquired inhibitors of coagulation
   - 8.8 Disseminated intravascular coagulation
   - 8.9 Antiphospholipid syndrome
   - 8.10 Platelet and blood vessel disorders
     - 8.10.1 Autoimmune thrombocytopenic purpura
     - 8.10.2 Drug induced thrombocytopenia
     - 8.10.3 Nonimmune platelet destruction
     - 8.10.4 Thrombotic thrombocytopenic purpura
     - 8.10.5 Platelet function disorders
     - 8.10.6 Congenital and acquired disorders of platelet function

9. **Malignant Lymphoid diseases**
   - 9.1 Classification of malignant lymphoid disorders
   - 9.2 Acute lymphoblastic leukemia (ALL)
   - 9.3 Hodgkin's Lymphoma
   - 9.4 Chronic Lymphoblastic Lymphoma
   - 9.5 Marginal Zone Lymphoma
   - 9.6 Follicular Lymphoma

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9.7 Mantle Cell Lymphoma
9.8 DLBCL
9.9 Burkitt's lymphoma
9.10 Primary CNS lymphoma
9.11 T cell and NK cell lymphoma
9.12 MGUS
9.13 Multiple myeloma
9.14 Light chain amyloidosis
9.15 Waldenstorm macroglobulinemia
9.16 Large granular lymphocytic leukemia
9.17 Hairy cell leukemia
9.18 Other malignant diseases: Amyloidosis, Heavy chain diseases

10. **Malignant myeloid diseases**
10.1 Classification & clinical manifestations of clonal myeloid disorders
10.2 Polycythemia Vera
10.3 Essential Thrombosis
10.4 Primary myelofibrosis
10.5 Myelodysplastic Syndrome
10.6 Chronic myeloid Leukemia
10.7 Acute Myeloid Leukemia

11. **Therapeutic principles in hematology**
11.1 Pharmacology & toxicity of antineoplastic drugs
11.2 Treatment of infections in immunocompromised host
11.3 Principles of antithrombotic therapy
11.4 Principles of immune cell therapy
11.5 Principles of vaccine therapy
11.6 Principles of therapeutic apheresis
11.7 Pain management

12. **Hematological diseases during pregnancy**

13. **Hematological diseases during elderly**

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, क्रिटिकल केयर मेडिसिन उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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निजामती कर्मचारी अस्पताल

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Applied anatomy**

1.1 **Nervous System**

1.1.1 Brain and its subdivisions
1.1.2 Spinal cord, structure of spinal cord, major ascending & descending pathways
1.1.3 Spinal meninges, subarachnoid & extradural space, extradural space-contents
1.1.4 Cerebral blood supply
1.1.5 CSF and its circulation
1.1.6 Spinal nerves, dermatomes
1.1.7 Brachial plexus, nerves of arm
1.1.8 Intercostal nerves
1.1.9 Nerves of abdominal wall
1.1.10 Nerves of leg and foot
1.1.11 Autonomic nervous system
1.1.12 Sympathetic innervation, sympathetic chain, ganglia and plexuses
1.1.13 Parasympathetic innervation.
1.1.14 Stellate ganglion
1.1.15 Cranial nerves, base of skull, trigeminal ganglion
1.1.16 Innervation of the larynx
1.1.17 Eye and orbit
1.1.18 Blood brain barrier

1.2 **Respiratory System**

1.2.1 Mouth, nose, pharynx, larynx, trachea, main bronchi, segmental bronchi, structure of bronchial tree and differences in the children's airway
1.2.2 Airway and respiratory tract, blood supply, innervation and lymphatic drainage
1.2.3 Pleura, mediastinum and its contents
1.2.4 Lungs, lobes, microstructure of lungs
1.2.5 Diaphragm, other muscles of respiration, innervation
1.2.6 Thoracic cage and primary and secondary muscles of respiration
1.2.7 Thoracic receptors
1.2.8 Interpretation of a chest X-ray

1.3 **Cardiovascular System**

1.3.1 Heart, chambers, conducting system, blood and nerve supply
1.3.2 Congenital deviations from normal anatomy
1.3.3 Pericardium
1.3.4 Great vessels, main peripheral arteries and veins
1.3.5 Foetal and maternal-foetal circulation
1.3.6 Coronary and pulmonary circulation

1.4 **Vertebral Column**

1.4.1 Cervical, thoracic, and lumbar vertebrae
1.4.2 Interpretation of cervical spinal imaging in trauma
1.4.3 Sacrum, sacral hiatus
1.4.4 Ligaments of vertebral column
1.4.5 Surface anatomy of vertebral spaces, length of cord in child and adult

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1.5 **Surface Anatomy:**
- 1.5.1 Structures in antecubital fossa
- 1.5.2 Structures in axilla, identifying the brachial plexus
- 1.5.3 Large veins and anterior triangle of neck
- 1.5.4 Large veins of leg and femoral triangle
- 1.5.5 Arteries of arm and leg
- 1.5.6 Landmarks for tracheostomy, cricothyrotomy
- 1.5.7 Abdominal wall (including the inguinal region): landmarks for suprapubic urinary and peritoneal lavage catheters
- 1.5.8 Landmarks for intrapleural drains and emergency pleurocentesis
- 1.5.9 Landmarks for pericardiocentesis

1.6 **Abdomen**
- 1.6.1 Gross anatomy of intra-abdominal organs
- 1.6.2 Blood supply to abdominal organs and lower body

1.7 **Endocrinal organs**
- 1.7.1 Gross anatomy of different endocrinal organs and their development
- 1.7.2 Histology of different endocrinal organs

2. **Applied Physiology & Biochemistry**
- 2.1 Organisation of the human body and homeostasis
- 2.2 Functions of micro/macro molecular, organelles and other structures of the cell
- 2.3 Nutritional requirements of normal people (different ages, male, female) and ill patients of all categories with their modality of supplement
- 2.4 Mechanisms of metabolic response to trauma and infection
- 2.5 Function of hemopoietic /R.E.system
- 2.6 Blood groups, methods of transfusion of blood & blood products & their hazards
- 2.7 Mechanism of haemostais, fibrinolysis & methods to control haemorrhage
- 2.8 Types of excitable tissues and methods of recording their activity
- 2.9 Cellular communication, chemical/neuronal/ electrical/synaptic transmission
- 2.10 Autonomic nervous system
- 2.11 Neuro transmitters, their synthesis and metabolism
- 2.12 Drugs affecting neurotransmitter activity
- 2.13 Cardiac and smooth muscles
- 2.14 Calcium metabolism
- 2.15 Pain and the mechanism of pain
- 2.16 Physiology of consciousness and sleep mechanism
- 2.17 Effect of injury to neurons
- 2.18 Different methods of monitoring of the heart functions
- 2.19 Drugs used for inotropic & chronotropic effects
- 2.20 Mechanism of blood pressure regulation
- 2.21 Physiology of circulation of different organ in the body
- 2.22 Pathophysiology of shock and principle of their management
- 2.23 Capillary exchange
- 2.24 Assess vascular functions
- 2.25 Respiration & cause of breathlessness
- 2.26 Measure blood flow
- 2.27 Measure/ assess blood gas

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2.28 Mechanism of respiratory control
2.29 Mechanism of transport
2.30 Use of oxygen as therapy
2.31 Mechanism of absorption from gut and physiology of gastrointestinal motility
2.32 Composition of GI and hepatobiliary secretions and methods for their assessment
2.33 Normal functions of the liver
2.34 Formation of urine
2.35 Mechanism of osmoregulation
2.36 Normal thermoregulation
2.37 Mechanism of hormone synthesis, secretion, metabolism

3. **General Pathology**

3.1 Concept of cell injury, different types of degeneration & trauma
3.2 Principles of inflammation and the results of various types of inflammation
3.3 Acute and chronic inflammation
3.4 Tissue regeneration, wound healing and healing process
3.5 Various types of disorder of growth
3.6 Principles of neoplasia
3.7 Benign and malignant tumor
3.8 Mechanism of thrombosis, and embolism and their effects
3.9 Ischemia & infarction
3.10 Mechanism of blood clotting and different types of bleeding disorders
3.11 Principle of blood grouping system & complications of blood transfusion
3.12 Principle of shock
3.13 Principle of genetics and apply its concept in hereditary diseases
3.14 Principle of immune response
3.15 Humoral and cell mediated immunity
3.16 Principle of organ transplantation and causes of its rejection
3.17 Principle of Host Parasite relationship
3.18 Different types of micro-organism (Bacteria, Fungus, Parasite, and Virus)
3.19 Pathogenic and non-pathogenicmicro-organisms
3.20 Principle of asepsis & antisepsis, sterilization and disinfection
3.21 Principle of antibiotic and chemotherapy
3.22 Microbes that cause wound infection
3.23 Principle of Hospital infection (Nosocomial infection)
3.24 Immunity disorders
3.25 Environmental and nutritional disorders

4. **Pharmacology and Critical Care Medicine**

4.1 Principles of Pharmacology, Pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, drug use, rational drug use
4.2 Principles of pharmacology therapy
4.3 Pharmacology of different medicines
4.4 Principles of critical care medicine
4.5 Oxygen delivery
4.6 Major manifestations, monitoring and management of critical illness
4.7 Acute and chronic poisoning and their management
4.8 Nutritional factors in health and disease
4.9 Hypnotics, sedatives and intravenous anaesthetic agents

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Section (B) – 50 Marks

5. **Disease Management**

5.1 **Acute disease:** Management of the care of the critically ill patient with following specific acute medical conditions:

5.1.1 Cardiogenic Shock
5.1.2 Acute Myocardial Infarction
5.1.3 Pulmonary oedema
5.1.4 Pulmonary hypertension
5.1.5 Pulmonary embolism
5.1.6 Ischemic heart disease
5.1.7 Life Threatening Arrhythmias
5.1.8 Pericardial Tamponade
5.1.9 Acute Ischemic Stroke
5.1.10 Intracranial Hemorrhage
5.1.11 Status Epilepticus
5.1.12 Head & Spine Trauma
5.1.13 Coma, Delirium, Brain Death
5.1.14 Acute neuromuscular failure (OPP/GBS/MG/Snakebite, etc)
5.1.15 Acute severe Asthma
5.1.16 Acute Exacerbation of COPD
5.1.17 Severe Community acquired pneumonia
5.1.18 Chest Trauma
5.1.19 Acute hypoxemia Respiratory Failure including ARDS
5.1.20 Acute GI Bleed
5.1.21 Acute Liver Failure
5.1.22 Acute Pancreatitis
5.1.23 Acute Abdomen
5.1.24 Acute coagulation disorders
5.1.25 Sepsis and Septicemic Shock
5.1.26 Meningitis
5.1.27 Acute Hemorrhagic Fevers
5.1.28 Severe forms of tropical infections like Malaria, Typhoid etc.
5.1.29 Acute Renal Failure
5.1.30 Eclampsia
5.1.31 Hypoglycemia & Hyperglycemia
5.1.32 Bone marrow suppression
5.1.33 Haemaological Malignancies, Neutrapenia & Coagulopathy
5.1.34 Critical care of mother and child including pre-eclampsia, eclampsia, acute fatty liver of pregnancy, HELLP syndrome, meconium aspiration syndrome, respiratory distress syndrome, transient tachypnoea of the newborn etc.
5.1.35 Acute poisoning

5.2 **Chronic Disease:** Identifications of the implications of chronic and co-morbid disease in the acutely ill patients Organ System Failure

5.2.1 Management of patients with or at risk of circulatory failure
5.2.2 Management of patients with or at risk of acute renal failure
5.2.3 Management of patients with or at risk of acute liver failure
5.2.4 Management of patients with or at risk of neurological impairment

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5.2.5 Management of patients with or at risk of acute gastrointestinal failure
5.2.6 Management of patients with or at risk of acute lung injury syndromes
5.2.7 Management of patients with or at risk of septic shock
5.2.8 Management of patients with or at risk of severe sepsis/septic shock with multi-organ dysfunction/failure
5.2.9 Management of patients following intoxication with drugs or environmental toxins
5.2.10 Early recognition and treatment of life-threatening complications, in mother and child, including but not limited to like eclampsia, preeclampsia, acute fatty liver of pregnancy, HELLP in mother and respiratory distress in child.

6. **Resuscitation and Initial Management of the Acutely Ill Patients**
   - 6.1 Timely approach to the recognition, assessment and stabilization of the acutely ill patients with disordered physiology
   - 6.2 Cardiopulmonary resuscitation
   - 6.3 Post-resuscitation management
   - 6.4 Triage and prioritization of patients for ICU admission
   - 6.5 Assessment and initial management of the trauma patient
   - 6.6 Assessment and initial management of the patient with burns
   - 6.7 Fundamentals of the management of mass casualties

7. **Diagnosis of the acutely ill patients**
   - 7.1 History taking and clinical examination
   - 7.2 Timely and appropriate investigations
   - 7.3 Understanding of echocardiography (trans-thoracic/trans-oesophageal), Indications and interpretation of results
   - 7.4 Understanding of Electrocardiography (ECG/EKG), Indications and interpretation of the results
   - 7.5 Appropriate microbiological sampling and interpretation of results
   - 7.6 Interpretation of results from blood gas samples
   - 7.7 Organization and interpretation of wide range of clinical imaging including bed-side chest x- rays, ultrasound, CT scan, MRI and nuclear imaging relevant for the diagnosis and management of critically ill and injured patients.
   - 7.8 Understanding and interpretation of physiological variables
   - 7.9 Integration of clinical findings with laboratory, radiology, microbiology and other investigations to form appropriate differential diagnosis and management strategy
   - 7.10 Cardiopulmonary resuscitation (basic and advanced cardiac life support)
   - 7.11 Post-operative recovery and monitoring
   - 7.12 Pain management Intravenous fluid management (Pre and post-surgery)
   - 7.13 Airway management using facemask, oral airway and intubation

8. **Therapeutic Interventions/Organ System Support in Single or Multiple Organ Failure**
   - 8.1 Principles of safe prescription
   - 8.2 Principles of safe delivery of life-support therapies
   - 8.3 Antimicrobial drug therapy – Fundamental principles and ICU specific issues
   - 8.4 Transfusion therapy - Fundamental principles and ICU specific issues
   - 8.5 Circulatory therapies - Fundamental principles and ICU specific issues pertaining to Fluid therapy including dynamic variables of fluid responsiveness and vasoactive/inotropic drugs
   - 8.6 Mechanical circulatory assist devices

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8.7 Initiation, management and weaning of the patients from invasive and non-invasive ventilatory support
8.8 Initiation, management and weaning of the patients from renal replacement therapy
8.9 Management of electrolyte, glucose and acid-base disturbances
8.10 Nutritional assessment and support
8.11 Oxygen therapy - Fundamental principles and ICU specific issues
8.12 Fibreoptic laryngoscopy
8.13 Emergency airway management
8.14 Difficult and failed airway management
8.15 Endotracheal suction
8.16 Fibreoptic bronchoscopy and BAL in the intubated patient
8.17 Percutaneous tracheostomy and mini-tracheostomy
8.18 Thoracocentesis via a chest drain
8.19 Peripheral venous catheterization
8.20 Arterial catheterization
8.21 Surgical isolation of vein/artery
8.22 Ultrasound techniques for vascular localization
8.23 Central venous catheterization
8.24 Defibrillation and cardioversion
8.25 Cardiac pacing (transvenous or transthoracic)
8.26 Fundamentals of pericardiocentesis
8.27 Measurement of cardiac output and derived haemodynamic variable
8.28 Lumbar puncture (intradural/spinal)
8.29 Basic understanding of neuraxial pain medication like epidural analgesia
8.30 Nasogastric tube placement
8.31 Abdominal paracentesis
8.32 Sengstaken tube (or equivalent) placement
8.33 Fundamentals of upper GI endoscopy
8.34 Measurement and interpretation of intra-abdominal pressure
8.35 Urinary catheterization

9. **Pre - & Post - Operative Care**
9.1 Management of the pre-& post-operative care of the high risk surgical patients
9.2 Fundamentals of the management of the care of patients following cardiac surgery
9.3 Fundamentals of the management of the patients following craniotomy
9.4 Fundamentals of the management of the patients following solid organ transplantation
9.5 Fundamentals of the management of the pre and post-operative trauma care of the trauma patients

10. **Critical Care of Children**
10.1 Understanding of the critical care of children including early diagnosis, initial management and life support therapies related to pediatric and neonatal emergencies

11. **Transportation**
11.1 Transportation of the mechanically ventilated critically ill patient outside the ICU
11.2 Understanding of the special considerations required during patient transport by air

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प्राविधिक सेवा, फ्यामिलि मेडिसिन एण्ड इमर्जेन्सी समूह, फ्यामिलि मेडिसिन एण्ड इमर्जेन्सी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, फ्यामिलि मेडिसिन एण्ड इमर्जेन्सी समूह, फ्यामिलि मेडिसिन एण्ड इमर्जेन्सी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Applied Basic Sciences**
   - 1.1 Applied anatomy
   - 1.2 Applied Physiology
   - 1.3 Applied Pathology
   - 1.4 Applied Pharmacology
   - 1.5 Applied immunology
   - 1.6 Applied biostatics
   - 1.7 Applied research methods
   - 1.8 Applied Molecular biology and genetics

2. **Knowledge of outpatient department**
   - 2.1 Initial assessment with logical approach to undifferentiated illness.
   - 2.2 Impact of illness in the context of the family and community
   - 2.3 Sensitive to psychosocial issues related to presentation
   - 2.4 Follow- up management plans especially in chronic disease (e.g. diabetes, hypertension, asthma, COPD, APD ,anxiety/depression, growth and development)
   - 2.5 STD, antenatal and postnatal care, well women and men assessments
   - 2.6 Care of previously treated problems
   - 2.7 Coordination of care

3. **Medicine**
   - 3.1 Chest pain (acute and chronic)
   - 3.2 Palpitations
   - 3.3 Shortness of breath (acute, intermittent and chronic)
   - 3.4 Wheezing/Stridor
   - 3.5 Haemoptysis
   - 3.6 Cough
   - 3.7 Cyanosis
   - 3.8 Swelling of body parts
   - 3.9 Dyspepsia
   - 3.10 Reflux
   - 3.11 Haematemesis and malaena
   - 3.12 Upper and lower abdominal pain (acute and chronic)
   - 3.13 Diarrhoea
   - 3.14 Vomiting
   - 3.15 Abdominal distension
   - 3.16 Constipation
   - 3.17 jaundice
   - 3.18 Dysuria
   - 3.19 Haematuria
   - 3.20 Impotence
   - 3.21 Confusion
   - 3.22 Coma
   - 3.23 Headache
   - 3.24 Convulsions
   - 3.25 Syncope
   - 3.26 paralysis

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3.27 paraesthesia
3.28 Weakness
3.29 Fever
3.30 Anorexia
3.31 Fatigue
3.32 Myalgia
3.33 Itch
3.34 Rash
3.35 Abnormal bleeding
3.36 Swollen glands
3.37 Joint swelling
3.38 Joint pain
3.39 Thyroid disease
3.40 Diabetes
3.41 Tuberculosis
3.42 Drug related problem -iatrogenic, poisoning, or abuse including alcohol/smoking
3.43 Anaemia
3.44 Depression
3.45 Hypertension
3.46 Spinal dysfunction
3.47 Urinary tract infection
3.48 Holistic management of patients with HIV/AIDS
3.49 palliative care

4. **Paediatrics**

4.1 Neonatal Knowledge-Normal Newborn Care
- 4.1.1 Prematurity/Postmaturity
- 4.1.2 Birth trauma/Asphyxia
- 4.1.3 Respiratory distress
- 4.1.4 Jaundice
- 4.1.5 Sepsis
- 4.1.6 Congenital problems (cardiac, hip, cleftpalate, tracheo-oesophageal fistula, imperforate anus, diaphragmatic hernia)

4.2 Acute Life Threatening Problems
- 4.2.1 Stridor /Airway compromise (Croup/epiglottitis)
- 4.2.2 Respiratory distress and potential respiratory failure (severe ARI, Asthma)
- 4.2.3 Circulatory failure/shock including Sepsis and dehydration
- 4.2.4 Altered Sensorium including Meningitis/ encephalitis / encephalopathies (hepatic, uraemic, hypertensive)
- 4.2.5 Seizures and status epilepticus
- 4.2.6 Congestive heart failure
- 4.2.7 Supraventricular tachycardia
- 4.2.8 Acute renal failure
- 4.2.9 Tetanus
- 4.2.10 Poisoning
- 4.2.11 Drowning/near drowning
- 4.2.12 Bleeding disorders
- 4.2.13 Diabetic Ketoacidosis
- 4.2.14 Acute Abdominal Pain (distinguish medical and surgical causes)

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4.3 Feeding Problems: Understanding of Breastfeeding and Nutrition
4.4 Growth Disorders: Protein Calorie Malnutrition,failure to thrive,short stature
4.5 Common Febrile Illness
- 4.5.1 ARI (including Pertussis)
- 4.5.2 Diarrheal diseases (viral, bacterial,Parasitic)
- 4.5.3 Urinary Tract Infection
- 4.5.4 Septicemia/Bacteremia
- 4.5.5 Enteric fever
- 4.5.6 Malaria
- 4.5.7 Viral exanthema (measles ,mumps, etc)
- 4.5.8 Acute tonsilitis
- 4.5.9 Rheumatic fever/endocarditis
- 4.5.10 Tuberculosis (TB)
- 4.5.11 Infective hepatitis
- 4.5.12 Kala azar
- 4.5.13 PUO

4.6 Cough - including Asthma/Bronchitis/Bronchiolitis
4.7 Oedema-including renal (nephritic syndrome, nephritis), Kwashiorkor, cardiac
4.8 Chronic abdominal pain
4.9 Jaundice
4.10 Seizure disorders
4.11 Anemia and blood dyscrasias including Leukemias(recognize and refer)
4.12 Arthritis (septic arthritis, osteomyelitis,Juvenile Rheumatoid arthritis)
4.13 Skin disease/rashes(eg; scabies)
4.14 Common eye problems (eg, conjunctivitis)
4.15 Common ear problems(eg, otitis media)
4.16 Developmental delay/cerebral palsy/mental retardation
4.17 Visual/hearing/speech disorders(recognize and refer)
4.18 Dehydration
4.19 Certain diseases can present in different ways, so specifics attention should be paid to
- 4.19.1 Diabetes mellitus
- 4.19.2 Hypothyroidism
- 4.19.3 TB
- 4.19.4 HIV/AIDS

5. **Dermatology**

The general practice doctor will be able to manage the following common skin conditions:
5.1 Bacterial : Superficial bacterial infections, Skin TB ,Leprosy
5.2 Viral: Herpes simplex, Herpes Zoster, Wart, Molluscum contagiosum
5.3 Fungal: Dermatophyte, Candida, Tinea versicolor, Deep Fungal infection
5.4 Parasites: Scabies,Pediculosis,Leishmaniasis
5.5 Approach : Systemic Causes
- 5.5.1 Skin Causes – Infective (e.g. Scabies), Urticaria, Dermatitis Herpetiform, Lichen Planus

5.6 Common Skin Problems: Eczema/Dermatitis, Acne, Psoriasis, Drugeruption, Erythema multiforme, Erythema , Nodosum, Purpura, Bullous dieases
5.7 Skin Ulcers: Hair and Nail Disorders:
- 5.7.1 Alopecia, Onycholysis, Paronychia
- 5.7.2 Pigmented Skin Lesion including Melanoma.

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5.7.3 Common Lumps and Bumps including Skin Cancers:
5.7.4 Warts, Keratoacanthoma, Basal Cell, Squamous Cell, Carcinoma

5.8 Sexually transmitted disease
5.8.1 Non-specific urethritis/cervicitis, punctate balanoposthitis, candidiasis, trichomoniasis,condylomaaccuminata, syphilis, gonorrhea and chancroid
5.8.2 Sexual contact history, past history of STI, medications
5.8.3 Clinical examination and investigation to find other STDs
5.8.4 Contact tracing and treatment of contacts
5.8.5 Regular follow -up of STD cases

6. **Psychiatry**

6.1 Anxiety including Panic and phobic disorders
6.2 Depression
6.3 Conversion/Dissociative disorder
6.4 Psychosis
6.5 Bipolar mood disorder
6.6 Somatic presentations- including pseudo-seizures and multi- symptomatic patients
6.7 Substance Related Disorder
6.8 Childhood Mental Health Conditions
6.9 Concept of diagnostic classification: eg, DSM IV, WHO guidelines
6.10 Concept and simple practice of non -pharmacological approaches to mental health problems
6.11 Drug therapy
6.12 Legal and ethical issues regarding mental competence and detention and relationship with police (recognizing at present there are no laws in Nepal but there is a proposed National Mental Health Act)
6.13 Long term therapy, strategies for optimizing regime and getting compliance
6.14 Liaison with other health workers for management of long term cases
6.15 Practical approach to stabilizing cases before referral
6.16 Common conditions of Primary Care
6.16.1 Anxiety
6.16.2 Depression
6.16.3 Somatic Presentation of mental distress
6.16.4 Culture specific presentation of mental distress
6.16.5 Culture Specific presentation- dhatu, night fall, demon possession, new brides, perceptions about disease
6.16.6 Alcohol and substance misuse
6.16.7 Chronic Tiredness
6.16.8 Sleep disturbances
6.17 Health Promotion and support in chronic mental illness
6.17.1 Monitoring and follow- up in patient with chronic mental illness
6.17.2 Social support for patient and their family
6.17.3 Referral to appropriate specialist care
6.17.4 Work effectively with other workers for the management of people with mental health problems
6.18 Stage of life issues
6.18.1 Behavioral disorders in children
6.18.2 Intellectual disability
6.18.3 Childhood and family problems

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6.18.4 Adolescent depression and somatization disorders
6.18.5 Perinatal mental illness
6.18.6 At risk -drinking other dangerous behavior in young men and women
6.18.7 Mid-life crises, menopause,sexual problems
6.18.8 Adjustment disorders and chronic physical illness, disability
6.18.9 Dementia
6.18.10 Dying and bereavement

7. **Emergency Medicine**
7.1 Triage serious & non-serious problem.
7.2 Manage Major and minor Trauma
7.3 Manage life threatening medical, surgical, paediatric, gynaecological /obstetric emergencies
7.4 Describe concept of Disaster Plan & management
7.5 Manage Medico Legal Cases
7.6 Develops systematic approach to undifferentiable presentation (unconscious patients, chest pain; abdominal pain, dyspnea, etc.)
7.7 Organize and manage emergency services
7.8 Use emergency equipment and supplies available in Nepal
7.9 Develop knowledge about the Emergency Drugs particularly analgesia

Section (B) – 50 Marks

8. **Anaesthesia**
8.1 Cardiopulmonary resuscitation(basic and advanced cardiac life support)
8.2 Pre-operative assessment,including assessing ASA Physical status to know whether a GP anaesthetic is appropriate
8.3 Pre-anesthetic prescribing
8.4 General anesthetic prescribing
8.5 Local anesthesia and regional blocks
8.6 Post-operative recovery and monitoring
8.7 Pain management Intravenous fluid management(Pre and post surgery)
8.8 Airway management using facemask, oral airway and intubation
8.9 Regional anesthetic blocks, spinal, epidural and peripheral
8.10 Ketamine anesthetics(total intravenous anesthesia)
8.11 General anesthesia using draw- over technique
8.12 Ether anesthesia (EMO)

9. **Surgery**
9.1 **Skin and subcutaneous tissue**
9.1.1 Diagnosis and management of inflammatory condition of skin like cellulites, boils, carbuncle, etc.
9.1.2 Diagnosis and excision of sebaceous cysts, lipomas, etc
9.1.3 Diagnosis and management of squamous cell carcinoma, basal cell carcinoma and malignant melanoma
9.2 **Burns**
9.2.1 Initial resuscitation
9.2.2 management of fluid
9.2.3 Surgical Management -debridement and grafting

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9.3 **Lymph Nodes**
- 9.3.1 Describe the differential diagnosis of lymph node enlargement

9.4 **Arterial disorders**
- 9.4.1 Describe the feature of chronic limb ischaemia including Buergers' disease
- 9.4.2 Diagnose acute limb ischaemia
- 9.4.3 Diagnose and manage dry gangrene
- 9.4.4 Diagnose and manage DVT

9.5 **Salivary gland**
- 9.5.1 Diagnosis and management of parotid and submandibular abcess
- 9.5.2 Differential diagnosis of parotid and submandibular lump(biopsy is inappropriate)

9.6 **Thyroid**
- 9.6.1 Differential diagnosis of solitary thyroid nodule
- 9.6.2 Features of nodular goiter, its complications and indications for surgery
- 9.6.3 Features of thyrotoxicosis, its complications and indications for surgery
- 9.6.4 Management of hypothyroidism

9.7 **Breast**
- 9.7.1 Method of Breast self examination
- 9.7.2 Differential diagnosis of breast lump
- 9.7.3 Triple investigation
- 9.7.4 Principles of management of breast carcinoma
- 9.7.5 Differential diagnosis of nipple discharge and indication for surgery
- 9.7.6 Breast pain

9.8 **Upper GI Tract**
- 9.8.1 Dysphagia : differential diagnosis, Investigations required
- 9.8.2 Principle of management of oesophageal carcinoma,
- 9.8.3 Gastro-oesophageal reflux disease: medical management
- 9.8.4 Peptic ulcer disease: symptomatology,indications for endosocopy, medical management, complications and indications for surgery.
- 9.8.5 Management of Ulcer GI Bleeding
- 9.8.6 Management of Gastric carcinoma (Operative details not required)

9.9 **Hepatobiliary**
- 9.9.1 Jaundice : Pathophysiology, differential diagnosis
- 9.9.2 Liver abscess
- 9.9.3 Tumors of liver : differential diagnosis
- 9.9.4 Gallstone disease and its complications

9.10 **Pancreas**
- 9.10.1 Acute pancreatitis: aetiology, definitions of mild and severe pancreatitis, management, complications and indications for surgery
- 9.10.2 Chronic pancreatitis

9.11 **Small Intestine**
- 9.11.1 Features of small bowel obstruction, its differential diagnosis and management
- 9.11.2 Enteric fever and its complication
- 9.11.3 Appendicitis, appendicular mass and appendicular diagnosis abcess

9.12 **Large bowel/Rectum and Anal Canal**
- 9.12.1 Features of large bowel obstruction and its differential diagnosis
- 9.12.2 Ulcerative colitis
- 9.12.3 Bleeding per rectum, differential diagnosis
- 9.12.4 Hemorrhoids including complications
- 9.12.5 Perianal abscess

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9.13 **Hernia**
- 9.13.1 Inguinal and Femoral
- 9.13.2 Incisional hernia

9.14 **Urology**
- 9.14.1 Haematuria:differential diagnosis and investigation
- 9.14.2 Phimosis,paraphimosis
- 9.14.3 Stones in rental tract:indications for surgery
- 9.14.4 BHP
- 9.14.5 Acute urinary retention
- 9.14.6 Kidney Infection
- 9.14.7 Vasectomy
- 9.14.8 Scrotal swelling: differential diagnosis and investigation Undescendedtestis ,Diagnosis and Management of Testicular Torsion
- 9.14.9 Urethral Strictures

10. **Orthopaedics**

10.1 Traumatic condition: Recognition of what need to be done acutely and when referral may be more appropriate where possible
- 10.1.1 Injuries of the upper limb: (Manage/ Consider Referral if Possible)
- 10.1.2 Injuries of the lower limb and pelvis: (Manage/Refer)

10.2 Non- Traumatic condition:
- 10.2.1 Infective condition : Most important, Acute infection: Acute osteomyelitis; Acute septic arthritis; Chronic osteomyelitis; Tubercular infections including spine
- 10.2.2 Degenerative condition and office orthopaedics

10.3 Approach to diagnosis and conservative management where possible, with referral if possible and benefit from orthopedic consultation.
- 10.3.1 Osteoarthritis
- 10.3.2 Gout/Pseudogout
- 10.3.3 Acute and Chronic low back and cervical pain
- 10.3.4 Regional Musculo-skeletal condition Shoulder, Elbow, Wrist, Hip, Knee,Ankle

10.4 Other Rarer Condition
- 10.4.1 Congenital Deformities
- 10.4.2 Neoplastic condition
- 10.4.3 Metabolic and other condition
- 10.4.4 Auto-immune diseases

11. **Obstetrics & Gynaecology**

11.1 Antenatal period(normal and abnormal pregnancy)
- 11.1.1 Normal/ low risk pregnancy and High risk pregnancy

11.2 Labour and delivery

11.3 Postpartum(Normal puerperium/Abnormal puerperium)

11.4 Gynaecology(Local management/Referral)

11.5 Medical condition during Pregnancy
- 11.5.1 DM: Hypertension
- 11.5.2 Heart disease
- 11.5.3 Jaundice

12. **Family Planning**

12.1 Male and female reproductive anatomy physiology

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12.2 The current status of family planning and voluntary surgical contraception in Nepal, including legal status, cultural barriers, myths and prejudices
12.3 The rational for vasectomy and tubal ligation, their benefits and disadvantages.
12.4 Recognize eligible candidates for voluntary surgical contraception and provide information and counseling services to ensure informed client consent.
12.5 Follow the principles of infection prevention and control and preoperative management for vasectomy and/or the minilap
12.6 Demonstrate the use of aseptic technique, appropriate anaesthesia and analgesia
12.7 Demonstrate the basic surgical skills required for vasectomy and /or minilap.
12.8 Manage post- operative patients, including any complication related to anaesthesia, surgery and early and late complications.
12.9 Techniques for reversal of vasectomy of tubal ligation
12.10 Utilize the common methods of contraception including Depo-Provera, Norplant, Intra-uterine devices, Oral contraceptives
12.11 Follow up patient who accept various methods of contraception

13. **Ultrasound**

13.1 The different components of Ultrasound equipment and their function
13.2 Take proper care of the Ultrasound equipment including sterilization of transducers
13.3 Identify artifacts and their usefulness and those that degrade the ultrasounds image
13.4 The ultrasound orientation of the image, scanning techniques and preparation of the patients
13.5 Identify key obstetrics, medical and surgical condition on ultrasound

14. **Dentistry**

14.1 Prevent common dental diseases
14.2 Recognize and manage common dental problems
14.3 Manage dental emergencies
14.4 Recognize and manage acute dental and periodontal conditions.
14.5 Perform minor procedures.
14.6 Recognize conditions that need to be referred for further therapeutic measures.
14.7 Temporo- mandibular joint dislocation
14.8 Post dental extraction bleeding
14.9 Gingivitis
14.10 Syncope
14.11 Periodontitis
14.12 Dental caries
14.13 Precancerous condition

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प्राविधिक सेवा, फ्यामिलि मेडिसिन एण्ड इमर्जेन्सी समूह, इमर्जेन्सी मेडिसिन उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. **प्रथम चरण** (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. **द्वितीय चरण** (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Applied Basic Sciences**
   - 1.1 Applied anatomy
   - 1.2 Applied Physiology
   - 1.3 Applied Pathology
   - 1.4 Applied Pharmacology
   - 1.5 Applied immunology
   - 1.6 Applied biostatics
   - 1.7 Applied research methods
   - 1.8 Applied Molecular biology and genetics

2. **Knowledge of outpatient department**
   - 2.1 Initial assessment with logical approach to undifferentiated illness.
   - 2.2 Impact of illness in the context of the family and community
   - 2.3 Sensitive to psychosocial issues related to presentation
   - 2.4 Follow- up management plans especially in chronic disease (e.g. diabetes, hypertension, asthma, COPD, APD ,anxiety/depression, growth and development)
   - 2.5 STD, antenatal and postnatal care, well women and men assessments
   - 2.6 Care of previously treated problems
   - 2.7 Coordination of care

3. **Medicine**
   - 3.1 Chest pain (acute and chronic)
   - 3.2 Palpitations
   - 3.3 Shortness of breath (acute, intermittent and chronic)
   - 3.4 Wheezing/Stridor
   - 3.5 Haemoptysis
   - 3.6 Cough
   - 3.7 Cyanosis
   - 3.8 Swelling of body parts
   - 3.9 Dyspepsia
   - 3.10 Reflux
   - 3.11 Haematemesis and malaena
   - 3.12 Upper and lower abdominal pain (acute and chronic)
   - 3.13 Diarrhoea
   - 3.14 Vomiting
   - 3.15 Abdominal distension
   - 3.16 Constipation
   - 3.17 jaundice
   - 3.18 Dysuria
   - 3.19 Haematuria
   - 3.20 Impotence
   - 3.21 Confusion
   - 3.22 Coma
   - 3.23 Headache
   - 3.24 Convulsions
   - 3.25 Syncope
   - 3.26 paralysis

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3.27 paraesthesia
3.28 Weakness
3.29 Fever
3.30 Anorexia
3.31 Fatigue
3.32 Myalgia
3.33 Itch
3.34 Rash
3.35 Abnormal bleeding
3.36 Swollen glands
3.37 Joint swelling
3.38 Joint pain
3.39 Thyroid disease
3.40 Diabetes
3.41 Tuberculosis
3.42 Drug related problem -iatrogenic, poisoning, or abuse including alcohol/smoking
3.43 Anaemia
3.44 Depression
3.45 Hypertension
3.46 Spinal dysfunction
3.47 Urinary tract infection
3.48 Holistic management of patients with HIV/AIDS
3.49 palliative care

4. **Paediatrics**

4.1 Neonatal Knowledge-Normal Newborn Care
- 4.1.1 Prematurity/Postmaturity
- 4.1.2 Birth trauma/Asphyxia
- 4.1.3 Respiratory distress
- 4.1.4 Jaundice
- 4.1.5 Sepsis
- 4.1.6 Congenital problems (cardiac, hip, cleftpalate, tracheo-oesophageal fistula, imperforate anus, diaphragmatic hernia)

4.2 Acute Life Threatening Problems
- 4.2.1 Stridor /Airway compromise (Croup/epiglottitis)
- 4.2.2 Respiratory distress and potential respiratory failure (severe ARI, Asthma)
- 4.2.3 Circulatory failure/shock including Sepsis and dehydration
- 4.2.4 Altered Sensorium including Meningitis/ encephalitis / encephalopathies (hepatic, uraemic, hypertensive)
- 4.2.5 Seizures and status epilepticus
- 4.2.6 Congestive heart failure
- 4.2.7 Supraventricular tachycardia
- 4.2.8 Acute renal failure
- 4.2.9 Tetanus
- 4.2.10 Poisoning
- 4.2.11 Drowning/near drowning
- 4.2.12 Bleeding disorders
- 4.2.13 Diabetic Ketoacidosis
- 4.2.14 Acute Abdominal Pain (distinguish medical and surgical causes)

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4.3 Feeding Problems: Understanding of Breastfeeding and Nutrition
4.4 Growth Disorders: Protein Calorie Malnutrition,failure to thrive,short stature
4.5 Common Febrile Illness
- 4.5.1 ARI (including Pertussis)
- 4.5.2 Diarrheal diseases (viral, bacterial,Parasitic)
- 4.5.3 Urinary Tract Infection
- 4.5.4 Septicemia/Bacteremia
- 4.5.5 Enteric fever
- 4.5.6 Malaria
- 4.5.7 Viral exanthema (measles ,mumps, etc)
- 4.5.8 Acute tonsilitis
- 4.5.9 Rheumatic fever/endocarditis
- 4.5.10 Tuberculosis (TB)
- 4.5.11 Infective hepatitis
- 4.5.12 Kala azar
- 4.5.13 PUO

4.6 Cough - including Asthma/Bronchitis/Bronchiolitis
4.7 Oedema-including renal (nephritic syndrome, nephritis), Kwashiorkor, cardiac
4.8 Chronic abdominal pain
4.9 Jaundice
4.10 Seizure disorders
4.11 Anemia and blood dyscrasias including Leukemias(recognize and refer)
4.12 Arthritis (septic arthritis, osteomyelitis,Juvenile Rheumatoid arthritis)
4.13 Skin disease/rashes(eg; scabies)
4.14 Common eye problems (eg, conjunctivitis)
4.15 Common ear problems(eg, otitis media)
4.16 Developmental delay/cerebral palsy/mental retardation
4.17 Visual/hearing/speech disorders(recognize and refer)
4.18 Dehydration
4.19 Certain diseases can present in different ways, so specifics attention should be paid to
- 4.19.1 Diabetes mellitus
- 4.19.2 Hypothyroidism
- 4.19.3 TB
- 4.19.4 HIV/AIDS

5. **Dermatology**

The general practice doctor will be able to manage the following common skin conditions:
5.1 Bacterial : Superficial bacterial infections, Skin TB ,Leprosy
5.2 Viral: Herpes simplex, Herpes Zoster, Wart, Molluscum contagiosum
5.3 Fungal: Dermatophyte, Candida, Tinea versicolor, Deep Fungal infection
5.4 Parasites: Scabies,Pediculosis,Leishmaniasis
5.5 Approach : Systemic Causes
- 5.5.1 Skin Causes – Infective (e.g. Scabies), Urticaria, Dermatitis Herpetiform, Lichen Planus

5.6 Common Skin Problems: Eczema/Dermatitis, Acne, Psoriasis, Drugeruption, Erythema multiforme, Erythema , Nodosum, Purpura, Bullous dieases
5.7 Skin Ulcers: Hair and Nail Disorders:
- 5.7.1 Alopecia, Onycholysis, Paronychia
- 5.7.2 Pigmented Skin Lesion including Melanoma.

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5.7.3 Common Lumps and Bumps including Skin Cancers:
5.7.4 Warts, Keratoacanthoma, Basal Cell, Squamous Cell, Carcinoma

5.8 Sexually transmitted disease
5.8.1 Non-specific urethritis/cervicitis, punctate balanoposthitis, candidiasis, trichomoniasis,condylomaaccuminata, syphilis, gonorrhea and chancroid
5.8.2 Sexual contact history, past history of STI, medications
5.8.3 Clinical examination and investigation to find other STDs
5.8.4 Contact tracing and treatment of contacts
5.8.5 Regular follow -up of STD cases

6. **Psychiatry**
6.1 Anxiety including Panic and phobic disorders
6.2 Depression
6.3 Conversion/Dissociative disorder
6.4 Psychosis
6.5 Bipolar mood disorder
6.6 Somatic presentations- including pseudo-seizures and multi- symptomatic patients
6.7 Substance Related Disorder
6.8 Childhood Mental Health Conditions
6.9 Concept of diagnostic classification: eg, DSM IV, WHO guidelines
6.10 Concept and simple practice of non -pharmacological approaches to mental health problems
6.11 Drug therapy
6.12 Legal and ethical issues regarding mental competence and detention and relationship with police (recognizing at present there are no laws in Nepal but there is a proposed National Mental Health Act)
6.13 Long term therapy, strategies for optimizing regime and getting compliance
6.14 Liaison with other health workers for management of long term cases
6.15 Practical approach to stabilizing cases before referral
6.16 Common conditions of Primary Care
6.16.1 Anxiety
6.16.2 Depression
6.16.3 Somatic Presentation of mental distress
6.16.4 Culture specific presentation of mental distress
6.16.5 Culture Specific presentation- dhatu, night fall, demon possession, new brides, perceptions about disease
6.16.6 Alcohol and substance misuse
6.16.7 Chronic Tiredness
6.16.8 Sleep disturbances
6.17 Health Promotion and support in chronic mental illness
6.17.1 Monitoring and follow- up in patient with chronic mental illness
6.17.2 Social support for patient and their family
6.17.3 Referral to appropriate specialist care
6.17.4 Work effectively with other workers for the management of people with mental health problems
6.18 Stage of life issues
6.18.1 Behavioral disorders in children
6.18.2 Intellectual disability
6.18.3 Childhood and family problems

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6.18.4 Adolescent depression and somatization disorders
6.18.5 Perinatal mental illness
6.18.6 At risk -drinking other dangerous behavior in young men and women
6.18.7 Mid-life crises, menopause,sexual problems
6.18.8 Adjustment disorders and chronic physical illness, disability
6.18.9 Dementia
6.18.10 Dying and bereavement

7. **Emergency Medicine**
7.1 Triage serious & non-serious problem.
7.2 Manage Major and minor Trauma
7.3 Manage life threatening medical, surgical, paediatric, gynaecological /obstetric emergencies
7.4 Describe concept of Disaster Plan & management
7.5 Manage Medico Legal Cases
7.6 Develops systematic approach to undifferentiable presentation (unconscious patients, chest pain; abdominal pain, dyspnea, etc.)
7.7 Organize and manage emergency services
7.8 Use emergency equipment and supplies available in Nepal
7.9 Develop knowledge about the Emergency Drugs particularly analgesia

Section (B) – 50 Marks

8. **Anaesthesia**
8.1 Cardiopulmonary resuscitation(basic and advanced cardiac life support)
8.2 Pre-operative assessment,including assessing ASA Physical status to know whether a GP anaesthetic is appropriate
8.3 Pre-anesthetic prescribing
8.4 General anesthetic prescribing
8.5 Local anesthesia and regional blocks
8.6 Post-operative recovery and monitoring
8.7 Pain management Intravenous fluid management(Pre and post surgery)
8.8 Airway management using facemask, oral airway and intubation
8.9 Regional anesthetic blocks, spinal, epidural and peripheral
8.10 Ketamine anesthetics(total intravenous anesthesia)
8.11 General anesthesia using draw- over technique
8.12 Ether anesthesia (EMO)

9. **Surgery**
9.1 **Skin and subcutaneous tissue**
9.1.1 Diagnosis and management of inflammatory condition of skin like cellulites, boils, carbuncle, etc.
9.1.2 Diagnosis and excision of sebaceous cysts, lipomas, etc
9.1.3 Diagnosis and management of squamous cell carcinoma, basal cell carcinoma and malignant melanoma
9.2 **Burns**
9.2.1 Initial resuscitation
9.2.2 management of fluid
9.2.3 Surgical Management -debridement and grafting

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9.3 **Lymph Nodes**
- 9.3.1 Describe the differential diagnosis of lymph node enlargement

9.4 **Arterial disorders**
- 9.4.1 Describe the feature of chronic limb ischaemia including Buergers' disease
- 9.4.2 Diagnose acute limb ischaemia
- 9.4.3 Diagnose and manage dry gangrene
- 9.4.4 Diagnose and manage DVT

9.5 **Salivary gland**
- 9.5.1 Diagnosis and management of parotid and submandibular abcess
- 9.5.2 Differential diagnosis of parotid and submandibular lump(biopsy is inappropriate)

9.6 **Thyroid**
- 9.6.1 Differential diagnosis of solitary thyroid nodule
- 9.6.2 Features of nodular goiter, its complications and indications for surgery
- 9.6.3 Features of thyrotoxicosis, its complications and indications for surgery
- 9.6.4 Management of hypothyroidism

9.7 **Breast**
- 9.7.1 Method of Breast self examination
- 9.7.2 Differential diagnosis of breast lump
- 9.7.3 Triple investigation
- 9.7.4 Principles of management of breast carcinoma
- 9.7.5 Differential diagnosis of nipple discharge and indication for surgery
- 9.7.6 Breast pain

9.8 **Upper GI Tract**
- 9.8.1 Dysphagia : differential diagnosis, Investigations required
- 9.8.2 Principle of management of oesophageal carcinoma,
- 9.8.3 Gastro-oesophageal reflux disease: medical management
- 9.8.4 Peptic ulcer disease: symptomatology,indications for endosocopy, medical management, complications and indications for surgery.
- 9.8.5 Management of Ulcer GI Bleeding
- 9.8.6 Management of Gastric carcinoma (Operative details not required)

9.9 **Hepatobiliary**
- 9.9.1 Jaundice : Pathophysiology, differential diagnosis
- 9.9.2 Liver abscess
- 9.9.3 Tumors of liver : differential diagnosis
- 9.9.4 Gallstone disease and its complications

9.10 **Pancreas**
- 9.10.1 Acute pancreatitis: aetiology, definitions of mild and severe pancreatitis, management, complications and indications for surgery
- 9.10.2 Chronic pancreatitis

9.11 **Small Intestine**
- 9.11.1 Features of small bowel obstruction, its differential diagnosis and management
- 9.11.2 Enteric fever and its complication
- 9.11.3 Appendicitis, appendicular mass and appendicular diagnosis abcess

9.12 **Large bowel/Rectum and Anal Canal**
- 9.12.1 Features of large bowel obstruction and its differential diagnosis
- 9.12.2 Ulcerative colitis
- 9.12.3 Bleeding per rectum, differential diagnosis
- 9.12.4 Hemorrhoids including complications
- 9.12.5 Perianal abscess

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9.13 **Hernia**
- 9.13.1 Inguinal and Femoral
- 9.13.2 Incisional hernia

9.14 **Urology**
- 9.14.1 Haematuria:differential diagnosis and investigation
- 9.14.2 Phimosis,paraphimosis
- 9.14.3 Stones in rental tract:indications for surgery
- 9.14.4 BHP
- 9.14.5 Acute urinary retention
- 9.14.6 Kidney Infection
- 9.14.7 Vasectomy
- 9.14.8 Scrotal swelling: differential diagnosis and investigation Undescendedtestis ,Diagnosis and Management of Testicular Torsion
- 9.14.9 Urethral Strictures

10. **Orthopaedics**

10.1 Traumatic condition: Recognition of what need to be done acutely and when referral may be more appropriate where possible
- 10.1.1 Injuries of the upper limb: (Manage/ Consider Referral if Possible)
- 10.1.2 Injuries of the lower limb and pelvis: (Manage/Refer)

10.2 Non- Traumatic condition:
- 10.2.1 Infective condition : Most important, Acute infection: Acute osteomyelitis; Acute septic arthritis; Chronic osteomyelitis; Tubercular infections including spine
- 10.2.2 Degenerative condition and office orthopaedics

10.3 Approach to diagnosis and conservative management where possible, with referral if possible and benefit from orthopedic consultation.
- 10.3.1 Osteoarthritis
- 10.3.2 Gout/Pseudogout
- 10.3.3 Acute and Chronic low back and cervical pain
- 10.3.4 Regional Musculo-skeletal condition Shoulder, Elbow, Wrist, Hip, Knee,Ankle

10.4 Other Rarer Condition
- 10.4.1 Congenital Deformities
- 10.4.2 Neoplastic condition
- 10.4.3 Metabolic and other condition
- 10.4.4 Auto-immune diseases

11. **Obstetrics & Gynaecology**

11.1 Antenatal period(normal and abnormal pregnancy)
- 11.1.1 Normal/ low risk pregnancy and High risk pregnancy

11.2 Labour and delivery

11.3 Postpartum(Normal puerperium/Abnormal puerperium)

11.4 Gynaecology(Local management/Referral)

11.5 Medical condition during Pregnancy
- 11.5.1 DM: Hypertension
- 11.5.2 Heart disease
- 11.5.3 Jaundice

12. **Family Planning**

12.1 Male and female reproductive anatomy physiology

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12.2 The current status of family planning and voluntary surgical contraception in Nepal, including legal status, cultural barriers, myths and prejudices
12.3 The rational for vasectomy and tubal ligation, their benefits and disadvantages.
12.4 Recognize eligible candidates for voluntary surgical contraception and provide information and counseling services to ensure informed client consent.
12.5 Follow the principles of infection prevention and control and preoperative management for vasectomy and/or the minilap
12.6 Demonstrate the use of aseptic technique, appropriate anaesthesia and analgesia
12.7 Demonstrate the basic surgical skills required for vasectomy and /or minilap.
12.8 Manage post- operative patients, including any complication related to anaesthesia, surgery and early and late complications.
12.9 Techniques for reversal of vasectomy of tubal ligation
12.10 Utilize the common methods of contraception including Depo-Provera, Norplant, Intra-uterine devices, Oral contraceptives
12.11 Follow up patient who accept various methods of contraception

13. **Ultrasound**

13.1 The different components of Ultrasound equipment and their function
13.2 Take proper care of the Ultrasound equipment including sterilization of transducers
13.3 Identify artifacts and their usefulness and those that degrade the ultrasounds image
13.4 The ultrasound orientation of the image, scanning techniques and preparation of the patients
13.5 Identify key obstetrics, medical and surgical condition on ultrasound

14. **Dentistry**

14.1 Prevent common dental diseases
14.2 Recognize and manage common dental problems
14.3 Manage dental emergencies
14.4 Recognize and manage acute dental and periodontal conditions.
14.5 Perform minor procedures.
14.6 Recognize conditions that need to be referred for further therapeutic measures.
14.7 Temporo- mandibular joint dislocation
14.8 Post dental extraction bleeding
14.9 Gingivitis
14.10 Syncope
14.11 Periodontitis
14.12 Dental caries
14.13 Precancerous condition

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, प्याथोलोजी समूह, जनरल प्याथोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Histopathology**
   - 1.1 Gross anatomy and histology of specimens and tissues of gastrointestinal (GIT), cardiovascular (CVS), respiratory (RS) systems
   - 1.2 Normal physiology of above systems
   - 1.3 Gross anatomical alterations in the surgically removed specimens
   - 1.4 Gross pathological diagnosis of the lesions of gastrointestinal (GIT), cardiovascular (CVS), respiratory (RS) system
   - 1.5 Different types and functions of fixatives in histopathology laboratory
   - 1.6 Different types of chemicals and equipment used in tissue processing and procedure
   - 1.7 Steps and principles of H and E staining and mounting
   - 1.8 Interpretation the microscopic findings of various types of lesions of gastrointestinal (GIT), cardiovascular (CVS), and respiratory (RS) system
   - 1.9 Biochemical changes in a tissue or organ in above mentioned conditions.
   - 1.10 Diagnose the above mentioned lesions and differentiate them from other similar lesions in view of the clinical findings provided
   - 1.11 Gross anatomy and histology of specimens and tissues of renal electrolytes and reproductive systems
   - 1.12 Normal physiology of renal electrolytes and reproductive systems
   - 1.13 Metabolism of carbohydrate, fat, protein, nucleic acids, vitamins, copper and minerals
   - 1.14 Gross anatomical alterations in the surgically removed specimen of renal electrolytes respiratory systems and metabolic disorders
   - 1.15 Gross pathological diagnosis of the lesions of renal electrolytes and reproductive systems with clinical data
   - 1.16 Interpretation the microscopic findings of various lesions of renal electrolyte reproductive system and metabolic disorders
   - 1.17 Diagnose and differentiate with various other lesions of above mentioned system.
   - 1.18 Gross anatomy and histology of specimen and tissues from musculoskeletal system, neuro sensory systems, eye, ENT and skin
   - 1.19 Normal physiology of the above mentioned systems
   - 1.20 Gross anatomical alterations in the surgically removed specimen of above mentioned systems
   - 1.21 Correlate the gross findings with the microscopic features and clinical presentations
   - 1.22 Explain the use of museum and importance of preservation of specimens
   - 1.23 Frozen Section
     - 1.23.1 Principle and function of cryostat
     - 1.23.2 Frozen section of intraoperative specimens and diagnose

2. **Cytopathology**
   - 2.1 Normal cell morphology in vaginal, cervical and endometrial specimens and sputum specimen
   - 2.2 Preparation of the above mentioned smears, fix and stain with Pap staining and mount them
   - 2.3 Different types of fixatives used in cytopathological laboratory and their functions
   - 2.4 Fine needle aspiration biopsy procedure, wet and dry smears fix and stain the slides with Pap stain and Giemsa stain
   - 2.5 Principle of Pap stain and Giemsa stain
   - 2.6 Interpret the cellular morphological changes in sputum, vaginal, cervical and endometrial

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specimen and neoplastic conditions
2.7 Correlate with the clinical findings and diagnose
2.8 Different methods of preparing smears from body fluids including urine and CSF
2.9 Principles of cytocentrifuge and Millipore filtration
2.10 Normal cell morphology in brushing, washing and body fluids smears.
2.11 Interpret the cellular morphological changes in brushing, washing and body fluid smears in different inflammatory, non-inflammatory, non-neoplastic and neoplastic conditions
2.12 Correlate the findings with the clinical findings and diagnose them.
2.13 Sex chromatin, methods of obtaining and preparation of smears for the examination of sex chromatin, Interpret the findings
2.14 Congenital anomalies in relation to sex chromosome
2.15 Interpret FNAC smears and diagnose the lesions

3. **Haematopathology**
3.1 Normal hemopoiesis and erythropoiesis.
3.2 Structure, function, synthesis and metabolism of haemaglobin
3.3 Classify the different types of Anaemias
3.4 Aetiopathogenesis and morphological findings in the peripheral and bone marrow smears in different types of anaemia and diagnose correctly
3.5 Routine as well as the following haematological tests and their principles:
3.5.1 Reticulocyte count
3.5.2 Osmotic fragility test
3.5.3 Foetal haemoglobin
3.5.4 LE cell phenomenon
3.5.5 Hb electrophoresis
3.5.6 Serum Iron, Folic acid, Vit B12
3.5.7 Total Iron binding capacity
3.5.8 Serum ferritin
3.6 Perform a fine needle bone marrow aspiration and stain with Wright's stain
3.7 Interpret and diagnose the morphological changes in the blood and bone marrow specimen
3.8 Common haematological procedures and interpret the results
3.9 Cytochemical test and interpretation
3.10 Classify Leukaemia
3.11 Different types and their morphological features
3.12 Explain principles and interpretation of :
3.12.1 Bleeding time
3.12.2 Clotting time
3.12.3 Prothrombin time
3.12.4 Activated partial thromboplastine time
3.12.5 Platelet function test
3.12.6 Factor VII and IX Assay
3.12.7 Bence Jones protein
3.13 Plan a strategy of investigations for common haematological diseases

Section (B): – 50 Marks

4. **Clinical Microbiology**
4.1 Routine examination of urine and faeces and interpret the findings correctly
4.2 Complete examination of CSF

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4.3 Examination of peripheral blood for blood parasites
4.4 Semen analysis
4.5 Common aerobic and anaerobic bacteria in a culture plate
4.6 Gram's stain and identification of the common bacteria
4.7 Sensitivity reactions of common bacteria
4.8 Principle of Gram's stain and ZN stain
4.9 Importance of collection of specimens of culture
4.10 Principle of HbSAg, HIV tests

5. **Clinical Chemistry**
5.1 Perform and interpret correctly the routine clinical chemistry tests
5.2 Working principles of spectrophotometer, colorimeter, flame photometer, blood gas analyzer, electrophoresis and automation in laboratory medicine

6. **Autopsy pathology**
6.1 Perform a complete/partial autopsy
6.2 Gross and microscopic features found in autopsy body and tissue sections respectively and correlate it with clinical history and diagnosis
6.3 Provisional and final anatomical diagnosis reports writing correctly

7. **Blood Bank**
7.1 Blood grouping and Rh typing tests and cross matching
7.2 Coombs test
7.3 Principles and interpretations of above tests

8. **Immunology**
8.1 Principles and interpretation of simple immunological tests:
8.1.1 Agar Gel precipitation
8.1.2 Haemaglutination
8.1.3 Immunoelecrophoresis
8.1.4 Identification of T and B cells in peripheral blood
8.1.5 Immuno Fluorescence technique
8.1.6 Counter current electrophoresis for demonstration of antigen
8.1.7 ELISA techniques.
8.1.8 Fluorescent microscopy

9. **Medical statistics and information technology**
9.1 Importance of statistical methods in assessing data from patient material and experimental studies, correlation coefficient, expected versus observed and their interpretations

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प्राविधिक सेवा, मेडिसिन समूह, इन्टरनल मेडिसिन उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, इन्टरनल मेडिसिन उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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प्राविधिक सेवा, मेडिसिन समूह, इन्टरनल मेडिसिन उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **Anatomy**

1.1 **Neuro-Anatomy**

1.1.1 Neuron and its structure
1.1.2 Supportive cell type structure, cellular and myelin sheaths
1.1.3 Synapsis, neuro-effective junctions and receptors
1.1.4 Cerebrum: morphology, cerebral cortex, cortical neurons, cortical layers
1.1.5 Motorsystem: structure, corticospinal, rubrospinal,vestibulospinal and reticulospinal tracts
1.1.6 Basalganglia: structure
1.1.7 Cerebellum: morphology, cellular structure and organization
1.1.8 Brainstem: general organization
1.1.9 Spinal cord and ganglia: morphology, motor and sensory organization in the spinal cord

1.2 **Anatomy of neuro-muscular system**

1.2.1 LMN, structuring of voluntary muscles, motor units, types of muscle fibres
1.2.2 Muscle spindles and other muscles & tendon receptors
1.2.3 Sensory system
1.2.4 Reflex pathways: involving cranial nerves,and limb and trunk
1.2.5 Cranial nerves and special senses: pathways and structure of special sense organs
1.2.6 Anatomy of ventricular system and CSF production
1.2.7 Anatomy of meninges
1.2.8 Autonomic nervous system
1.2.9 Arterial and venous cerebral circulation
1.2.10 Blood brain barrier

1.3 **Pulmonology**

1.3.1 Gross anatomy of upper and lower respiratory tracts, lungs with lobes and fissureswith surface marking
1.3.2 Concept of bronch opulmonary segments and lobule or acinus aerated by aterminal bronchiole
1.3.3 Histology of alveolar lining cells
1.3.4 Pulmonary vascular bed
1.3.5 Pleura and pleural space, functions and histology
1.3.6 Media stinum and their structures
1.3.7 Thoracic cage and primary and secondary muscles of respiration
1.3.8 Thediaphragm its attachments, nerve supply and function
1.3.9 Lymphatic drainage of lungs and pleura
1.3.10 Innervation of the lungs
1.3.11 Thoracic receptors

1.4 **Cardiovascular system**

1.4.1 Gross anatomy of the heart and circulatory system
1.4.2 Histology of the cardiac muscles
1.4.3 Embryology of the heart and circulation
1.4.4 Coronary and pulmonary circulation

1.5 **Gastrointestinal tract**

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1.5.1 Gross anatomy of the gastrointestinal tract at different levels
1.5.2 Gross anatomy of the hepatobiliary system and pancreas
1.5.3 Histological aspects of GI tract at different levels
1.5.4 Blood supply and development aspects of GI tract and hepatobiliary system

1.6 **Kidney and urinary tract**
1.6.1 Gross anatomy of the kidney and urinary tract
1.6.2 Structure of nephron and function at different level
1.6.3 Development of kidney and urinary tract
1.6.4 Renal circulation

1.7 **Endocrinal organs**
1.7.1 Gross anatomy of different endocrinal organs and their development
1.7.2 Histology of different endocrinal organs

2. **Physiology**

2.1 Homeostatic behaviors of different fluid compartment in the body and implications during common clinical situations of burn, blood loss, diarrhea, vomiting, etc.
2.2 Role of pH in normal and in abnormal conditions e.g., diarrhea, vomiting, airway obstruction, medication, etc
2.3 Functions of micro/macro molecular, organelles and other structures of the cell
2.4 Nutritional requirements of normal people (different ages, male, female) and ill patients of all categories with their modality of supplement
2.5 Mechanisms of metabolic response to trauma and infection
2.6 Function of hemopoietic /R.E.system
2.7 Blood groups, methods of transfusion of blood & blood products & their hazards
2.8 Mechanism of haemostais, fibrinolysis & methods to control haemorrhage
2.9 Types of excitable tissues and methods of recording their activity e.g., EMG, EEG, ECG, etc
2.10 Cellular communication, chemical/neuronal/ electrical/synaptic transmission
2.11 Autonomic nervous system
2.12 Neuro transmitters, their synthesis and metabolism
2.13 Drugs affecting neurotransmitter activity
2.14 Cardiac and smooth muscles
2.15 Calcium metabolism
2.16 Pain and the mechanism of pain
2.17 Physiology of consciousness and sleep mechanism
2.18 Effect of injury to neurons
2.19 Different methods of monitoring of the heart functions
2.20 Drugs used for inotropic & chronotropic effects
2.21 Mechanism of blood pressure regulation
2.22 Physiology of circulation of different organ in the body
2.23 Pathophysiology of shock and principle of their management
2.24 Capillary exchange
2.25 Assess vascular functions
2.26 Respiration & cause of breathlessness
2.27 Measure blood flow
2.28 Measure/ assess blood gas
2.29 Mechanism of respiratory control
2.30 Mechanism of transport
2.31 Use of oxygen as therapy

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2.32 Mechanism of absorption from gut and physiology of gastrointestinal motility
2.33 Composition of GI and hepatobiliary secretions and methods for their assessment
2.34 Normal functions of the liver
2.35 Formation of urine
2.36 Mechanism of osmoregulation
2.37 Normal thermoregulation
2.38 Mechanism of hormone synthesis, secretion, metabolism

3. **Pathology**
3.1 Concept of cell injury, different types of degeneration & trauma
3.2 Principles of inflammation and the results of various types of inflammation
3.3 Acute and chronic inflammation
3.4 Tissue regeneration, wound healing and healing process
3.5 Various types of disorder of growth
3.6 Principles of neoplasia
3.7 Benign and malignant tumor
3.8 Mechanism of thrombosis, and embolism and their effects
3.9 Ischemia & infarction
3.10 Mechanism of blood clotting and different types of bleeding disorders
3.11 Principle of blood grouping system & complications of blood transfusion
3.12 Principle of shock
3.13 Principle of genetics and apply its concept in hereditary diseases
3.14 Principle of immune response
3.15 Humoral and cell mediated immunity
3.16 Principle of organ transplantation and causes of its rejection
3.17 Principle of Host Parasite relationship
3.18 Different types of micro-organism (Bacteria, Fungus, Parasite, and Virus)
3.19 Pathogenic and non-pathogenicmicro-organisms
3.20 Principle of asepsis & antisepsis, sterilization and disinfection
3.21 Principle of antibiotic and chemotherapy
3.22 Microbes that cause wound infection
3.23 Principle of Hospital infection (Nosocomial infection)

4. **Clinical Pharmacology**
4.1 **General clinical pharmacology**
4.1.1 Pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, drug use in childhood, pregnancy, lactation, and old age
4.1.2 Clinical trials
4.1.3 Rational drug use
4.2 **Neurosensory and musculoskeletal systems**
4.2.1 Parasympathomimetics and parasympatholytics, adrenergic and antiadrenergic drugs, narcotic and non-narcoticanalgesics, non-steroidalanti-inflammatory drugs, alcohol, sedative/hypnotics, anti-parkinsonism drugs, anesthetics (general and local), appetite suppressants
4.2.2 Drugs for psychiatric disorder, gout and rheumatoid arthritis, vertigo, and eye, ENT, and skin diseases
4.3 **Cardiovascular system**
4.3.1 Drugs for the treatment of heart failure, cardiac arrhythmias, angina pectoris, hypertension, shock, thromboembolic disorders, myocardial infarction, anemia

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4.3.2 Hemostatics, anti-coagulants, and lipid-lowering drugs

4.4 **Gastrointestinal system**
- 4.4.1 Drugs for peptic ulcer, diarrhoea, constipation
- 4.4.2 Antispasmodics, antiemetics

4.5 **Respiratory system**
- 4.5.1 Drugs for bronchial asthma
- 4.5.2 Antihistamines and other antiallergic agents
- 4.5.3 Cough preparation, nasal decongestants, and respiratory stimulants

4.6 **Reproductive/Endocrine systems**
- 4.6.1 Anti-diabetics, thyroid and anti-thyroid drugs, corticosteroids, sex hormones and antagonists, hypothalamic and pituitary hormones
- 4.6.2 Drugs used in labor and puerperium

4.7 **Renal/Electrolyte system**
- 4.7.1 Drugs for edema, and fluid/electrolyte and acid/base disturbances

4.8 **Infections**
- 4.8.1 General principle of chemotherapy
- 4.8.2 Antibacterial, antiprotozoal, anthelminthic, antifungal, and antiviral drugs

4.9 **Miscellaneous drugs**
- 4.9.1 Drugs for malignant diseases and immunosuppression
- 4.9.2 Vaccines
- 4.9.3 Vitamins and minerals
- 4.9.4 Antidotes

5. **Recent Advances in Internal Medicine and Emergencies**

5.1 Recent advances in all disciplines of Internal Medicine

5.2 Cardiovascular emergencies: Cardiac arrest, Acute MI, Cariogenic shock, Cardiacarrhythmias, Pulmonary edema, Hypertensive crisis, Acute cardiac tamponade, DVT & pulmonary embolism

5.3 Respiratory emergencies: Hemoptysis, Acute respiratory failure, Pneumothorax, Statusasthmaticus, ARDS

5.4 Gastrointestinal emergencies: G.I. bleeding, Acute gastroenteritis and food poisoning, Acute pancreatitis, Hepatic failure, Acute abdomen

5.5 Neurological emergencies: CVA including SAH, Hypertensive encephalopathy, Meningitis, Encephalitis, Unconscious patient, Status epilepticus, Myastheniagravis

5.6 Endocrine and metabolic emergencies: DKA and coma, Hypoglycemia, Hyperosmolar non ketotic diabetic coma, Thyroid crisis, Myxoedema coma, Pheochromocytoma, Acuteadrenocorticalcrisis, Hypopituitarism

5.7 Hematological emergencies: Aplastic anaemia, Agranulocytosis, Acutethromocythpenicpurpur, Leukemia, Hemophiliaandallieddisorders

5.8 Renal emergencies: Renalcolic, Renalfailure, Hematuria

5.9 Miscellaneous emergencies:
- 5.9.1 Emergencies in fluid and electrolyte balance
- 5.9.2 Acute emergencies in infectious and tropicaldisease
- 5.9.3 Malaria
- 5.9.4 Septicemia
- 5.9.5 Tetanus
- 5.9.6 Snakebite
- 5.9.7 Dog bite & rabies
- 5.9.8 Poisonings

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5.9.9 Drowning
5.9.10 Electrocution
5.9.11 High altitude sickness

Section (B) – 50 Marks

6. **Principles and Practice of Internal Medicine**

6.1 **Gastroenterology**

6.1.1 Acid peptic diseases
6.1.2 Gastrointestinal bleeding: upper (nonvariceal/variceal) and lower
6.1.3 Gastroesophageal reflux disease (GERD)
6.1.4 Dysphagia in relation to malignancy and achalasia
6.1.5 Malabsorption syndrome
6.1.6 IBD: ulcerative colitis and Crohn's disease
6.1.7 Diverticular diseases
6.1.8 Irritable bowel syndrome
6.1.9 Acute abdomen
6.1.10 Ascites
6.1.11 Liver disorders
6.1.12 Hepatitis: acute and chronic
6.1.13 Cirrhosis with special reference
6.1.14 Hepatic cellular cancer
6.1.15 Jaundice: obstructive and non-obstructive
6.1.16 Liver failure: acute and chronic
6.1.17 Pancreas
6.1.18 Acute, recurrent & chronic pancreatitis
6.1.19 Pancreatic tumor (exocrine & endocrine)
6.1.20 Cystic fibrosis & other childhood disorder of the pancreas
6.1.21 Hereditary pancreatitis
6.1.22 Pancreatic transplantation

6.2 **Respiratory Medicine**

6.2.1 Anatomy and applied physiology of the respiratory system
6.2.2 Understanding of basic pathophysiology and be able to manage the disease processes mentioned below considering the relevant differential diagnosis:
6.2.2.1 Pneumonias
6.2.2.2 Lung abscess
6.2.2.3 Tuberculosis
6.2.2.4 Fungal infections
6.2.2.5 Bronchial asthma
6.2.2.6 Chronic bronchitis, emphysema and cor-pulmonale
6.2.2.7 Cystic fibrosis
6.2.2.8 Pulmonary eosinophilia
6.2.2.9 Bronchiectasis (including its postural drainage management)
6.2.2.10 Pulmonary oedema (cardiogenic and non-cardiogenic including ARDS)
6.2.2.11 Interstitial lung disease (including fibrosingalveolitis, extrinsical veolitis, lung fibrosis, sarcoidosis and pneumoconiosis)
6.2.2.12 Carcinoma lung and other neoplasms
6.2.2.13 Mediastinal masses
6.2.2.14 Pleural diseases (e.g.,drypleurisy, pleural effusion,empyema)

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6.2.2.15 Pneumothorax
6.2.2.16 Sleepapnoea syndrome
6.2.2.17 Acute and chronic respiratory failure

6.3 **Hematology**

6.3.1 Physiology and pathophysiology of bloodcell formation and haemostasis
6.3.2 Pathophysiology, causes and management of:
6.3.2.1 Anaemia: iron deficiency (with iron metabolism), megaloblastic, haemolytic anaemia and aplastic anaemia
6.3.2.2 Haemoglobinopathy and Polycythemia
6.3.2.3 Leukaemia: myeloid (acute and chronic) and lymphoid (acute and chronic)
6.3.2.4 Myeloproliferative diseases
6.3.2.5 PV(Polycythemia Vera)
6.3.2.6 Myelofibrosis
6.3.2.7 Essential thrombocytosis
6.3.2.8 Bleeding Disorders
6.3.2.9 Plateletes Disorders
6.3.2.10 Lymphomas: Hodgkin's and NonHodgkin's
6.3.3 Explain the underlying principles and complications of:
6.3.3.1 Blood Transfusion, Blood group and Rh factor, Principles of cross match, Hazards of transfusion, Blood–platelets component, Bone MarrowTransplantation
6.3.3.2 Infectious and Tropicaldiseases
6.3.4 Understanding of the following procedures:
6.3.4.1 Peripheral blood smear
6.3.4.2 Splenicaspiration
6.3.4.3 Z– N staining
6.3.4.4 Gram's staining
6.3.4.5 Bone marrow examination
6.3.4.6 Stool examination
6.3.4.7 Aldehyde test
6.3.4.8 Liver biopsy
6.3.5 Microbiological aspects of various infectious disease
6.3.6 Underlying pathogenesis of various infectious/tropical disorders
6.3.7 Basic pharmacokinetics of drugs used for treatment of tropical and infectious diseases
6.3.8 Diagnose and manage following emergencies:
6.3.8.1 Septicemia, septic shock
6.3.8.2 Cerebral malaria/black waterfever
6.3.8.3 Tetanus/gasgangrene
6.3.8.4 Acute viral encephalitis
6.3.8.5 Hepatic Encephalopathy
6.3.8.6 Enteric Encephalopathy
6.3.8.7 HIV&AIDS

6.4 **Rheumatology**

6.4.1 Common clinical presentations of rheumatic disease
6.4.2 Systemic perspective of rheumatic diseases in different systems
6.4.3 Genetics and rheumatic diseases
6.4.4 Inflammatory arthritides (RA, SpA, crystal arthritis and others)

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6.4.5 Infection and joints (Septic arthritis and others)
6.4.6 Connective tissue diseases (SLE, systemic sclerosis and others)
6.4.7 Vasculitides
6.4.8 Diseases of bones and cartilages (osteoarthritis, osteoporosis and others)
6.4.9 Regional musculoskeletal pain syndromes
6.4.10 Miscellaneous conditions (autoinflammatory diseases, sarcoidosis & others)
6.4.11 Bone marrow aspiration
6.4.12 Bone marrow biopsy
6.4.13 Z-N staining
6.4.14 Muscle biopsy
6.4.15 Skin biopsy
6.4.16 Arthrocentesis
6.4.17 Intra–articularinjections
6.4.18 Anatomicalandphysiologicalaspectsofjointsmuscleandbloodvesselsin relation to rheumatologic conditions
6.4.19 Basisofcellularandhumoralimmuneresponse,autoimmunityandgenetherapyin rheumatological disorders
6.4.20 Interpret the results of various tests such as LEcell, ANF, antids DNA, electrophoresis, complement system
6.4.21 Analysis of synovial fluid
6.4.22 Interpret the X-ray findings of bones and joints
6.4.23 Interpretation of the results of:
6.4.23.1 Muscle biopsy
6.4.23.2 Skin biopsy
6.4.23.3 Kidney biopsy
6.4.24 To diagnose and manage rheumatologic emergencies

6.5 **Endocrinology and metabolic diseases**

6.5.1 Understanding of the following procedures:
6.5.1.1 Arterial puncture for blood gas analysis
6.5.1.2 Use of glucometer and stripes for blood sugar
6.5.1.3 Urine examination for sugar, Ketones, Specific gravity
6.5.2 Interpret the findings of the followingprocedures/tests:
6.5.2.1 Arterial blood gas analysis
6.5.2.2 Pulse oximetry
6.5.2.3 Thyroid function tests
6.5.2.4 Pituitary function tests
6.5.2.5 Parathyroid function tests
6.5.2.6 Adrenal gland functiontests
6.5.2.7 G.T.T
6.5.2.8 Sex hormone analysis
6.5.2.9 Plain X-ray of various parts concerned
6.5.3 Interpret the finding of:
6.5.3.1 FNAC report of thyroid gland
6.5.3.2 CT scan reports of various endocrine organs
6.5.4 Diagnose and manage following emergencies:
6.5.4.1 D.K.A. and comaand hyperosmolarnon ketoticcoma
6.5.4.2 Hypoglycaemia
6.5.4.3 Thyroidcrisis
6.5.4.4 Myxoedemacoma

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6.5.4.5 Phaeochromocytoma
6.5.4.6 Hypopituitarism
6.5.4.7 Hypocalcaemia
6.5.4.8 Acuteadrenocorticalcrisis
6.5.4.9 Hypopituitarism

6.5.5 Explain the structural and functionalbasis:
6.5.5.1 Various endocrine glands, homeostatic control mechanism of hormone regulation, and the genetic basis of various endocrine disorders

7. **Cardiology**

7.1 Diagnose order and interpret appropriate investigations and manage the following clinical conditions:
7.1.1 Acute Rheumatic Fever
7.1.2 Valvular heart disease: rheumatic and non-rheumatic
7.1.3 Common congenital heart diseases
7.1.4 Hypertension and hypertensive heart disease
7.1.5 Ischaemic heart disease:
7.1.5.1 Stable and unstable angina
7.1.5.2 Acute myocardial infraction
7.1.6 Cardiomyopathies: dilated cadiomyopathy, hypertrophic cardiomyopathy, restrictive cardiomyopathy
7.1.7 Pericardial diseases: pericarditis, pericardial effusion and constrictive pericarditis
7.1.8 Diseases of great arteries: coarctation of aorta, aortitis,aneurysm
7.1.9 Deepveinthrombosis: thromboembolism & pulmonaryembolism
7.1.10 Arrhythmias
7.1.10.1 Bradyarrhythmia (SA, AVblocks)
7.1.10.2 Tachyarrhythmias (SVT, VT, VF, WPW, AF, AVF)
7.1.10.3 Infective Endocarditis

7.2 Interpret the investigative of following procedures:
7.2.1 ECG with various arrhythmias
7.2.2 Stress electrocardiomyopathy
7.2.3 Echocardiogram of common acquired and congenital heart disease
7.2.4 Cardiac enzymes, pericardial fluid analysis

7.3 Diagnose and manage
7.3.1 Pulmonary oedema and cardiogenic shock
7.3.2 Dyslipidaemias
7.3.3 Corpulmonale and pulmonaryarterioal hypertension
7.3.4 Electrolyte imbalance
7.3.5 Basic science applied to cardiology
7.3.6 Fetal circulation
7.3.7 Coronary circulation
7.3.8 Pulmonary circulation
7.3.9 Embryogenesis of congenital heart diseases
7.3.10 Valvularapparatus
7.3.11 Conduction system
7.3.12 Pharmacology of cardiac drugs
7.3.13 Exercisephysiology
7.3.14 Etiopathogenesis and pathophysiology of various cardiac diseases in relation to clotting system, lipid abnormalities, infectious diseases

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7.3.15 Hemodynamics (exercise, high altitude, metabolic and hormonal disorders, fetal circulation)

8. **Nephrology**
   - 8.1 Diagnose, investigate and treatment of following renal emergencies:
     - 8.1.1 Acute renal failure
     - 8.1.2 Renal colic
     - 8.1.3 Haematuria
     - 8.1.4 Fluid, electrolyte and acid-basic imbalance
   - 8.2 Diagnose, investigate and treatment of following common renal diseases:
     - 8.2.1 Acute glomerulonephritis
     - 8.2.2 Nephrotic syndrome
     - 8.2.3 Urinary tract infection
     - 8.2.4 Chronicrenal failure
     - 8.2.5 Adult polycystic kidney disease, Alperts syndrome
     - 8.2.6 Diabetic Nephropathy
     - 8.2.7 Renal tubular acidosis (RTA)
     - 8.2.8 Interstitial Nephropathy
     - 8.2.9 Toxic Nephropathy
     - 8.2.10 Lupus Nephritis
     - 8.2.11 Nephrocalcinosis and Nephrolithiasis
     - 8.2.12 Renal arterystenosis (RAS)
   - 8.3 Interpret investigations of:
     - 8.3.1 Renal function test(RFT)
     - 8.3.2 Blood gas analysis
     - 8.3.3 Renal biopsy report
   - 8.4 Basic principles of haemodialysis and peritoneal dialysis and their specific indications

9. **Neurology**
   - 9.1 Perform following procedures independently:
     - 9.1.1 Lumbar puncture
     - 9.1.2 Intrathecal injection
     - 9.1.3 Administration of IV contrastagent
   - 9.2 Understanding of the following procedures
     - 9.2.1 EEG, EMG, Nerve conduction studies
   - 9.3 Interpretation of the findings of:
     - 9.3.1 CT scan / MRI scan of:
       - 9.3.1.1 Subdural haematoma
       - 9.3.1.2 Intracranial haemorrhage including subarachnoid haemorrhage
       - 9.3.1.3 Infarction
       - 9.3.1.4 Obstructive hydrocephalus
     - 9.3.2 Myelogram:
       - 9.3.2.1 Complete obstruction
       - 9.3.2.2 Intramedullary compression
       - 9.3.2.3 Extramedullary compression
     - 9.3.3 Interpretation of theresults of:
       - 9.3.3.1 Muscle biopsy
       - 9.3.3.2 Nerve biopsy
       - 9.3.3.3 EEG

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9.3.3.4 EMG
9.3.3.5 Nerve conduction study
9.3.3.6 Carotid and vertebral angiogram
9.3.3.7 CT myelography

9.4 Diagnose and management the following neurological emergency:
- 9.4.1 CVA including subarachnoid haemorrhage
- 9.4.2 Meningitis
- 9.4.3 Encephalitis
- 9.4.4 Unconscious patient
- 9.4.5 Status epilepticus
- 9.4.6 Myastheniagravis
- 9.4.7 Increased Intracranialpressure
- 9.4.8 Guillain–Barre syndrome
- 9.4.9 Hypoxicencephalopathy

10. **Oncology**
- 10.1 Etiopathogenesis of cancer
- 10.2 Epidemiology of cancer
- 10.3 Cancer prevention & screening
- 10.4 Diagnosis & diagnostic tools in cancer
- 10.5 Principles of cancer management
- 10.6 Common cancers: Oesophagus, stomach, colorectum, hepatocellular cancer, cancers of the biliary tree, pancreas, breast, lung, renal cell carcinoma, prostate, testicular, GIST, ovarian, endometrial, hematological & lymphoid malignancies, cancers of the endocrine system, HIV-associated cancers, tumors of the mediastinum etc
- 10.7 Oncological emergencies & paraneoplastic syndromes
- 10.8 Anticancer therapeutics

11. **Dermatology**
- 11.1 Scabies
- 11.2 Superficial mycoses
- 11.3 Superficial bacterial infections
- 11.4 Diagnosis and management of drug induced cutaneous eruptions

12. **Psychiatry**
- 12.1 Diagnose anxiety neurosis, depression and schizophrenia
- 12.2 Differentiate between functional and organic psychoses (simple and uncomplicated)
- 12.3 Treat cases of anxiety neurosis and depression
- 12.4 Diagnose and manage substance abuse

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प्राविधिक सेवा, पेडीयाट्रिक्स समूह, नियोनेटोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Basic Sciences**
   - 1.1 Basic genetics
   - 1.2 Fetal and neonatal immunology
   - 1.3 Applied anatomy and embryology
   - 1.4 Feto-placental physiology
   - 1.5 Neonatal adaptation
   - 1.6 Development and maturation of lungs, respiratory control, lung functions, ventilation, gas exchange, ventilation perfusion.
   - 1.7 Physiology and development of cardiovascular system, developmental defects,physiology and hemodynamics of congenital heart disease.
   - 1.8 Fetal and intrauterine growth.
   - 1.9 Development and maturation of nervous system, cerebral blood flow, bloodbrain barrier.
   - 1.10 Fetal and neonatal endocrine physiology
   - 1.11 Developmental pharmacology
   - 1.12 Developmental hematology, bilirubin metabolism
   - 1.13 Renal physiology
   - 1.14 Physiology of gastrointestinal tract, digestion, absorption.
   - 1.15 Electrolyte balance
   - 1.16 Metabolic pathways pertaining to glucose, calcium and magnesium
   - 1.17 Biochemical basis of inborn errors of metabolism

2. **Perinatology**
   - 2.1 Perinatal and neonatal mortality, morbidity, epidemiology.
   - 2.2 High risk pregnancy: detection, monitoring and management.
   - 2.3 Fetal monitoring, clinical, electronic; invasive, and non-invasive
   - 2.4 Intrapartum monitoring and procedures
   - 2.5 Assessment of fetal risk, and decision for termination of pregnancy
   - 2.6 Diagnosis and management of fetal diseases
   - 2.7 Medical diseases affecting pregnancy and fetus, psychological and ethical considerations
   - 2.8 Fetal interventions.
   - 2.9 Fetal origin of adult disease

3. **Neonatal Resuscitation**
4. **Neonatal Ventilation**
5. **Blood Gas and Acid Base Disorders**
6. **Neonatal Assessment and Follow Up**
   - 6.1 Assessment of gestation, neonatal behavior, neonatal reflexes
   - 6.2 Developmental assessment, and follow up detection of neuromotor delay, stimulation techniques

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7. **Body Systems**
   - 7.1 Respiratory System
     - 7.1.1 Neonatal airways: physiology, pathology; management
     - 7.1.2 Pulmonary diseases: Hyaline membrane disease, transient tachypnea, aspiration pneumonia, pulmonary air leak syndromes, pulmonary hemorrhage, developmental defects
     - 7.1.3 Oxygen therapy and its monitoring
     - 7.1.4 Pulmonary infections
     - 7.1.5 Miscellaneous pulmonary disorders
   - 7.2 Cardiovascular system
     - 7.2.1 Fetal circulation, transition from fetal to neonatal physiology
     - 7.2.2 Examination and interpretation of cardiovascular signs and symptoms
     - 7.2.3 Special tests and procedures (Echocardiography, angiography)
     - 7.2.4 Diagnosis and management of congenital heart diseases
     - 7.2.5 Rhythm disturbances
     - 7.2.6 Hypertension in neonates
     - 7.2.7 Shock: pathophysiology, monitoring, management.
   - 7.3 Gastrointestinal system
     - 7.3.1 Disorders of liver and biliary system.
     - 7.3.2 Bilirubin metabolism
     - 7.3.3 Neonatal jaundice: diagnosis, monitoring, management, phototherapy, exchange transfusion.
     - 7.3.4 Prolonged hyperbilirubinemia
     - 7.3.5 Kernicterus
     - 7.3.6 Congenital malformations
     - 7.3.7 Necrotising enterocolitis
   - 7.4 Renal system
     - 7.4.1 Developmental disorders
     - 7.4.2 Renal functions
     - 7.4.3 Fluid and electrolyte management
     - 7.4.4 Acute renal failure (diagnosis, monitoring, management).
   - 7.5 Endocrine and metabolism
     - 7.5.1 Glucose metabolism, hypoglycemia, hyperglycemia
     - 7.5.2 Calcium disorders
     - 7.5.3 Magnesium disorders
     - 7.5.4 Thyroid disorders
     - 7.5.5 Adrenal disorders
     - 7.5.6 Ambiguous genitalia
     - 7.5.7 Inborn errors of metabolism
   - 7.6 Hematology
     - 7.6.1 Physiology
     - 7.6.2 Anemia

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7.6.3 Polycythemia
7.6.4 Bleeding and coagulation disorders
7.6.5 Rh hemolytic disease

7.7 Neurology
7.7.1 Clinical neurological assessment
7.7.2 EEG, ultrasonography, CT scan
7.7.3 Neonatal seizures
7.7.4 Intracranial hemorrhage
7.7.5 Brain imaging
7.7.6 Hypoxic ischemic encephalopathy
7.7.7 Neuro-muscular disorders
7.7.8 Degenerative diseases
7.7.9 CNS malformation

7.8 Nutrition
7.8.1 Fetal nutrition
7.8.2 Physiology of lactation
7.8.3 Breast feeding and kangaroo mother care
7.8.4 Lactation management, breast milk banking, maternal medications and nursing
7.8.5 Parenteral nutrition
7.8.6 Vitamins and micronutrients in newborn health

7.9 Neonatal infections
7.9.1 Intrauterine infections
7.9.2 Superficial infections
7.9.3 Diarrhea
7.9.4 Septicemia
7.9.5 Meningitis
7.9.6 Osteomyelitis and arthritis
7.9.7 Pneumonias
7.9.8 Perinatal HIV

7.10 Neonatal ophthalmology
7.10.1 Developmental aspects
7.10.2 Retinopathy of prematurity
7.10.3 Sequelae of perinatal infections

7.11 Neonatal dermatology

8. **Surgery and orthopedics**
8.1 Neonatal surgical conditions
8.2 Pre and post operative care
8.3 Neonatal anesthesia
8.4 Metabolic changes during anesthesia and surgery
8.5 Orthopedic problems

9. **Neonatal Imaging:** X-rays, ultrasound, MRI, CT Scan, etc.
10. **Transport of neonates**

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, न्युरोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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प्राविधिक सेवा, मेडिसिन समूह, न्युरोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II: Technical Subject

Section (A) – 50 % Marks

1. Basic

1.1 Principles of clinical diagnosis in the neurological examination

1.2 Diagnosing muscle weakness :Symptoms, Cerebral hemisphere lesions, Brainstem lesions,Spinal cord lesions, Neuromuscular diseases, Fluctuating weakness

1.3 Somato-sensory abnormalities

1.4 Symptoms of neurological disorders :Delirium and Dementia; Aphasia,Araxia,and Agnosia; Syncope and Seizure; Coma; Pain and Paresthesias; Dizziness and hearing loss; Impaired vision; Headache; Involuntary movements; Gait disorders

1.5 Autonomic disorders

1.5.1 Clinical features of Autonomic disorders, Autonomic function testing and Causes of autonomic failure

1.6 Neurological Investigations

1.6.1 Clinical Neurophysiology – procedure and interpretation –Electroencephalogram (EEG)and Evoked potentials (EP) - VEP, SSEP, MEP, BAER, ENMG, TMS

1.6.2 Neuroimaging : CT, MRI, fMRI, MRS, SPECT, PET, DTI, Vascular imaging, Neuroangiographic anatomy, TCD

1.6.3 Imaging of cerebral circulation :Catheter angiography; Duplex sonography; CT angiography and perfusion imaging; MR angiography and perfusion imaging; Transcranial Doppler sonography

1.6.4 Nerve conduction studies and electromyography

1.6.4.1 Lumber puncture and CSF examination

1.6.4.2 Neurolgical autoantibodies

1.7 Clinical Neuro-anatomy

1.7.1 Embryonic development and structure of CNS, PNS

1.7.2 Covering of the nervous system

1.7.3 Blood brain barrier

1.7.4 Vascular anatomy- Arterial and Venous system (sinuses)

1.8 Neurophysiology and Neurochemistry

1.8.1 Structure and function of neural membranes including cell membrane; membrane transport; Ion Channels and channelopathies, electrical excitability of cell membrane, lipid biochemistry, structure and function of myelin and various diseases of myelin

1.8.2 Synaptic transmission, neurotransmitters (acetylcholine, catecholamines, serotonin, histamine, opioids, GABA and Glycine), Neurochemistry of drug abuse, neurotransmitter disorders of basal ganglia, neurochemistry of degenerative diseases like Parkinsons and Alzhiemer's ; Neurochemistry of epilepsy and antiepileptic drugs

1.8.3 Muscle fiber structure, proteins with application in muscular dystrophies

1.8.4 Axonal transport, neural plasticity, aging biochemical basis, neuronal hypoxia and ischemia

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1.8.5 Metabollic disorders affecting brain – disorders of carbohydrate, fatty acid, aminoacid, mitochondrial disorder, urea cycle disorder. Organic acid disorders; Vitamin and other nutritional deficiency; Metabolic encephalopathies ; Genetic disorders of lipid, glycoprotein and mucopolysaccharide; Endocrine system and nervous system

1.8.6 Genetics basics and advances and application in neurological diseases – cell cycle, genetic imprinting, X – inactivation, Human genome project, cytogenetics and molecular genetics, Karyotyping, Mutations, Patterns of inheritance, genetic counseling, genetics of common neurological disorders

1.9 Microbiology and Pathology

1.9.1 Infections in brain : Meningitis, encephalitis : Various agents responsible, their diagnosis, pathogenesis and complications

1.9.2 Pathology of different disorders affecting CNS and PNS – demyelination, vasculitis, infections, recognition on specimen, tissue preparation, stain, interpretation of biopsies – brain, nerve and muscles including special station, IHC and EM

1.10 Neuropharmacology

1.10.1 Pharmacology of drugs used in various neurological disorders: Epilepsy, Parkinsonism, stroke, Myasthenia, Migraine, dementia, various medications used in critical care

1.10.2 Side effects, interactions, overdose of various medication sedatives

1.10.3 Newer drug delivery system

1.10.4 Pain Management

1.10.5 Neuro-intensive care

1.11 Others

1.11.1 Neuro-opthalmology-afferent visual system, ocular motor system, Neuro-otology, Neuro-urology, Neuroepidemiology, Neurogenetics/DNA diagnosis, Neuroimmunology, Neurovirology, Neuroendocrinology

1.12 Neuropsychology/ Neuropsychological evaluation

Section (B) – 50 % Marks

2. Clinical

2.1 Clinical approach to common Neurological problems

2.1.1 Clinical methods of neurology

2.1.2 Cardinal manifestations of neurological diseases

2.1.3 Localisation in neurology and syndromic approach: in cases of Delirium, episodic impairment of consciousness, falls and drop attacks, stupor and coma, memory impairment, Apraxias, aphasia, agnosia, dysphagia, vision loss, diplopia, Nystagmus, dizziness and vertigo, tinnitus and hearing loss, brainstem syndromes, ataxic disorders, movement disorders, gait disorders, hemiplegia, paraplegia and spinal cord disorders, pattern of weakness, hypotonic child, delayed milestone and regression of milestone, sensory abnormalities of limbs, trunk and face

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2.2 **Neurological diseases**

Clinical features, evaluation and management of:

2.2.1 Neurological infections
- 2.2.1.1 Meningitis
- 2.2.1.2 Encephalitis and infectious encephalopathies
- 2.2.1.3 Intracranial space occupying infections and neurological HIV disease

2.2.2 Nerve and muscle diseases
- 2.2.2.1 Lower cranial nerves and dysphagia
- 2.2.2.2 Polyneuropathy
- 2.2.2.3 Focal peripheral neuropathy
- 2.2.2.4 Motor neuron disorders
- 2.2.2.5 Muscle diseases

2.2.3 Structural diseases affecting brain, spinal cord, and nerve roots (Trauma and Tumors)
- 2.2.3.1 Head injury
- 2.2.3.2 Spinal injury
- 2.2.3.3 Intravertebral disks & radiculopathy
- 2.2.3.4 Cervical spondylotic myelopathy
- 2.2.3.5 Lumber spondylosis
- 2.2.3.6 Peripheral & cranial nerve lesions
- 2.2.3.7 Neuropathic pain
- 2.2.3.8 Post traumatic pain syndrome
- 2.2.3.9 Radiation injury
- 2.2.3.10 Electrical & lightning injury
- 2.2.3.11 Decompression sickness
- 2.2.3.12 Raised intracranial pressure, cerebral edema and hydrocephalus
- 2.2.3.13 Tumors of skull & cranial nerves
- 2.2.3.14 Tumors of meninges
- 2.2.3.15 Glioma
- 2.2.3.16 Lymphoma
- 2.2.3.17 Pineal region tumours
- 2.2.3.18 Tumors of pituitary gland
- 2.2.3.19 Congenital & childhood central nervous system tumors
- 2.2.3.20 Vascular tumors & malformations
- 2.2.3.21 Metastatic tumors
- 2.2.3.22 Spinal tumors
- 2.2.3.23 Cauda equine lesions, radiculopathy and sphincter disorders
- 2.2.3.24 Paraneoplastic manifestations affection brain

2.2.4 Vascular, demyelinating, inflammatory and degenerating disorders of central nervous system
- 2.2.4.1 Cerebrovascular disease
- 2.2.4.2 Cerebral & cerebellar haemorrhage

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2.2.4.3 Subarachnoid haemorrhage
2.2.4.4 Cerebral veins & sinuses thrombosis
2.2.4.5 Vascular disease of the spinal cord
2.2.4.6 Disorders of cerebrospinal & brain fluid
2.2.4.7 Hydrocephalus
2.2.4.8 Brain oedema& disorders of intracranial pressure
2.2.4.9 Superficial siderosis of the central nervous system
2.2.4.10 Vaculitis and collagen vascular disease
2.2.4.11 Multiple sclerosis and other demyelinating disease
2.2.4.12 Paraneoplastic disorders and neuro-immunology
2.2.4.13 Tremor, ataxia and cerebellar disorders
2.2.4.14 Movement disorders : (Huntington disease, Sydenham & other forms of chorea, Myoclonus, Gilles de la Tourette syndrome, Dystonia, Essential tremor, Parkinsonism, Progressive supranuclear palsy, Tardive dyskinesia & other neuroleptic induced syndrome)

2.2.5 Vascular diseases of nervous system – Stroke – ischemic, haemorrhagic, aneurysm and SAH, AV malformation, stroke in young and children. Spinal cord vascular diseases, CNS vasculitis

2.2.6 Birth injuries and developmental abnormalities
2.2.6.1 Floppy infant syndrome
2.2.6.2 Static disorders of brain development
2.2.6.3 Structural malformation
2.2.6.4 Genetic diseases of the central nervous system
2.2.6.5 Chomosomal diseases
2.2.6.6 Disorders of amino acid metabolism
2.2.6.7 Disorders of purine metabolism
2.2.6.8 Lysosomal & other storage diseases
2.2.6.9 Peroxisomal diseases
2.2.6.10 Disorders of metal metabolism

2.2.7 Disorders of mitochondrial DNA
2.2.7.1 Mitrochondrialencephalomyopathies
2.2.7.2 Leber hereditary optic neuropathy

2.2.8 Neurocutaneous disorders
2.2.8.1 Neurofibromatosis
2.2.8.2 Encephalotrigeminalangiomatosis
2.2.8.3 Incontinentiapigmenti
2.2.8.4 Tuberoussclerosis

2.2.9 Peripheral neuropathies
2.2.9.1 Hereditary neuropathy
2.2.9.2 Acquired neuropathy

2.2.10 Infections of nervous system :Bacterial infections, Viral infections, Acquired immunodeficiency syndrome, Fungal & yeast infections, Neurosarcoidosis,

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Spirochete infections, Parasitic infections, Prion diseases, Whipple disease, Reye syndrome

2.2.11 Spinal cord diseases
- 2.2.11.1 Hereditary & acquired spastic paraplegia
- 2.2.11.2 Hereditary & acquired motor neuron diseases
- 2.2.11.3 Syringomyelia

2.2.12 Disorders of the neuromuscular junction
- 2.2.12.1 Myesthenia gravis
- 2.2.12.2 Lambert-Eaton syndrome
- 2.2.12.3 Botulism & antibiotic- induced neuromuscular disorder
- 2.2.12.4 Acute quadriplegic myopathy

2.2.13 Myopathies
- 2.2.13.1 Progressive muscular dystrophies
- 2.2.13.2 Congenital disorders of muscle
- 2.2.13.3 Muscle cramps & stiffness
- 2.2.13.4 Dermatomyositis
- 2.2.13.5 Polymyositis, inclusion body myositis & related myopathies
- 2.2.13.6 Myositis ossificans

2.2.14 Demyelinating diseases
- 2.2.14.1 Multiple sclerosis
- 2.2.14.2 Marchiafava- Bignami disease
- 2.2.14.3 Central pontine myelinosis

2.2.15 Autonomic disorders
- 2.2.15.1 Neurogenic orthostatic hypotension & autonomic failure
- 2.2.15.2 Acute autonomic neuropathy
- 2.2.15.3 Familial dysautonomia

2.2.16 Paroxysmal disorders
- 2.2.16.1 Migraine and other headaches
- 2.2.16.2 Epilepsy and disorders of consciousness
- 2.2.16.3 Transient global amnesia
- 2.2.16.4 Meinere syndrome
- 2.2.16.5 Sleep disorders

2.3 Brain Death

2.4 Developmental Neurology
- 2.4.1 Clinical approach to developmental neurology
- 2.4.2 Development, degeneration and regeneration of the CNS
- 2.4.3 Neuro-developmental disorders
- 2.4.4 Neurometabolic disorders
- 2.4.5 Neurocutaneous syndrome
- 2.4.6 Inborn errors of metabolism of nervous system, mitochondrial disorders and channelopathies

2.5 Psychiatric disorders
- 2.5.1 Anxiety neuroses, hysteria and personality disorders

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2.5.2 Depression and bipolar diseases
2.5.3 Schizophrenias and paranoid states

2.6 Environmental neurology
2.6.1 Alcoholism
2.6.2 Drug dependence
2.6.3 Iatrogenic disease
2.6.4 Occupational and environmental neurotoxicology

2.7 Rehabilitation :Neurologic rehabilitation

2.8 Ethical and legal guidelines : End- of- life issues in neurology

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अबस्ट्रेटिक्स एण्ड गाइनेकोलोजी समूह, अबस्ट्रेटिक्स एण्ड गाइनेकोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Obsterics**

1.1 Anatomy: Knowledge of anatomy of abdomen and pelvis applied to surgical procedures undertaken by the obstetrician and gynaecologist.

1.2 Pathology: Infection, inflammation therapeutic intervention (especially by the use of irradiation, cytotoxic drugs and hormones), disturbances in blood flow, loss of body fluids and neoplasia. Knowledge about changes in haemostasis in health and disease of a pregnant women.

1.3 Pharmacology: Knowledge of those drugs used in obstetrics and gynaecology Hormonal contraceptives in pregnancy and gonadotrophins and drugs contraindicated in pregnancy.

1.4 Immunology: Immunological changes in pregnancy; fetal development of the immune system, with particular knowledge of rhesus and isoimmunisations.

1.5 Infectious diseases: Knowledge of infectious diseases affecting pregnant and non-pregnant woman and fetus in utero. Knowledge of epidemiology, diagnostic techniques, prophylaxis, immunization and the use of antibiotics and antiviral agents.

1.6 Epidemiology and statistics: Collect data apply methods of statistical analysis. Knowledge of setting up clinical trials and the ability to interpret data through commonly used terms and techniques, interpretation of results of research, investigations, clinical trials design and medical audit.

1.7 Diagnostic imaging: Understand the application of ultrasound, computerized tomographic scanning and magnetic resonance imaging.

1.8 Radiodiagnosis: Basic chest skull and abdominal radiography in different views. Contrast radiography of different organic like IVP, Ba-series, Hysterosalphingography. Radiology of bones and joints.

1.9 Recent advances in radiology like CT, MRI and radioisotope scanning, Genetics and embryology. Detailed knowledge of normal and abnormal karyotypes, of the inheritance of genetic disorders and of the genetic causes of early abortion to diagnosis fetal abnormality, intrauterine treatment of the fetus genetics and embryology. Demonstrate the ability to explain to patients and discuss its practical and ethical implications.

1.10 Normal pregnancy: Changes maternal and fetal physiology during normal pregnancy, antepartum care its, aim and methods changes of implementation, i.e. organization of intrapartum care, including obstetrical analgesia and anaesthesia and anaesthesia, and of the normal puerperium. Importance of Nutrition during pregnancy and puerperium. Understand the importance of breast feeding and postpartum contraception.

1.11 Abnormal pregnancy: Knowledge of all aspects of abnormality during pregnancy, labor and puerperium and their management. Understand effects of pre-existing disease (obstetrical, gynaecological medical or surgical) on pregnancy and demonstrate the ability to provide informative counseling before, during and after pregnancy. Knowledge of neonatal resuscitation and of the principles of neonatal management, Respiratory distress syndrome (RDS), prematutity and congenital abnormality.

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Section (B) – 50 Marks

2. **Gynaecology**

2.1 Prepubertal gynaecology: Knowledge of normal and abnormal sexual development paediatric pathology and its management, normal puberty and its disorders and their management.

2.2 Adolescent gynaecology: Disorder of behaviour and sexual function counseling for safe living

2.3 Menstruation: Physiology of normal menstruation, pathophysiology of menstrual disorders their investigation and management. Menopause and its management.

2.4 Infertility: Causes of infertility, investigation and management of the infertile couple, techniques involved in assisted reproduction.

2.5 Infection: Sexually transmitted diseases including AIDS.

2.6 Abortion: Cause of abortion, its management, complication of therapeutic abortion and its legal aspects.

2.7 Contraception: Various method of permanent and temporary contraceptives, their uses and side effect.

2.8 Psychosexual medicine: Management of psychosexual problems including puerperal psychosis and the psycho social impact of violence against women

2.9 Urogynaecology: Surgical and non- surgical management urogynaecological problems.

2.10 Gynaecological oncology: Epidemiology and aetiology and the principles of carcinogenesis, tumor immunology and pathology. Diagnostic techniques and staging of gynaecological tumors. Treatment including surgery, radiotherapy, chemotherapy, and terminal care of patients dying due to gynaecological malignancy.

2.11 Breast: Problems of lactation and its management, Breast Lump and its management.

2.12 Obstetrical and Gynaecological surgery: Principle of obstetric and gynaecological (surgery) procedures preoperative assessment and post operative care.

2.13 Ethics and the law: Basic ethical and legal issues involved in contemporary obstetrical and gynecological practice, Introduction to ethical theories, medical ethics, Professional ethics, Ethics in research, Ethics in health policy.

2.14 Recent advances and subspeciality: Uro-gynaecology, Infertility, Gynaecology oncology,

2.15 Community obsterics and gynaecology:

2.15.1 Knowledge about basics community disease profile

2.15.2 Definitions and causes of maternal morbidity and mortality and perinatal mortality, neonatal mortality and infant mortality rate

2.15.3 Effect of socio cultural behavior in Reproductive health.

2.15.4 National Health Programmes related to Maternal and child health, continuing health services for maternal care and child health, organizing health care delivery and referral system.

2.15.5 Future vision to reduce maternal morbidity and mortality and perinatal mortality.

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
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     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Applied Basic Sciences**
   - 1.1 Applied anatomy
   - 1.2 Applied Physiology
   - 1.3 Applied Pathology
   - 1.4 Applied Pharmacology
   - 1.5 Applied immunology
   - 1.6 Applied biostatics
   - 1.7 Applied research methods
   - 1.8 Applied Molecular biology and genetics

2. **Recent Advances**
   - 2.1 Arthroscopy
   - 2.2 Endoscopic surgery (Spine, Knee, etc)
   - 2.3 Illizarov external fixator
   - 2.4 Total joint replacement
   - 2.5 Limb sparing surgery
   - 2.6 Bone Banking, Laser surgery, etc.

3. **Emergencies: Orthopedics**
   - 3.1 Acute Osteomyelitis
   - 3.2 Septic Arthritis
   - 3.3 Compartmental Syndrome
   - 3.4 Cauda Equina Syndrome
   - 3.5 Necrotizing fasciitis

4. **Emergencies : Trauma**
   - 4.1 All fractures and dislocations
   - 4.2 Open fractures
   - 4.3 Crush injuries
   - 4.4 Hand injuries
   - 4.5 Spinal injuries

Section (B) – 50 Marks

5. **Principles and practice of : Orthopedic Surgery**
   - 5.1 General orthopedics
   - 5.2 Regional Orthopedics
   - 5.3 Pediatric Orthopedics
   - 5.4 Orthopedic Oncology
   - 5.5 Orthopedic Neurology

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5.6 Sports Medicine
5.7 Physical Medicine and Rehabilitation

6. **Principles and practice of : Trauma Surgery**
   6.1 General principles of Trauma including Pathophysiology
   6.2 General practice of Trauma: Early management of injured, Management of Polytrauma, Disaster, Mass casualty, and management of Neglected trauma
   6.3 Definite management of Musculoskeletal injuries; their operative treatment and rehabilitation

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प्राविधिक सेवा, पेडीयाट्रिक्स समूह, पेडीयाट्रिक्स उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	6 × 10 = 60 (Long answer) 2 × 20 = 40 (Critical Analysis)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, पेडीयाट्रिक्स समूह, पेडीयाट्रिक्स उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **Growth development and behavior**
   - 1.1 Physical and psychosocial growth and development of normal child
   - 1.2 Disorders of growth
   - 1.3 Delay and deviations of development
   - 1.4 Assessment of growth and development
   - 1.5 Disorders of psychological development
   - 1.6 Common behavioral problems of preschool children
   - 1.7 Common speech disorders
   - 1.8 Common Paediatric Behavioural and Psychiatric disorders

2. **Nutrition, Fluid and Electrolytes**
   - 2.1 Normal nutrition in infancy and childhood
   - 2.2 Common nutritional disorders in childhood
   - 2.3 Nutrition supplementation programs
   - 2.4 Acid base balance
   - 2.5 Maintenance and replacement therapy of fluid and electrolytes

3. **Preventive pediatrics**
   - 3.1 Immunizations
   - 3.2 Prevention and management of common disorders of childhood
   - 3.3 Prevention and management of poisonings and accidents

4. **Social pediatrics**
   - 4.1 School health services
   - 4.2 National health programmes related to maternal and child health
   - 4.3 Community health services for the maternal and childhood
   - 4.4 Organizing health care delivery and referral systems for children

5. **Genetics**
   - 5.1 Genetic and chromosomal disorders
   - 5.2 Inborn errors of metabolism
   - 5.3 Genetic counseling including antenatal diagnosis
   - 5.4 Gene therapy

6. **Neonatology**
   - 6.1 Management of normal, high risk and sick neonates
   - 6.2 Monitoring and ventilatory support of the sick neonates
   - 6.3 Foetal disorders
   - 6.4 Perinatology
   - 6.5 Preventive neonatology

Section (B) - 50 Marks

7. **Adolescent Medicine**
   - 7.1 Adolescent development
   - 7.2 Adolescent health problems

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8. **Infectious diseases**
   8.1 Diagnosis and management of common infectious diseases (bacterial, viral, parasitic, fungal) in the pediatric age group and their management principles

9. **Immunity, allergy and rheumatic disorders of Paediatric age group**

10. **System based pediatrics**
    10.1 Diagnosis and management of common diseases/ disorders affecting Gastro intestinal, hepatobiliary, cardiovascular, respiratory, endocrine, blood and lymphoreticular, genitourinary, nervous and musculoskeletal systems

11. **Eye, ear, nose and throat**
    11.1 Diagnosis and management of common disorders of eye, ear, nose and throat in the pediatric age group

12. **Paediatric Dermatology**
    12.1 Common dermatological problems in Children
    12.2 Sexually transmitted diseases, AIDS

13. **Paediatric Surgery**
    13.1 Diagnosis and supportive management of common surgical disorders of neonates, infants and children and appropriate referral

14. **Pediatric Emergencies**
    14.1 Diagnosis and management of common pediatric emergencies such as coma, convulsions, shock, acute severe asthma, cyanotic spells, poisonings, accidents etc. Pediatric advance life support skills, cardiovascular support and stabilization

15. **Neoplastic disorders and tumors**
    15.1 Epidemiology, principles of diagnosis and treatment of common Paediatric neoplastic disorders (leukaemias, lymphomas, neuroblastoma, soft tissue sarcoma, retinoblastoma) and benign tumors

16. **Radio diagnosis**
    16.1 Interpretation of :
        16.1.1 Basic chest and abdominal and abdominal radiography in different views
        16.1.2 Contrast radiography of different organs - IVP, MCU, Ba-series and myelogram
        16.1.3 Radiology of bones and joints
        16.1.4 Ultrasonography of brain, abdomen and other organs
        16.1.5 Echocardiography
    16.2 Recent advances in radiology - CT, MRI, USG, radioisotope scanning and PET

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प्राविधिक सेवा, रेडियोलोजी समूह, रेडियो डाइग्नोसिस एण्ड इमेजीङ उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

Civil Service Hospital

निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियो डाइग्नोसिस एण्ड इमेजीङ उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **Physics in radiology**
   - 1.1 Production of x-rays
   - 1.2 Interaction of x-rays with metals
   - 1.3 X-ray tube
   - 1.4 Radiation protection
   - 1.5 Basic physics and advances in fluoroscopy/ imaging intensifier
   - 1.6 Basic physics and advances in CR/DR system
   - 1.7 Basic physics and advances in CT
   - 1.8 Basic physics and advances in MRI
   - 1.9 Basic physics and advances in USG
   - 1.10 Introduction to nuclear medicine

2. **Sectional and Imaging anatomy**
   - 2.1 Cross-sectional & imaging anatomy of brain
   - 2.2 Cross-sectional and imaging anatomy of chest
   - 2.3 Cross-sectional and imaging anatomy of Abdomen
   - 2.4 Anatomy of orbits and its bones
   - 2.5 Vascular anatomy of brain/head
   - 2.6 Vascular anatomy of abdominal aorta and its branches
   - 2.7 Vascular anatomy of upper and lower limbs
   - 2.8 Relevant Embryology

3. **Nervous system**
   - 3.1 Craniocerebral Trauma
   - 3.2 Imaging of non-traumatic SAH
   - 3.3 Imaging of non-traumatic ICH
   - 3.4 Imaging of stroke
   - 3.5 Cerebral ischemia
   - 3.6 Brain tumors and tumor like processes
   - 3.7 Extra-axial Tumors
   - 3.8 Imaging of sellar tumours
   - 3.9 Non-neoplastic and neoplastic spinal cord pathologies

4. **Head & Neck**
   - 4.1 Radiological imaging of diseases and conditions related to Ear, Nose, Throat
   - 4.2 Radiological imaging of diseases of thyroid, salivary gland and other soft tissue neck

5. **Paediatric imaging**
   - 5.1 Imaging of the kidneys and urinary tract in children
   - 5.2 Imaging of congenital CNS malformations
   - 5.3 Respiratory Distress

6. **Recent advances in radiology and imaging**
   - 6.1 Teleradiology, Radiology Information System & PACS
   - 6.2 Newer advances in CR/ DR system, Fluoroscopy and Mammogram
   - 6.3 Newer advances in CT and MRI

Civil Service Hospital

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निजामती कर्मचारी अस्पताल

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Section (B) – 50 Marks

7. **CVS & Interventional**
   - 7.1 Radiological imaging of aortic and peripheral arterial diseases
   - 7.2 Radiologic approach to pulmonary thromboembolism
   - 7.3 Heart and pericardium
   - 7.4 Congenital and acquired heart disease
   - 7.5 Image guided radiological procedures and contrast media

8. **Musculoskeletal System**
   - 8.1 Skeletal trauma
   - 8.2 Radiological imaging of bone tumors
   - 8.3 Radiological imaging of large and small joints
   - 8.4 Haemopoietic bone disorder
   - 8.5 Osteomyelitis and septic arthritis

9. **Thoracic / respiratory system**
   - 9.1 Radiological imaging of Chest
   - 9.2 Chest trauma

10. **Gastrointestinal & hepatobiliary system**
    - 10.1 Imaging of non-neoplastic / neoplastic esophageal pathology
    - 10.2 Imaging of gastric pathology
    - 10.3 Liver neoplasms
    - 10.4 Inflammatory bowel disease
    - 10.5 Imaging and interventions in GI bleed
    - 10.6 Imaging of pancreatic neoplasm

11. **Genito-urinary system**
    - 11.1 Renovascular disease
    - 11.2 Gentiurinary trauma
    - 11.3 Genito-urinary tumor
    - 11.4 Urinary bladder & Prostate imaging

12. **Breast and diagnostic ultrasound**
    - 12.1 Breast imaging
    - 12.2 Role of USG in IUGR
    - 12.3 Diagnostic ultrasound

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, जनरल सर्जरी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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निजामती कर्मचारी अस्पताल

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Basic & Applied**
   - 1.1 **Applied Surgical Anatomy**
     - 1.1.1 Required to have acknowledge of the structure and function of all system of the body (where applicable to common clinical conditions in surgery)
     - 1.1.2 Knowledge of histology to understand the function to tissue and organs as well as growth, degeneration and repair
     - 1.1.3 Embryological basis of common congenital anomalies
   - 1.2 **System**
     - 1.2.1 Nervous system
     - 1.2.2 Respiratory system
     - 1.2.3 Cardiovascular system
     - 1.2.4 Digestive system
     - 1.2.5 Endocrine system
     - 1.2.6 Musculoskeletal system
     - 1.2.7 General – e.g. Acid-base balance, fluid and electrolyte balance, nutrition, metabolic response to trauma and sepsis, etc.

2. **Applied Physiology**

3. **Surgical Pathology**
   - 3.1 Knowledge of the surgical pathology and microbiology in the context of surgery including inflammation, infection, neoplasm, response on the tissues to injury, disturbance of growth, degeneration processes, repair and regulation
   - 3.2 Immunology and Genetics
   - 3.3 Neoplastic diseases
   - 3.4 Gross and histopathology of common surgical conditions
   - 3.5 Nervous system
   - 3.6 Respiratory system
   - 3.7 Cariovascular system
   - 3.8 Genito-urinary system
   - 3.9 Gastrointestinal system
   - 3.10 Muscleskeletal system

4. **Critical Care**
   - 4.1 Basics of pathophysiology, approach and management of critical surgical situation e.g. Trauma, shock, sepsis, organfailure
     - 4.1.1 Clinical pictures
     - 4.1.2 Investigation
     - 4.1.3 Diagnosis confirmation
     - 4.1.4 Management–use of equipments
     - 4.1.5 Monitoring–complications
     - 4.1.6 Counseling – communication
     - 4.1.7 Follow-up

5. **Recent advance**
   - 4.2 Research-inside country
   - 4.3 Recent advance–international

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4.4 Not published research work
4.5 Future national vision

Section (B) – 50 Marks

6. **Surgical Management**
   - 6.1 Principle of management of common general surgical conditions
     - 6.1.1 Clinical practice (History and examinations)
     - 6.1.2 Investigation
     - 6.1.3 Provisional Diagnosis and differentials
     - 6.1.4 Treatment-Conservative, operative, palliative
     - 6.1.5 Monitoring
     - 6.1.6 Follow-up–of the patients with general surgical condition of following systems
       - 6.1.6.1 Nervous system
       - 6.1.6.2 Respiratory system
       - 6.1.6.3 Cardiovascular system
       - 6.1.6.4 Gastrointestinal system
       - 6.1.6.5 Genitourinary system
       - 6.1.6.6 Endocrine and breast
       - 6.1.6.7 Musculo-skeletal system and soft tissue
       - 6.1.6.8 Trauma/Polytrauma

7. **Principles of Surgery**
   - 7.1 Knowledge of the General principle and practice of Surgery
     - 7.1.1 Imaging techniques/interventional Radiology
     - 7.1.2 Endoscopy/Laparoscopy
     - 7.1.3 Surgery at extremes of life
     - 7.1.4 Theatre techniques
       - 7.1.4.1 Aseptic techniques–sterilization
       - 7.1.4.2 Anesthesia in general, maintenance of homeostasis
       - 7.1.4.3 Basic techniques–suturing material dressing plaster
       - 7.1.4.4 Diathermy and electrosurgical devices
       - 7.1.4.5 Tourniquet
     - 7.1.5 Wound healing, dehiscence, scar, contractures
     - 7.1.6 Post operative complication and management
     - 7.1.7 Sepsis's surgery
       - 7.1.7.1 Acute and Chronic, inflammation
       - 7.1.7.2 Wound infection and septicemia
       - 7.1.7.3 TB, Leprosy, AIDS, Bacterial infection
       - 7.1.7.4 Antiseptic, Antibiotic policies

8. **OperationSurgery**
   - 8.1 **Nervous System**
     - 8.1.1 Exposure to extradural haematoma
     - 8.1.2 Skull traction
     - 8.1.3 Nerve repair and transplant
     - 8.1.4 Trauma–skull, strive
   - 8.2 **Respiratory System**
     - 8.2.1 F.B. in respiratory tract
     - 8.2.2 Tracheostomy, cricothyroidotomy

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8.2.3 Chest Drainage
8.2.4 Thoractomy
8.2.5 Chesttrauma (variety of injuries)

8.3 **Cardiovascular**
8.3.1 Cardiac Tamponade
8.3.2 Exposure to artery and vein,embolectomy
8.3.3 Amputations

8.4 **Gastrointestinal System**
8.4.1 All type of GI Surgery of all magnitude and types
8.4.2 Different combination of operation
8.4.3 Except-transplantation

8.5 **Genitourinary system**
8.5.1 Suprapublic bladder drainage
8.5.2 Cystocscopy
8.5.3 Exposure of kidney, calculus, obstructive uropathy
8.5.4 Perinephric abscess
8.5.5 Scrotal/testicular operation
8.5.6 Ectopic pregnancy/otherpelvicsurgery

8.6 **Endocrine and breast**
8.6.1 Thyroid/parathyroid
8.6.2 Breast surgery (noreconstruction)

8.7 **Musculoskeletal and soft tissue**
8.7.1 Simple skeletal traction
8.7.2 Compartmental syndrome
8.7.3 Bone infection

8.8 **Plastic**
8.8.1 Simple ceftlip repair
8.8.2 Skin grafting /flaps
8.8.3 Skin lesion
8.8.4 Lymph node and biopsy

8.9 **Other**
8.9.1 Venesection centralline
8.9.2 Laryngoscope, E Tintubation
8.9.3 FNAC /tru-cut needle biopsy
8.9.4 Defibrillation

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, मेडिकल अंकोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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प्राविधिक सेवा, मेडिसिन समूह, मेडिकल अंकोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II: Technical Subject

Section (A) – 50 % Marks

1. **Pharmacology and critical care medicine**
   - 1.1 Classification of Chemotherapeutic Drugs
   - 1.2 Plant alkaloids
   - 1.3 Alkylating agents
   - 1.4 Antimetabolites
   - 1.5 Anthracyclines, Antitumor antibiotics
   - 1.6 Topo-isomerase inhibitors, proteosome inhibitors
   - 1.7 Corticosteroids
   - 1.8 Principles of pharmacology therapy
   - 1.9 Pharmacology of different medicines
   - 1.10 Principles of critical care medicine
   - 1.11 Oxygen delivery
   - 1.12 Major manifestations, monitoring and management of critical illness
   - 1.13 Nutritional factors in health and disease

2. **Infection**
   - 2.1 Basic of infection
   - 2.2 Major manifestations of infections
   - 2.3 Principles of management of infection, including different antimicrobial agent and prevention of infection
   - 2.4 Diseases due to different organism like virus, bacteria, protozoa, helminthes

3. **Cancer of various Systems : Solid Tumors**
   - 3.1 Bone and soft tissue sarcomas
   - 3.2 Respiratory system
   - 3.3 GI Malignancies
   - 3.4 Genitourinary Malignancies
   - 3.5 CNS Tumors
   - 3.6 Hepatobiliary and pancreatic cancers
   - 3.7 Cardiovascular malignancies
   - 3.8 Cancer of unknown primary
   - 3.9 Cancer of breast
   - 3.10 Cancer of skin
   - 3.11 Cancer of endocrine system
   - 3.12 Mesotheliomas
   - 3.13 Gynaecologic cancers
   - 3.14 Malignant melanomas

4. **Haematological malignancies**
   - 4.1 Mylodysplastic Syndrome
   - 4.2 Acute and chronic leukemias
   - 4.3 Hodgkin,s and Non-Hodgkins Lymphomas
   - 4.4 Plasma cell Dyscrasias
   - 4.5 Myeloproliferative disorders

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5. **Manifestation of complications of cancer and cancer treatment in various systems and their management**
   - 5.1 Haematological complications
   - 5.2 Renal complications
   - 5.3 GI related complications
   - 5.4 Infection and sepsis
   - 5.5 Para- Neoplastic syndrome
   - 5.6 Cardiovascular complications
   - 5.7 Respiratory Complications
   - 5.8 CNS complications
   - 5.9 Metabolic Complications
   - 5.10 Neuromuscular complications
   - 5.11 Bone and joint complications
   - 5.12 Skin and Appendages
   - 5.13 Fertility issues
   - 5.14 Psychosocial issues
6. **Stem Cell Transplant**
   - 6.1 Indications and principles of stem cell transplant
   - 6.2 Sources of stem cells preparative regimen
   - 6.3 Procedure, complications, prognosis

Section (B) – 50 % Marks

7. **Cancer Diagnostics**
   - 7.1 Radiological diagnostics
   - 7.2 Molecular and cytogenetics
   - 7.3 Cytological and Histopathological diagnostics
   - 7.4 Biochemical Diagnostics
   - 7.5 Tumor markers, IHC (Immunohistochemistry), Flowcytometry
   - 7.6 Nuclear and Radionuclear imaging
   - 7.7 Interventional Radiology
   - 7.8 Basics of Radiation Oncology
   - 7.9 Basics of Surgical Oncology

8. **Recent Advances in cancer management**
   - 8.1 Genetics and disease
   - 8.2 Investigation of the molecular basic of disease
   - 8.3 Modern molecular methods in human disease
   - 8.4 Types of genetic disease
   - 8.5 Genetic factors in common diseases
   - 8.6 Essentials of Molecular Biology
   - 8.7 Molecular Biology of cancer
   - 8.8 Newer approaches in cancer; Immunotherapy, Biotherapy, Genetherapy
   - 8.9 Basics of high dose chemotherapy and newer modalities of treatment, principles of radiotherapy, the use of various radioisotopes

9. **Palliative Care**
   - 9.1 Introduction and basic concept including definition
   - 9.2 Guidelines for palliative care
   - 9.3 Different pharmacologic & non-pharmacologic methods

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9.4 Pain assessment and management, WHO ladder, balanced use of opiods
9.5 Common symptom management
9.6 Palliative anticancer medicine
9.7 Ethical issues in Palliative care
9.8 Psychosocial issues
9.9 End of life care
9.10 Supportive care and quality of life
9.11 Rehabilitation of cancer patient
9.12 Palliative radiotherapy
9.13 Palliative chemotherapy
9.14 Home care
9.15 Hospice care

10. **Non-communicable diseases and cancer related conditions**
    10.1 Epidemiology and control of cancers
    10.2 HIV and cancer
    10.3 TB and cancer
    10.4 Infections and cancer
    10.5 Diabetes and cancer
    10.6 Management of Anaemia in cancer
    10.7 Diet and nutrition in cancer patients
11. **Geriatrics and Skin system and disorders**
    11.1 Normal ageing
    11.2 Major manifestations of disease in frail older people
    11.3 Functional anatomy and physiology of the skin
    11.4 Major manifestations and investigations of skin disease
    11.5 Skin diseases
    11.6 The skin and systemic disease
12. **Nuclear medicine**
    12.1 Basic knowledge of use of nuclear medicine in diagnosis of both oncologic and non-oncological hematological disorders
13. **General Surgical Principles**
    13.1 Shock
    13.2 Surgical infection
    13.3 Fluid and electrolyte imbalance
    13.4 Preoperative and post-operative patient care
    13.5 TNM classification of cancers
14. TNM and other commonly used cancer staging systems
15. Common pediatric malignancy - Diagnosis, staging and treatment

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, अर्थोप्लाष्टी एण्ड अर्थोस्कोपि उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
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   - 1.4. Purpose of medical and non-medical data and records
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   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
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     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
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     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
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   - 2.7. Health Management Information System, forms, indicators, annual reports
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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, अर्थोप्लाष्टी एण्ड अर्थोस्कोपि उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II: Technical Subject

Section (A) – 50 % Marks

1. Hip Joint

1.1. Anatomy and biomechanics of hip joint.
1.2. Clinical examination of hip joint.
1.3. Natural History, clinical presentation, classification and treatment of adult hip dysplasia.
1.4. Management of femoro-acetabular Impingement.
1.5. Occurrence, etiology, clinical presentation, imaging, staging and treatment of osteonecrosis of Femoral head.
1.6. Transient osteoporosis of the Hip.
1.7. Management of hip arthritis.
1.8. Biomechanics, indications, contraindications, pre-operative Planning, templating, techniques, surgical Approaches, soft tissue handling, rehabilitation and outcomes of total hip arthroplasty.
1.9. Total hip arthroplasty implants: composition, choices, biomechanics, merits and demerits.
1.10. Bone cement.
1.11. Polyethylene wear, composition, manufacturing and osteolysis in THA.
1.12. Peri-prosthetic fractures in THA.
1.13. Biomechanics, techniques, advantages, contraindications and complications of Hip resurfacing arthroplasty
1.14. Complications after THA; Pre-operative, Intraoperative and post-operative complications: dislocation, neurovascular injury, infections and osteolysis, thromboembolism, limb length discrepancy, peri-prosthetic fractures, heterotopic ossifications and impingements.
1.15. THA in special cases: DDH, sickle cell anemia, protusio acetabuli, paget's disease, acute femoral neck fracture, failed hip surgeries, acetabular fractures, arthrodesis of hip joint, chronic renal failure, hemophilia, tuberculosis, pyogenic arthritis and neuromuscular disorders.
1.16. Principles, techniques of Revision THA.
1.17. Current concepts in Total Hip Arthroplasty.

2. Knee Joint

2.1. Clinical presentation, imaging studies and treatment of knee osteoarthritis
2.2. Clinical examinations of knee joint
2.3. Surgical anatomy and biomechanics of knee joint
2.4. Modern prosthesis evolution and different designs: cruciate retaining, cruciate sacrificing, posterior stabilized, mobile bearing, uni-compartmental, Anterior stabilized, modular, constraint design and hinged.
2.5. Biomechanics, indications, contraindications, pre-operative planning, templating, surgical approaches, soft tissue balancing, rehabilitation, complications and outcomes of total knee arthroplasty.
2.6. Polyethylene issues in TKA.
2.7. Indications and contraindications for total knee arthroplasty, unicondylar knee arthroplasty and patella-femoral arthroplasty.
2.8. Patellar resurfacing arthroplasty and simultaneous bilateral total knee arthroplasty.
2.9. Management of bone deficiency in TKA.
2.10. Patello-femoral tracking after TKA.

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2.11. Wound closure after TKA.
2.12. Pre-operative, Intra-operative and Postoperative management after TKA.
2.13. Surgical problems in specific disorders: previous high tibial osteotomy, previous patellectomy, neuropathic arthropathy and other medical conditions.
2.14. Complications after TKA: Thromboembolism, Infection, Patellofemoral complications, neurovascular complications and periprosthetic fractures
2.15. Revision total knee arthroplasty: Aseptic failure of primary total knee arthroplasty, surgical exposures, component removal, reconstruction principles, and results.
2.16. Current concepts in total knee arthroplasty

3. Other Joints and miscellaneous

3.1. Indications, requirements, component positioning, complications after shoulder hemi-arthroplasty, total shoulder arthroplasty and reverse shoulder arthroplasty
3.2. General principles of arthroplasty of wrist joint, elbow joint, ankle joints and small joints of hands and feet.
3.3. Indications, contraindications, general principles, techniques and complications after arthrodesis of hip, knee, shoulder, elbow, wrist, ankle, small joints of hands and feet.
3.4. Soft tissue procedures and corrective osteotomies around knee joints.
3.5. Ligaments and soft tissue reconstruction for instabilities of different joints: shoulder, elbow wrist, hip, knee ankle and other small joints.
3.6. Bony and soft tissue reconstruction in special conditions: Cerebral palsy, poliomyelitis, brachial plexus injury, myelo-meningocele, other congenital and acquired disorders.

Section (B) – 50 % Marks

4. General Principles of Arthroscopy

4.1 Instruments and equipment
4.2 Anesthesia
4.3 Documentation
4.4 Advantages
4.5 Disadvantages
4.6 Indications and contraindications
4.7 Basic arthroscopic techniques
4.8 Surgical implants used in Arthroscopic therapy.
4.9 Complications

5. Arthroscopy of the Lower Extremity

5.1 Knee
- 5.1.1 Basic diagnostic techniques
- 5.1.2 Arthroscopic examination of the knee
- 5.1.3 Arthroscopic surgery of the meniscus
- 5.1.4 Anterior cruciate ligament
- 5.1.5 Posterior cruciate ligament
- 5.1.6 Posteromedial complex
- 5.1.7 Posterolateral complex
- 5.1.8 Arthroscopic surgery for other disorders
- 5.1.9 Other applications of arthroscopy of the knee
- 5.1.10 Complications

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5.2 Foot &Ankle
- 5.2.1 Arthroscopic portal placement and examination of Ankle
- 5.2.2 Soft-tissue procedures
- 5.2.3 Bony procedures
- 5.2.4 Complications
- 5.2.5 Arthroscopy of the subtalar joint, arthroscopic subtalar arthrodesis

5.3 Hip
- 5.3.1 Indications including Clinical assessment and patient selection
- 5.3.2 General setup,
- 5.3.3 Arthroscopy in supine and lateral position
- 5.3.4 Management of labral and articular lesions/injuries, Femoral acetabular impingement
- 5.3.5 Snapping hip syndromeand Peri trochanteric disorders
- 5.3.6 Biopsy, Irrigation for infection, OCD & Chondral lesions, Lig Teres injury, IA loose bodies, foreign body. Assessment of Total Hip Replacement,
- 5.3.7 Extraarticular conditions: Snapping Psoas, Piriformis syndrome & Sciatic Nerve decompression, Ischiofemoral impingement.
- 5.3.8 Complications

6. Arthroscopy of the Upper Extremity

6.1 Shoulder
- 6.1.1 Indications
- 6.1.2 Patient positioning and anesthesia
- 6.1.3 Lateral decubitus position
- 6.1.4 Beach-chair position
- 6.1.5 Control of bleeding during arthroscopy
- 6.1.6 Fluid extravasation
- 6.1.7 Portal placement
- 6.1.8 Diagnostic arthroscopy and arthroscopic anatomy
- 6.1.9 Specific arthroscopic surgical procedures
  - 6.1.9.1 Removal of loose bodies
  - 6.1.9.2 Synovectomy
  - 6.1.9.3 Drainage and debridement
  - 6.1.9.4 Repair of labral tears
  - 6.1.9.5 Repair of biceps tendon lesions
  - 6.1.9.6 Reconstruction for anterior instability
  - 6.1.9.7 Posterior shoulder stabilization
  - 6.1.9.8 Impingement syndrome
  - 6.1.9.9 Impingement and os acromiale
  - 6.1.9.10 Partial rotator cuff tears
  - 6.1.9.11 Delamination tears and localized partial-thickness, articular-side rotator cuff tears
  - 6.1.9.12 Complete rotator cuff tears
  - 6.1.9.13 Massive contracted rotator cuff tears
  - 6.1.9.14 Subscapularis tendon tears
  - 6.1.9.15 Acromioclavicular joint
  - 6.1.9.16 Calcific tendinitis of the rotator cuff
  - 6.1.9.17 Arthroscopic debridement for osteoarthritis

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6.1.9.18 Posterior ossification of the shoulder (Bennett lesion)
6.1.9.19 Spinoglenoid cyst
6.1.9.20 Arthroscopic capsular release
6.1.9.21 Complications

6.2 Elbow
6.2.1 Indications
6.2.2 Patient positioning and anesthesia
6.2.3 Portal placement
6.2.4 Arthroscopic examination of the elbow
6.2.5 Specific arthroscopic surgical procedures
6.2.5.1 Removal of loose bodies
6.2.5.2 Panner's disease and osteochondritis dissecans
6.2.5.3 Throwing injuries
6.2.5.4 Evaluation of ulnar collateral ligament function
6.2.5.5 Posterior elbow impingement
6.2.5.6 Radial head resection
6.2.5.7 Arthroscopic treatment for arthrofibrosis
6.2.5.8 Arthroscopic debridement for osteoarthritis
6.2.5.9 Synovectomy
6.2.5.10 Tennis elbow release
6.2.5.11 Olecranon bursitis
6.2.5.12 Arthroscopic-assisted intraarticular fracture care
6.2.5.13 Pyarthrosis
6.2.5.14 Complications

6.3 Wrist
6.3.1 Wrist arthroscopy anatomy, portals
6.3.2 Triangular fibrocartilage complex tears
6.3.3 Arthroscopic treatment of dorsal and volar ganglion, repetitive strain injury
6.3.4 Endoscopic carpal tunnel release
6.3.5 Role of wrist arthroscopy in intraarticular distal radius fractures

7. Arthroscopy of Axial skeleton

7.1 Spine:
7.1.1 Treatment of Disc herniation and degenerative discs
7.1.2 Spinal deformity
7.1.3 Tumors
7.2 Temporomandibular joint :
7.2.1 Diagnostics/Therapeutics

8. Arthroscopy & Recent advances

8.1 Regenerative Medicine
8.2 Computer assisted surgery/ Navigation surgery
8.3 Robotic assisted surgery

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, स्पाइनल सर्जरी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :आ.व. २०७९/०८०

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निजामती कर्मचारी अस्पताल
प्राविधिक सेवा, सर्जरी समूह, स्पाइनल सर्जरी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II: Technical Subject

Section (A) – 50 % Marks

I. Basic Science

1. Anatomy

1.1. Embryology of spine: Development of dermatomes, myotomes, nerve roots and spinal cord
1.2. Structure and biomechanics of craniovertebral junctuion
1.3. Ligaments of upper cervical spine
1.4. Anatomy of atlas and axis
1.5. Anatomy of subaxial spine
1.6. Anatomy of thoracic spine
1.7. Anatomy of lumbar spine
1.8. Anatomy of sacrum and coccyx
1.9. Anatomy of brachial and lumbosacral plexuses and peripheral nerves
1.10. Concept of dermatomes and myotomes

2. Physiology

2.1. Physiology of cerebrospinal fluid circulation
2.2. Myelopathy and radiculopathy
2.3. Biomechanics of spine:
  2.3.1. Normal curvatures
  2.3.2. Saggital/coronal balance
  2.3.3. Physiological loads
  2.3.4. Concept of stability
  2.3.5. Principal of spinal instrumentations
2.4. Physiology of bladder and bowel function
2.5. Physiology of sexual function
2.6. Nutrition status in spine patients
2.7. Age related changes in spine
2.8. Pathways of spinal pains

3. Pathology

3.1. Basic pathologies involving the spine
3.2. Congenital anomalies: congenital scoliosis, hemivertebra, Klippel-Feil deformity
3.3. Craniovertebral anomalies, basilar invagination
3.4. Traumatic syndromes of spine
3.5. Tumors involving vertebral column and spinal cord
3.6. Degenerative diseases of spine
3.7. Pathology of different pain syndromes
3.8. Infections of spine
3.9. Neurmuscular disorders
3.10. Different neurologic bladder syndromes

4. Pharmacology

4.1. Steroids: indication and contraindications

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4.2. Analgesics use in spinal injury and pain syndrome

II. Principles and practice (Clinical features, diagnosis and nonoperative management)

5. Common presentations of spine cases (Patient Assessment)

5.1. Pain
- 2.3.6. Causes of pain
- 2.3.7. Characteristics of pain in relation to anatomical origin of pain
- 2.3.8. Radicular pain
- 2.3.9. Claudication

5.2. Stiffness / spasticity

5.3. Deformity
- 5.3.1. Scoliosis/Kyphosis, gibbus/Kyphoscoliosis/List/Torticolis/Hump

5.4. Neurological deficits
- 5.4.1. Monoplegia/Hemiplegia/Paraplegia/Quadriplegia
- 5.4.2. Grading of neurological deficits: Frankel grading/ ASIA grading

5.5. Types of partial cord injuries (Brown Sequard syndrome, anterior cord syndrome, posterior cord syndrome, central cord syndrome)

5.6. Conus medullaris syndrome

5.7. Cauda equina syndrome

5.8. Myelopathies (cervical and thoracic)

5.9. Spinal dysrrhaphisms

5.10. Bowel and bladder dysfunctions

5.11. Sexual dysfunctions

5.12. Swellings on back and other cutaneous signs

5.13. Knowledge on Yellow flag and Red flag signs in spine

5.14. Associated co-morbidities related to spinal diseases

6. Examination of the Spine

6.1. General examination of Spine
- 6.1.1. Inspection
  - 6.1.1.1. Any obvious swellings or surgical scars, dimples, tufts of hair
  - 6.1.1.2. Deformity: scoliosis, kyphosis, loss of lumbar lordosis or hyperlordosis of the lumbar spine.
  - 6.1.1.3. Shoulder asymmetry and pelvic tilt
  - 6.1.1.4. Gait and attitude
- 6.1.2. Palpation
  - 6.1.2.1. Tenderness over bone and soft tissues, step off deformity
  - 6.1.2.2. Digital rectal examination
- 6.1.3. Movement
  - 6.1.3.1. Ranges of movement of major joints
  - 6.1.3.2. Examination of the shoulders and examination of the sacroiliac joints and hips

6.2. Neurological Assessment in spinal disorders

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6.2.1. Examination of cranial nerves, motor and sensory systems including peripheral nerves
6.2.2. Deep tendon reflexes/cutaneuous reflexes/abdominal reflexes
6.2.3. Examination for cerebellar dysfunctions

6.3. Vascular examination
6.3.1. Peripheral vascular examination

6.4. Psychosocial factors
6.4.1. Waddell's sign

6.5. Movements (normal ranges)
6.5.1. Flexion: Schober's test
6.5.2. Extension; Lateral flexion, rotation
6.5.3. Straight leg raising test, Bowstring test, Lasegue's sign, femoral stretch test

6.6. Chest examination

6.7. Abdominal and cardiovascular examinations
6.7.1. Non-musculoskeletal causes of back pain - e.g., urological, gynaecological, gastrointestinal and vascular
6.7.2. Primary malignancy sites

7. Investigations

7.1. Laboratory investigations
7.1.1 Basic hematological and biochemical tests
7.1.2 Rheumatologic profile
7.1.3 Immunological tests
7.1.4 Understandings on microbiology: staining, culture and sensitivity of common microorganisms affecting spine
7.1.5 Genetic tests
7.1.6 Principles and interpretation of histopathology
7.1.7 Immuno-histochemistry of commonly diagnosed spinal diseases

7.2. Imaging studies in spine
7.2.1 Plain X-ray
7.2.2 Tomography
7.2.3 Ultrasonography
7.2.4 CT scan
7.2.5 Bone scan
7.2.6 MRI
7.2.7 Fluoroscopy
7.2.8 Latest imaging technologies: PET, SPECT

7.3. Neuro physiological investigations

7.4. Spinal injections

8. Management of spine diseases

8.1. Congenital, traumatic, infective/inflammatory, degenerative, neoplastic, metabolic, mechanical, disc prolapse, spondylolisthesis, spondylolysis

8.2. Grading and scoring in spinal diseases

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8.2.1 Concept of spinal instability
8.2.2 ASIA, TLICS, SLICS, AO,JOA score, Nurick score, ODI, VAS

8.3. Non-surgical Management
8.3.1 Principle of management
8.3.2 Indications
8.3.3 Pain management
8.3.4 Physiotherapy
8.3.5 Bracing, corset
8.3.6 Skull traction
8.3.7 Halo vest, traction
8.3.8 Principles of post acute care and rehabilitation

Section (B) – 50 % Marks

III. Operative Spine Surgery

9. Positioning in spine surgery

10. Surgical approaches

10.1. Cervical spine
10.1.1 Upper cervical spine – C0/1/2 exposure
10.1.2 Smith Robinson approach – related complications
10.1.3 Anterior odontoid (trans oral) and manubrium splitting approach
10.1.4 Management of vascular complications in cervical spine
10.1.5 Anterior and posterior approaches to the cervical spine

10.2. Thoracic spine
10.2.1 Principles of thoracotomy in relation to spine surgery
10.2.2 Thoracotomy approach and thoraco-abdominal approach
10.2.3 Anterolateral approach
10.2.4 Costotransversectomy

10.3. Lumbar spine
10.3.1 Anterolateral retroperitoneal approach to lumbar spine
10.3.2 Posterior approach in lumbar spine
10.3.3 Wiltse approach in lumbar spine

10.4. Spinal biopsy techniques – open and percutaneous
10.5. Peri/Post operative management
10.5.1 Pre-operative assessment
10.5.2 Intra operative anesthesia management
10.5.3 Post operative care & pain management

11. Techniques

11.1 Cervical spine
11.1.1 Cranio-vertebral junction – Chiari malformations and basilar invagination – treatment protocols
11.1.2 Pearls and pitfalls in C0/1/2 techniques
11.1.3 Sub axial lateral mass and pedicle screw techniques
11.1.4 ACDF/ACCF complications

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11.1.5 Laminoplasty and laminectomy techniques
11.1.6 Difficulties in anterior odontoid screw fixation
11.1.7 Triple wiring techniques in upper and subaxial cervical spine
11.1.8 Ossification of ligamentum flavum and ossification of posterior longitudinal ligament (OYL and OPLL)

11.2 Thoracic spine
11.2.1 Thoracic disc herniation – surgical techniques
11.2.2 AIS – approaches and surgical techniques
11.2.3 Scheurmann's kyphosis – treatment protocol

11.3 Lumbar spine
11.3.1 Surgical management of thoraco-lumbar trauma
11.3.2 Adult spinal deformity – operative treatment
11.3.3 Lumbar disc herniation and cauda equine syndrome
11.3.4 Lumbar spine stenosis
11.3.5 Lumbar spondylolisthesis – treatment techniques
11.3.6 Bony and spinal tumors – surgical techniques
11.3.7 Management of dural tears
11.3.8 Metastatic / bony spine tumors – operative management
11.3.9 Pseudoarthrosis and PJK – treatment methods
11.3.10 Sacral and coccygeal trauma – surgical fixation methods
11.3.11 Meningicele and meningomyelocele – treatment methods

11.4 Minimally invasive spine surgery
11.4.1. Posterior cervical foraminotomy
11.4.2. Percutaneous pedicle screw fixation in thoracic and lumbar spine
11.4.3. MISS TLIF
11.4.4. Endoscopic spine surgery

11.5 Management of post-operative complications

IV. Recent Advances

12. Trauma

12.1. Role of early surgery (within 72 hours) versus delayed surgery in acute cervical spinal cord injury
12.2. Role of C1-C2 wiring alone in the treatment of traumatic atlanto axial subluxation
12.3. Recent trend in the surgical treatment of Odontoid fractures
12.4. Role of steroids in acute spinal cord injury
12.5. Recent advances in spinal cord injury rehabilitation
12.6. Link between spinal cord recovery and high blood pressure
12.7. Spinal cord epidural stimulation (ScES) treatment
12.8. Human stem cell therapy and spinal cord regeneration

13. Tumor

13.1. Intradural tumors/Primary tumors of spine, spinal metastasis
13.2. The significance of grade, age, and extent of surgical resection with overall survival and cause-specific survival for both astrocytomas and ependymomas of spinal cord

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13.3. The role of radiotherapy and chemotherapy in pediatric spinal intramedullary tumors
13.4. The indications of craniospinal irradiation in spinal tumors

14. Degenerative

14.1. Role of decompressive surgery and ventral versus dorsal approaches for the surgical management of cervical spondylotic myelopathy
14.2. Role of laminoplasty and laminoplasty baskets in cervical canal stenosis
14.3. Timing of surgery for cauda equina syndrome
14.4. The prevalence and significance of posticus ponticus in humans
14.5. Role of atlanto axial joint distraction as a treatment of basilar invagination
14.6. Surgical treatments of Chiari malformation 'I'
14.7. Recent advances in surgical treatment in elderly and osteoporotic spine

15. Miscellaneous

15.1. Role of neuromonitoring in spinal surgery
15.2. Role of Neuro Navigation in spinal surgery
15.3. Role of Robotic Surgery in spinal Surgery
15.4. USG guided root block/facet block/medial branch block in radiculopathy
15.5. MIS in the treatment of spinal infections

16. Outcome assessment in spine surgery

16.1.Pain :general aspects & instrumentation
16.2. Disability
16.3. Quality of safe
16.4. Psychological aspects work satisfactions/fear
16.5. Avoidance belief

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, युरोलोजी उपसमूह, सिनीयर रजिष्ट्रार (स्पेसलिष्ट) पद, नवौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

Civil Service Hospital

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II: Technical Subject

Section (A) – 50 % Marks

1. Embryology and surgical anatomy of retroperitoneum
   - 1.1 Kidney
   - 1.2 Uterus
   - 1.3 Adrenal gland
   - 1.4 Other retroperitoneal structures
2. Embryology and surgical anatomy of lower urinary tract with congenital anomalies
3. Development of testes and congenital defects
4. Congenital defects in urology with special reference to hypospadius, epispadius.
5. Symptoms and signs of disorders of genito uninary tract
6. Urological laboratory investigations
7. Radiological investigation of urinary tract and retroperitoneal structures
8. Renal physiology and pathophysiology of
   - 8.1 Reno vascular hypertension
   - 8.2 Ischemic nephropathy
   - 8.3 Obstructive uropathy
   - 8.4 Acute and chronic renal failures
9. Basic principles of immunology in urology and renal transplantation
10. Pathophysiology and management of urinary tract obstruction: obstructive uropathy including benign prostatic hyperplasia and prostatic cancer

Section (B) – 50 % Marks

11. Genito urinary trauma and the basic principles and management
    - 11.1 Renal trauma
    - 11.2 Ureteric trauma
    - 11.3 Bladder trauma
    - 11.4 Urethral trauma
    - 11.5 Penile trauma
    - 11.6 Scrotal trauma
12. Infection and Inflammation of uninary tract
13. Voiding functions and dysfunction
14. Physiology and pharmacology in urinary bladder and urethra
15. Neurourological evaluation
16. Neuromuscular dysfunction of lower urinary tract
17. Reproductive function and dysfunction
18. Concept of endourology
19. Concept of common urological problem and their approaches in:
    - 19.1 Heamaturia
    - 19.2 Obstructive uropathy

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19.3 Retention of urine

20. Urolithiasia and modern trend in their management.
21. Neoplasm of genito urinary system especially.
    - 21.1 Renal cell carcinoma (RCC)
    - 21.2 Transitional cell carcinoma (TCC)
    - 21.3 Cancer Penis
    - 21.4 Testicular tumors
    - 21.5 Adrenal tumors
22. Concept of urinary diversions
23. Radiotherapy and chemotherapy in urology
24. Disorders of testes, scrotum, spermatic cord and external genitalia
25. Male Infertility and Erectile dysfunction

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, सर्जरी समूह, जनरल सर्जरी उपसमूह, कन्सल्टचान्ट पद, दशौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	१००	४०	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			१००	४०	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविधिक सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Basic & Applied**
   - 1.1 **Applied Surgical Anatomy**
     - 1.1.1 Required to have acknowledge of the structure and function of all system of the body (where applicable to common clinical conditions in surgery)
     - 1.1.2 Knowledge of histology to understand the function to tissue and organs as well as growth, degeneration and repair
     - 1.1.3 Embryological basis of common congenital anomalies
   - 1.2 **System**
     - 1.2.1 Nervous system
     - 1.2.2 Respiratory system
     - 1.2.3 Cardiovascular system
     - 1.2.4 Digestive system
     - 1.2.5 Endocrine system
     - 1.2.6 Musculoskeletal system
     - 1.2.7 General – e.g. Acid-base balance, fluid and electrolyte balance, nutrition, metabolic response to trauma and sepsis, etc.

2. **Applied Physiology**

3. **Surgical Pathology**
   - 3.1 Knowledge of the surgical pathology and microbiology in the context of surgery including inflammation, infection, neoplasm, response on the tissues to injury, disturbance of growth, degeneration processes, repair and regulation
   - 3.2 Immunology and Genetics
   - 3.3 Neoplastic diseases
   - 3.4 Gross and histopathology of common surgical conditions
   - 3.5 Nervous system
   - 3.6 Respiratory system
   - 3.7 Cariovascular system
   - 3.8 Genito-urinary system
   - 3.9 Gastrointestinal system
   - 3.10 Muscleskeletal system

4. **Critical Care**
   - 4.1 Basics of pathophysiology, approach and management of critical surgical situation e.g. Trauma, shock, sepsis, organfailure
     - 4.1.1 Clinical pictures
     - 4.1.2 Investigation
     - 4.1.3 Diagnosis confirmation
     - 4.1.4 Management–use of equipments
     - 4.1.5 Monitoring–complications
     - 4.1.6 Counseling – communication
     - 4.1.7 Follow-up

5. **Recent advance**
   - 4.2 Research-inside country
   - 4.3 Recent advance–international

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4.4 Not published research work
4.5 Future national vision

Section (B) – 50 Marks

6. **Surgical Management**
   - 6.1 Principle of management of common general surgical conditions
     - 6.1.1 Clinical practice (History and examinations)
     - 6.1.2 Investigation
     - 6.1.3 Provisional Diagnosis and differentials
     - 6.1.4 Treatment-Conservative, operative, palliative
     - 6.1.5 Monitoring
     - 6.1.6 Follow-up–of the patients with general surgical condition of following systems
       - 6.1.6.1 Nervous system
       - 6.1.6.2 Respiratory system
       - 6.1.6.3 Cardiovascular system
       - 6.1.6.4 Gastrointestinal system
       - 6.1.6.5 Genitourinary system
       - 6.1.6.6 Endocrine and breast
       - 6.1.6.7 Musculo-skeletal system and soft tissue
       - 6.1.6.8 Trauma/Polytrauma

7. **Principles of Surgery**
   - 7.1 Knowledge of the General principle and practice of Surgery
     - 7.1.1 Imaging techniques/interventional Radiology
     - 7.1.2 Endoscopy/Laparoscopy
     - 7.1.3 Surgery at extremes of life
     - 7.1.4 Theatre techniques
       - 7.1.4.1 Aseptic techniques–sterilization
       - 7.1.4.2 Anesthesia in general, maintenance of homeostasis
       - 7.1.4.3 Basic techniques–suturing material dressing plaster
       - 7.1.4.4 Diathermy and electrosurgical devices
       - 7.1.4.5 Tourniquet
     - 7.1.5 Wound healing, dehiscence, scar, contractures
     - 7.1.6 Post operative complication and management
     - 7.1.7 Sepsis's surgery
       - 7.1.7.1 Acute and Chronic, inflammation
       - 7.1.7.2 Wound infection and septicemia
       - 7.1.7.3 TB, Leprosy, AIDS, Bacterial infection
       - 7.1.7.4 Antiseptic, Antibiotic policies

8. **OperationSurgery**
   - 8.1 **Nervous System**
     - 8.1.1 Exposure to extradural haematoma
     - 8.1.2 Skull traction
     - 8.1.3 Nerve repair and transplant
     - 8.1.4 Trauma–skull, strive
   - 8.2 **Respiratory System**
     - 8.2.1 F.B. in respiratory tract
     - 8.2.2 Tracheostomy, cricothyroidotomy

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8.2.3 Chest Drainage
8.2.4 Thoractomy
8.2.5 Chesttrauma (variety of injuries)

8.3 **Cardiovascular**
8.3.1 Cardiac Tamponade
8.3.2 Exposure to artery and vein,embolectomy
8.3.3 Amputations

8.4 **Gastrointestinal System**
8.4.1 All type of GI Surgery of all magnitude and types
8.4.2 Different combination of operation
8.4.3 Except-transplantation

8.5 **Genitourinary system**
8.5.1 Suprapublic bladder drainage
8.5.2 Cystocscopy
8.5.3 Exposure of kidney, calculus, obstructive uropathy
8.5.4 Perinephric abscess
8.5.5 Scrotal/testicular operation
8.5.6 Ectopic pregnancy/otherpelvicsurgery

8.6 **Endocrine and breast**
8.6.1 Thyroid/parathyroid
8.6.2 Breast surgery (noreconstruction)

8.7 **Musculoskeletal and soft tissue**
8.7.1 Simple skeletal traction
8.7.2 Compartmental syndrome
8.7.3 Bone infection

8.8 **Plastic**
8.8.1 Simple ceftlip repair
8.8.2 Skin grafting /flaps
8.8.3 Skin lesion
8.8.4 Lymph node and biopsy

8.9 **Other**
8.9.1 Venesection centralline
8.9.2 Laryngoscope, E Tintubation
8.9.3 FNAC /tru-cut needle biopsy
8.9.4 Defibrillation

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	१००	४०	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			१००	४०	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
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     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Anatomy**

1.1 **Neuro-Anatomy**

1.1.1 Neuron and its structure
1.1.2 Supportive cell type structure, cellular and myelin sheaths
1.1.3 Synapsis, neuro-effective junctions and receptors
1.1.4 Cerebrum: morphology, cerebral cortex, cortical neurons, cortical layers
1.1.5 Motorsystem: structure, corticospinal, rubrospinal,vestibulospinal and reticulospinal tracts
1.1.6 Basalganglia: structure
1.1.7 Cerebellum: morphology, cellular structure and organization
1.1.8 Brainstem: general organization
1.1.9 Spinal cord and ganglia: morphology, motor and sensory organization in the spinal cord

1.2 **Anatomy of neuro-muscular system**

1.2.1 LMN, structuring of voluntary muscles, motor units, types of muscle fibres
1.2.2 Muscle spindles and other muscles & tendon receptors
1.2.3 Sensory system
1.2.4 Reflex pathways: involving cranial nerves,and limb and trunk
1.2.5 Cranial nerves and special senses: pathways and structure of special sense organs
1.2.6 Anatomy of ventricular system and CSF production
1.2.7 Anatomy of meninges
1.2.8 Autonomic nervous system
1.2.9 Arterial and venous cerebral circulation
1.2.10 Blood brain barrier

1.3 **Pulmonology**

1.3.1 Gross anatomy of upper and lower respiratory tracts, lungs with lobes and fissureswith surface marking
1.3.2 Concept of bronch opulmonary segments and lobule or acinus aerated by aterminal bronchiole
1.3.3 Histology of alveolar lining cells
1.3.4 Pulmonary vascular bed
1.3.5 Pleura and pleural space, functions and histology
1.3.6 Media stinum and their structures
1.3.7 Thoracic cage and primary and secondary muscles of respiration
1.3.8 Thediaphragm its attachments, nerve supply and function
1.3.9 Lymphatic drainage of lungs and pleura
1.3.10 Innervation of the lungs
1.3.11 Thoracic receptors

1.4 **Cardiovascular system**

1.4.1 Gross anatomy of the heart and circulatory system
1.4.2 Histology of the cardiac muscles
1.4.3 Embryology of the heart and circulation
1.4.4 Coronary and pulmonary circulation

1.5 **Gastrointestinal tract**

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1.5.1 Gross anatomy of the gastrointestinal tract at different levels
1.5.2 Gross anatomy of the hepatobiliary system and pancreas
1.5.3 Histological aspects of GI tract at different levels
1.5.4 Blood supply and development aspects of GI tract and hepatobiliary system

1.6 **Kidney and urinary tract**
1.6.1 Gross anatomy of the kidney and urinary tract
1.6.2 Structure of nephron and function at different level
1.6.3 Development of kidney and urinary tract
1.6.4 Renal circulation

1.7 **Endocrinal organs**
1.7.1 Gross anatomy of different endocrinal organs and their development
1.7.2 Histology of different endocrinal organs

2. **Physiology**

2.1 Homeostatic behaviors of different fluid compartment in the body and implications during common clinical situations of burn, blood loss, diarrhea, vomiting, etc.
2.2 Role of pH in normal and in abnormal conditions e.g., diarrhea, vomiting, airway obstruction, medication, etc
2.3 Functions of micro/macro molecular, organelles and other structures of the cell
2.4 Nutritional requirements of normal people (different ages, male, female) and ill patients of all categories with their modality of supplement
2.5 Mechanisms of metabolic response to trauma and infection
2.6 Function of hemopoietic /R.E.system
2.7 Blood groups, methods of transfusion of blood & blood products & their hazards
2.8 Mechanism of haemostais, fibrinolysis & methods to control haemorrhage
2.9 Types of excitable tissues and methods of recording their activity e.g., EMG, EEG, ECG, etc
2.10 Cellular communication, chemical/neuronal/ electrical/synaptic transmission
2.11 Autonomic nervous system
2.12 Neuro transmitters, their synthesis and metabolism
2.13 Drugs affecting neurotransmitter activity
2.14 Cardiac and smooth muscles
2.15 Calcium metabolism
2.16 Pain and the mechanism of pain
2.17 Physiology of consciousness and sleep mechanism
2.18 Effect of injury to neurons
2.19 Different methods of monitoring of the heart functions
2.20 Drugs used for inotropic & chronotropic effects
2.21 Mechanism of blood pressure regulation
2.22 Physiology of circulation of different organ in the body
2.23 Pathophysiology of shock and principle of their management
2.24 Capillary exchange
2.25 Assess vascular functions
2.26 Respiration & cause of breathlessness
2.27 Measure blood flow
2.28 Measure/ assess blood gas
2.29 Mechanism of respiratory control
2.30 Mechanism of transport
2.31 Use of oxygen as therapy

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2.32 Mechanism of absorption from gut and physiology of gastrointestinal motility
2.33 Composition of GI and hepatobiliary secretions and methods for their assessment
2.34 Normal functions of the liver
2.35 Formation of urine
2.36 Mechanism of osmoregulation
2.37 Normal thermoregulation
2.38 Mechanism of hormone synthesis, secretion, metabolism

3. **Pathology**
3.1 Concept of cell injury, different types of degeneration & trauma
3.2 Principles of inflammation and the results of various types of inflammation
3.3 Acute and chronic inflammation
3.4 Tissue regeneration, wound healing and healing process
3.5 Various types of disorder of growth
3.6 Principles of neoplasia
3.7 Benign and malignant tumor
3.8 Mechanism of thrombosis, and embolism and their effects
3.9 Ischemia & infarction
3.10 Mechanism of blood clotting and different types of bleeding disorders
3.11 Principle of blood grouping system & complications of blood transfusion
3.12 Principle of shock
3.13 Principle of genetics and apply its concept in hereditary diseases
3.14 Principle of immune response
3.15 Humoral and cell mediated immunity
3.16 Principle of organ transplantation and causes of its rejection
3.17 Principle of Host Parasite relationship
3.18 Different types of micro-organism (Bacteria, Fungus, Parasite, and Virus)
3.19 Pathogenic and non-pathogenicmicro-organisms
3.20 Principle of asepsis & antisepsis, sterilization and disinfection
3.21 Principle of antibiotic and chemotherapy
3.22 Microbes that cause wound infection
3.23 Principle of Hospital infection (Nosocomial infection)

4. **Clinical Pharmacology**
4.1 **General clinical pharmacology**
4.1.1 Pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, drug use in childhood, pregnancy, lactation, and old age
4.1.2 Clinical trials
4.1.3 Rational drug use
4.2 **Neurosensory and musculoskeletal systems**
4.2.1 Parasympathomimetics and parasympatholytics, adrenergic and antiadrenergic drugs, narcotic and non-narcoticanalgesics, non-steroidalanti-inflammatory drugs, alcohol, sedative/hypnotics, anti-parkinsonism drugs, anesthetics (general and local), appetite suppressants
4.2.2 Drugs for psychiatric disorder, gout and rheumatoid arthritis, vertigo, and eye, ENT, and skin diseases
4.3 **Cardiovascular system**
4.3.1 Drugs for the treatment of heart failure, cardiac arrhythmias, angina pectoris, hypertension, shock, thromboembolic disorders, myocardial infarction, anemia

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4.3.2 Hemostatics, anti-coagulants, and lipid-lowering drugs

4.4 **Gastrointestinal system**
- 4.4.1 Drugs for peptic ulcer, diarrhoea, constipation
- 4.4.2 Antispasmodics, antiemetics

4.5 **Respiratory system**
- 4.5.1 Drugs for bronchial asthma
- 4.5.2 Antihistamines and other antiallergic agents
- 4.5.3 Cough preparation, nasal decongestants, and respiratory stimulants

4.6 **Reproductive/Endocrine systems**
- 4.6.1 Anti-diabetics, thyroid and anti-thyroid drugs, corticosteroids, sex hormones and antagonists, hypothalamic and pituitary hormones
- 4.6.2 Drugs used in labor and puerperium

4.7 **Renal/Electrolyte system**
- 4.7.1 Drugs for edema, and fluid/electrolyte and acid/base disturbances

4.8 **Infections**
- 4.8.1 General principle of chemotherapy
- 4.8.2 Antibacterial, antiprotozoal, anthelminthic, antifungal, and antiviral drugs

4.9 **Miscellaneous drugs**
- 4.9.1 Drugs for malignant diseases and immunosuppression
- 4.9.2 Vaccines
- 4.9.3 Vitamins and minerals
- 4.9.4 Antidotes

5. **Recent Advances in Internal Medicine and Emergencies**

5.1 Recent advances in all disciplines of Internal Medicine

5.2 Cardiovascular emergencies: Cardiac arrest, Acute MI, Cariogenic shock, Cardiacarrhythmias, Pulmonary edema, Hypertensive crisis, Acute cardiac tamponade, DVT & pulmonary embolism

5.3 Respiratory emergencies: Hemoptysis, Acute respiratory failure, Pneumothorax, Statusasthmaticus, ARDS

5.4 Gastrointestinal emergencies: G.I. bleeding, Acute gastroenteritis and food poisoning, Acute pancreatitis, Hepatic failure, Acute abdomen

5.5 Neurological emergencies: CVA including SAH, Hypertensive encephalopathy, Meningitis, Encephalitis, Unconscious patient, Status epilepticus, Myastheniagravis

5.6 Endocrine and metabolic emergencies: DKA and coma, Hypoglycemia, Hyperosmolar non ketotic diabetic coma, Thyroid crisis, Myxoedema coma, Pheochromocytoma, Acuteadrenocorticalcrisis, Hypopituitarism

5.7 Hematological emergencies: Aplastic anaemia, Agranulocytosis, Acutethromocythpenicpurpur, Leukemia, Hemophiliaandallieddisorders

5.8 Renal emergencies: Renalcolic, Renalfailure, Hematuria

5.9 Miscellaneous emergencies:
- 5.9.1 Emergencies in fluid and electrolyte balance
- 5.9.2 Acute emergencies in infectious and tropicaldisease
- 5.9.3 Malaria
- 5.9.4 Septicemia
- 5.9.5 Tetanus
- 5.9.6 Snakebite
- 5.9.7 Dog bite & rabies
- 5.9.8 Poisonings

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5.9.9 Drowning
5.9.10 Electrocution
5.9.11 High altitude sickness

Section (B) – 50 Marks

6. **Principles and Practice of Internal Medicine**

6.1 **Gastroenterology**

6.1.1 Acid peptic diseases
6.1.2 Gastrointestinal bleeding: upper (nonvariceal/variceal) and lower
6.1.3 Gastroesophageal reflux disease (GERD)
6.1.4 Dysphagia in relation to malignancy and achalasia
6.1.5 Malabsorption syndrome
6.1.6 IBD: ulcerative colitis and Crohn's disease
6.1.7 Diverticular diseases
6.1.8 Irritable bowel syndrome
6.1.9 Acute abdomen
6.1.10 Ascites
6.1.11 Liver disorders
6.1.12 Hepatitis: acute and chronic
6.1.13 Cirrhosis with special reference
6.1.14 Hepatic cellular cancer
6.1.15 Jaundice: obstructive and non-obstructive
6.1.16 Liver failure: acute and chronic
6.1.17 Pancreas
6.1.18 Acute, recurrent & chronic pancreatitis
6.1.19 Pancreatic tumor (exocrine & endocrine)
6.1.20 Cystic fibrosis & other childhood disorder of the pancreas
6.1.21 Hereditary pancreatitis
6.1.22 Pancreatic transplantation

6.2 **Respiratory Medicine**

6.2.1 Anatomy and applied physiology of the respiratory system
6.2.2 Understanding of basic pathophysiology and be able to manage the disease processes mentioned below considering the relevant differential diagnosis:
6.2.2.1 Pneumonias
6.2.2.2 Lung abscess
6.2.2.3 Tuberculosis
6.2.2.4 Fungal infections
6.2.2.5 Bronchial asthma
6.2.2.6 Chronic bronchitis, emphysema and cor-pulmonale
6.2.2.7 Cystic fibrosis
6.2.2.8 Pulmonary eosinophilia
6.2.2.9 Bronchiectasis (including its postural drainage management)
6.2.2.10 Pulmonary oedema (cardiogenic and non-cardiogenic including ARDS)
6.2.2.11 Interstitial lung disease (including fibrosingalveolitis, extrinsical veolitis, lung fibrosis, sarcoidosis and pneumoconiosis)
6.2.2.12 Carcinoma lung and other neoplasms
6.2.2.13 Mediastinal masses
6.2.2.14 Pleural diseases (e.g.,drypleurisy, pleural effusion,empyema)

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6.2.2.15 Pneumothorax
6.2.2.16 Sleepapnoea syndrome
6.2.2.17 Acute and chronic respiratory failure

6.3 **Hematology**

6.3.1 Physiology and pathophysiology of bloodcell formation and haemostasis
6.3.2 Pathophysiology, causes and management of:
6.3.2.1 Anaemia: iron deficiency (with iron metabolism), megaloblastic, haemolytic anaemia and aplastic anaemia
6.3.2.2 Haemoglobinopathy and Polycythemia
6.3.2.3 Leukaemia: myeloid (acute and chronic) and lymphoid (acute and chronic)
6.3.2.4 Myeloproliferative diseases
6.3.2.5 PV(Polycythemia Vera)
6.3.2.6 Myelofibrosis
6.3.2.7 Essential thrombocytosis
6.3.2.8 Bleeding Disorders
6.3.2.9 Plateletes Disorders
6.3.2.10 Lymphomas: Hodgkin's and NonHodgkin's
6.3.3 Explain the underlying principles and complications of:
6.3.3.1 Blood Transfusion, Blood group and Rh factor, Principles of cross match, Hazards of transfusion, Blood–platelets component, Bone MarrowTransplantation
6.3.3.2 Infectious and Tropicaldiseases
6.3.4 Understanding of the following procedures:
6.3.4.1 Peripheral blood smear
6.3.4.2 Splenicaspiration
6.3.4.3 Z– N staining
6.3.4.4 Gram's staining
6.3.4.5 Bone marrow examination
6.3.4.6 Stool examination
6.3.4.7 Aldehyde test
6.3.4.8 Liver biopsy
6.3.5 Microbiological aspects of various infectious disease
6.3.6 Underlying pathogenesis of various infectious/tropical disorders
6.3.7 Basic pharmacokinetics of drugs used for treatment of tropical and infectious diseases
6.3.8 Diagnose and manage following emergencies:
6.3.8.1 Septicemia, septic shock
6.3.8.2 Cerebral malaria/black waterfever
6.3.8.3 Tetanus/gasgangrene
6.3.8.4 Acute viral encephalitis
6.3.8.5 Hepatic Encephalopathy
6.3.8.6 Enteric Encephalopathy
6.3.8.7 HIV&AIDS

6.4 **Rheumatology**

6.4.1 Common clinical presentations of rheumatic disease
6.4.2 Systemic perspective of rheumatic diseases in different systems
6.4.3 Genetics and rheumatic diseases
6.4.4 Inflammatory arthritides (RA, SpA, crystal arthritis and others)

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6.4.5 Infection and joints (Septic arthritis and others)
6.4.6 Connective tissue diseases (SLE, systemic sclerosis and others)
6.4.7 Vasculitides
6.4.8 Diseases of bones and cartilages (osteoarthritis, osteoporosis and others)
6.4.9 Regional musculoskeletal pain syndromes
6.4.10 Miscellaneous conditions (autoinflammatory diseases, sarcoidosis & others)
6.4.11 Bone marrow aspiration
6.4.12 Bone marrow biopsy
6.4.13 Z-N staining
6.4.14 Muscle biopsy
6.4.15 Skin biopsy
6.4.16 Arthrocentesis
6.4.17 Intra–articularinjections
6.4.18 Anatomicalandphysiologicalaspectsofjointsmuscleandbloodvesselsin relation to rheumatologic conditions
6.4.19 Basisofcellularandhumoralimmuneresponse,autoimmunityandgenetherapyin rheumatological disorders
6.4.20 Interpret the results of various tests such as LEcell, ANF, antids DNA, electrophoresis, complement system
6.4.21 Analysis of synovial fluid
6.4.22 Interpret the X-ray findings of bones and joints
6.4.23 Interpretation of the results of:
6.4.23.1 Muscle biopsy
6.4.23.2 Skin biopsy
6.4.23.3 Kidney biopsy
6.4.24 To diagnose and manage rheumatologic emergencies

6.5 **Endocrinology and metabolic diseases**

6.5.1 Understanding of the following procedures:
6.5.1.1 Arterial puncture for blood gas analysis
6.5.1.2 Use of glucometer and stripes for blood sugar
6.5.1.3 Urine examination for sugar, Ketones, Specific gravity
6.5.2 Interpret the findings of the followingprocedures/tests:
6.5.2.1 Arterial blood gas analysis
6.5.2.2 Pulse oximetry
6.5.2.3 Thyroid function tests
6.5.2.4 Pituitary function tests
6.5.2.5 Parathyroid function tests
6.5.2.6 Adrenal gland functiontests
6.5.2.7 G.T.T
6.5.2.8 Sex hormone analysis
6.5.2.9 Plain X-ray of various parts concerned
6.5.3 Interpret the finding of:
6.5.3.1 FNAC report of thyroid gland
6.5.3.2 CT scan reports of various endocrine organs
6.5.4 Diagnose and manage following emergencies:
6.5.4.1 D.K.A. and comaand hyperosmolarnon ketoticcoma
6.5.4.2 Hypoglycaemia
6.5.4.3 Thyroidcrisis
6.5.4.4 Myxoedemacoma

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6.5.4.5 Phaeochromocytoma
6.5.4.6 Hypopituitarism
6.5.4.7 Hypocalcaemia
6.5.4.8 Acuteadrenocorticalcrisis
6.5.4.9 Hypopituitarism

6.5.5 Explain the structural and functionalbasis:
6.5.5.1 Various endocrine glands, homeostatic control mechanism of hormone regulation, and the genetic basis of various endocrine disorders

7. **Cardiology**

7.1 Diagnose order and interpret appropriate investigations and manage the following clinical conditions:
7.1.1 Acute Rheumatic Fever
7.1.2 Valvular heart disease: rheumatic and non-rheumatic
7.1.3 Common congenital heart diseases
7.1.4 Hypertension and hypertensive heart disease
7.1.5 Ischaemic heart disease:
7.1.5.1 Stable and unstable angina
7.1.5.2 Acute myocardial infraction
7.1.6 Cardiomyopathies: dilated cadiomyopathy, hypertrophic cardiomyopathy, restrictive cardiomyopathy
7.1.7 Pericardial diseases: pericarditis, pericardial effusion and constrictive pericarditis
7.1.8 Diseases of great arteries: coarctation of aorta, aortitis,aneurysm
7.1.9 Deepveinthrombosis: thromboembolism & pulmonaryembolism
7.1.10 Arrhythmias
7.1.10.1 Bradyarrhythmia (SA, AVblocks)
7.1.10.2 Tachyarrhythmias (SVT, VT, VF, WPW, AF, AVF)
7.1.10.3 Infective Endocarditis

7.2 Interpret the investigative of following procedures:
7.2.1 ECG with various arrhythmias
7.2.2 Stress electrocardiomyopathy
7.2.3 Echocardiogram of common acquired and congenital heart disease
7.2.4 Cardiac enzymes, pericardial fluid analysis

7.3 Diagnose and manage
7.3.1 Pulmonary oedema and cardiogenic shock
7.3.2 Dyslipidaemias
7.3.3 Corpulmonale and pulmonaryarterioal hypertension
7.3.4 Electrolyte imbalance
7.3.5 Basic science applied to cardiology
7.3.6 Fetal circulation
7.3.7 Coronary circulation
7.3.8 Pulmonary circulation
7.3.9 Embryogenesis of congenital heart diseases
7.3.10 Valvularapparatus
7.3.11 Conduction system
7.3.12 Pharmacology of cardiac drugs
7.3.13 Exercisephysiology
7.3.14 Etiopathogenesis and pathophysiology of various cardiac diseases in relation to clotting system, lipid abnormalities, infectious diseases

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7.3.15 Hemodynamics (exercise, high altitude, metabolic and hormonal disorders, fetal circulation)

8. **Nephrology**
- 8.1 Diagnose, investigate and treatment of following renal emergencies:
  - 8.1.1 Acute renal failure
  - 8.1.2 Renal colic
  - 8.1.3 Haematuria
  - 8.1.4 Fluid, electrolyte and acid-basic imbalance
- 8.2 Diagnose, investigate and treatment of following common renal diseases:
  - 8.2.1 Acute glomerulonephritis
  - 8.2.2 Nephrotic syndrome
  - 8.2.3 Urinary tract infection
  - 8.2.4 Chronicrenal failure
  - 8.2.5 Adult polycystic kidney disease, Alperts syndrome
  - 8.2.6 Diabetic Nephropathy
  - 8.2.7 Renal tubular acidosis (RTA)
  - 8.2.8 Interstitial Nephropathy
  - 8.2.9 Toxic Nephropathy
  - 8.2.10 Lupus Nephritis
  - 8.2.11 Nephrocalcinosis and Nephrolithiasis
  - 8.2.12 Renal arterystenosis (RAS)
- 8.3 Interpret investigations of:
  - 8.3.1 Renal function test(RFT)
  - 8.3.2 Blood gas analysis
  - 8.3.3 Renal biopsy report
- 8.4 Basic principles of haemodialysis and peritoneal dialysis and their specific indications

9. **Neurology**
- 9.1 Perform following procedures independently:
  - 9.1.1 Lumbar puncture
  - 9.1.2 Intrathecal injection
  - 9.1.3 Administration of IV contrastagent
- 9.2 Understanding of the following procedures
  - 9.2.1 EEG, EMG, Nerve conduction studies
- 9.3 Interpretation of the findings of:
  - 9.3.1 CT scan / MRI scan of:
    - 9.3.1.1 Subdural haematoma
    - 9.3.1.2 Intracranial haemorrhage including subarachnoid haemorrhage
    - 9.3.1.3 Infarction
    - 9.3.1.4 Obstructive hydrocephalus
  - 9.3.2 Myelogram:
    - 9.3.2.1 Complete obstruction
    - 9.3.2.2 Intramedullary compression
    - 9.3.2.3 Extramedullary compression
  - 9.3.3 Interpretation of theresults of:
    - 9.3.3.1 Muscle biopsy
    - 9.3.3.2 Nerve biopsy
    - 9.3.3.3 EEG

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9.3.3.4 EMG
9.3.3.5 Nerve conduction study
9.3.3.6 Carotid and vertebral angiogram
9.3.3.7 CT myelography

9.4 Diagnose and management the following neurological emergency:
- 9.4.1 CVA including subarachnoid haemorrhage
- 9.4.2 Meningitis
- 9.4.3 Encephalitis
- 9.4.4 Unconscious patient
- 9.4.5 Status epilepticus
- 9.4.6 Myastheniagravis
- 9.4.7 Increased Intracranialpressure
- 9.4.8 Guillain–Barre syndrome
- 9.4.9 Hypoxicencephalopathy

10. **Oncology**
- 10.1 Etiopathogenesis of cancer
- 10.2 Epidemiology of cancer
- 10.3 Cancer prevention & screening
- 10.4 Diagnosis & diagnostic tools in cancer
- 10.5 Principles of cancer management
- 10.6 Common cancers: Oesophagus, stomach, colorectum, hepatocellular cancer, cancers of the biliary tree, pancreas, breast, lung, renal cell carcinoma, prostate, testicular, GIST, ovarian, endometrial, hematological & lymphoid malignancies, cancers of the endocrine system, HIV-associated cancers, tumors of the mediastinum etc
- 10.7 Oncological emergencies & paraneoplastic syndromes
- 10.8 Anticancer therapeutics

11. **Dermatology**
- 11.1 Scabies
- 11.2 Superficial mycoses
- 11.3 Superficial bacterial infections
- 11.4 Diagnosis and management of drug induced cutaneous eruptions

12. **Psychiatry**
- 12.1 Diagnose anxiety neurosis, depression and schizophrenia
- 12.2 Differentiate between functional and organic psychoses (simple and uncomplicated)
- 12.3 Treat cases of anxiety neurosis and depression
- 12.4 Diagnose and manage substance abuse

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, अबस्ट्रेटिक्स एण्ड गाइनेकोलोजी समूह, अबस्ट्रेटिक्स एण्ड गाइनेकोलोजी उपसमूह, कन्सल्टचान्ट पद, दशौं तहका खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	१००	४०	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			१००	४०	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Obsterics**

1.1 Anatomy: Knowledge of anatomy of abdomen and pelvis applied to surgical procedures undertaken by the obstetrician and gynaecologist.

1.2 Pathology: Infection, inflammation therapeutic intervention (especially by the use of irradiation, cytotoxic drugs and hormones), disturbances in blood flow, loss of body fluids and neoplasia. Knowledge about changes in haemostasis in health and disease of a pregnant women.

1.3 Pharmacology: Knowledge of those drugs used in obstetrics and gynaecology Hormonal contraceptives in pregnancy and gonadotrophins and drugs contraindicated in pregnancy.

1.4 Immunology: Immunological changes in pregnancy; fetal development of the immune system, with particular knowledge of rhesus and isoimmunisations.

1.5 Infectious diseases: Knowledge of infectious diseases affecting pregnant and non-pregnant woman and fetus in utero. Knowledge of epidemiology, diagnostic techniques, prophylaxis, immunization and the use of antibiotics and antiviral agents.

1.6 Epidemiology and statistics: Collect data apply methods of statistical analysis. Knowledge of setting up clinical trials and the ability to interpret data through commonly used terms and techniques, interpretation of results of research, investigations, clinical trials design and medical audit.

1.7 Diagnostic imaging: Understand the application of ultrasound, computerized tomographic scanning and magnetic resonance imaging.

1.8 Radiodiagnosis: Basic chest skull and abdominal radiography in different views. Contrast radiography of different organic like IVP, Ba-series, Hysterosalphingography. Radiology of bones and joints.

1.9 Recent advances in radiology like CT, MRI and radioisotope scanning, Genetics and embryology. Detailed knowledge of normal and abnormal karyotypes, of the inheritance of genetic disorders and of the genetic causes of early abortion to diagnosis fetal abnormality, intrauterine treatment of the fetus genetics and embryology. Demonstrate the ability to explain to patients and discuss its practical and ethical implications.

1.10 Normal pregnancy: Changes maternal and fetal physiology during normal pregnancy, antepartum care its, aim and methods changes of implementation, i.e. organization of intrapartum care, including obstetrical analgesia and anaesthesia and anaesthesia, and of the normal puerperium. Importance of Nutrition during pregnancy and puerperium. Understand the importance of breast feeding and postpartum contraception.

1.11 Abnormal pregnancy: Knowledge of all aspects of abnormality during pregnancy, labor and puerperium and their management. Understand effects of pre-existing disease (obstetrical, gynaecological medical or surgical) on pregnancy and demonstrate the ability to provide informative counseling before, during and after pregnancy. Knowledge of neonatal resuscitation and of the principles of neonatal management, Respiratory distress syndrome (RDS), prematutity and congenital abnormality.

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Section (B) – 50 Marks

2. **Gynaecology**

2.1 Prepubertal gynaecology: Knowledge of normal and abnormal sexual development paediatric pathology and its management, normal puberty and its disorders and their management.

2.2 Adolescent gynaecology: Disorder of behaviour and sexual function counseling for safe living

2.3 Menstruation: Physiology of normal menstruation, pathophysiology of menstrual disorders their investigation and management. Menopause and its management.

2.4 Infertility: Causes of infertility, investigation and management of the infertile couple, techniques involved in assisted reproduction.

2.5 Infection: Sexually transmitted diseases including AIDS.

2.6 Abortion: Cause of abortion, its management, complication of therapeutic abortion and its legal aspects.

2.7 Contraception: Various method of permanent and temporary contraceptives, their uses and side effect.

2.8 Psychosexual medicine: Management of psychosexual problems including puerperal psychosis and the psycho social impact of violence against women

2.9 Urogynaecology: Surgical and non- surgical management urogynaecological problems.

2.10 Gynaecological oncology: Epidemiology and aetiology and the principles of carcinogenesis, tumor immunology and pathology. Diagnostic techniques and staging of gynaecological tumors. Treatment including surgery, radiotherapy, chemotherapy, and terminal care of patients dying due to gynaecological malignancy.

2.11 Breast: Problems of lactation and its management, Breast Lump and its management.

2.12 Obstetrical and Gynaecological surgery: Principle of obstetric and gynaecological (surgery) procedures preoperative assessment and post operative care.

2.13 Ethics and the law: Basic ethical and legal issues involved in contemporary obstetrical and gynecological practice, Introduction to ethical theories, medical ethics, Professional ethics, Ethics in research, Ethics in health policy.

2.14 Recent advances and subspeciality: Uro-gynaecology, Infertility, Gynaecology oncology,

2.15 Community obsterics and gynaecology:

2.15.1 Knowledge about basics community disease profile

2.15.2 Definitions and causes of maternal morbidity and mortality and perinatal mortality, neonatal mortality and infant mortality rate

2.15.3 Effect of socio cultural behavior in Reproductive health.

2.15.4 National Health Programmes related to Maternal and child health, continuing health services for maternal care and child health, organizing health care delivery and referral system.

2.15.5 Future vision to reduce maternal morbidity and mortality and perinatal mortality.

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	१००	४०	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			१००	४०	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
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   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
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     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
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2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
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Paper II : Technical Subject

Section (A): 50 %

1. **General Principles of Trauma**
   - 1.1 Polytrauma, Mass casualty, Disaster management
   - 1.2 Metabolic Response to trauma
   - 1.3 Blood transfusion and its products
   - 1.4 Fluid and Electrolyte balance
   - 1.5 Shock
   - 1.6 Nutritional support in surgical patient
   - 1.7 Wounds and Fracture healing

2. **Fractures and Joint Injuries**
   - 2.1 Principle of fracture, types grades, complication and its management
   - 2.2 Compartment syndrome, VIC and its management
   - 2.3 Infected Nonunion
   - 2.4 Reflex sympathetic dystrophy/ Fracture diseases.
   - 2.5 Fracture of lower extremity
   - 2.6 Fracture of hip and pelvis
   - 2.7 Fracture of upper extremity and shoulder
   - 2.8 Spinal injury
   - 2.9 Dislocation and Subluxation of joints
   - 2.10 Traumatic disorders of joints, knee, shoulder, wrist and hands
   - 2.11 Hand injury
   - 2.12 Fracture and dislocations in children

Section (B): 50 %

3. **Operative Surgery**
   - 3.1 Arthodesis
     - 3.1.1 Arthodesis of lower extremities and Hip
     - 3.1.2 Arthodesis of upper extremities
     - 3.1.3 Arthodesis of spine
   - 3.2 Arthroplasty
     - 3.2.1 Arthroplasty of Hip
     - 3.2.2 Arthroplasty of Knee
   - 3.3 Arthroscopy
     - 3.3.1 Arthroscopy of Knee
     - 3.3.2 Arthroscopy of shoulder
   - 3.4 Spinal Surgery
     - 3.4.1 Surgery for Spinal Trauma
     - 3.4.2 Surgery for Spinal infection e.g. T.B.
     - 3.4.3 Anterior and posterior instrumentation of spine
     - 3.4.4 Other Procedures described in Campbell's Operative Surgery

4. **General Orthopaedics**
   - 4.1 Diagnosis in Orthopaedics

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4.2 Infections
4.3 Rheumatic disorders
4.4 Osteoarthritis and related disorders
4.5 Osteonecrosis and Osteochondiritis
4.6 Metabolic and Endocrine disorders
4.7 Genetic disorders, dysplasia and malformations
4.8 Tumors
4.9 Neuromuscular disorders
4.10 Peripheral Nerve Injury

5. **Regional Orthopaedics**
5.1 The shoulder
5.2 Elbow
5.3 Hand
5.4 Neck
5.5 Back
5.6 Hip
5.7 Knee
5.8 Ankle and foot

6. **Recent advances in Orthopaedics Surgery**

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प्राविधिक सेवा, पेडियाट्रिक्स समूह, पेडियाट्रिक मेडिसिन उपसमूह, कन्सल्टचान्ट पद, दशौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	१००	४०	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			१००	४०	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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प्राविधिक सेवा, पेडियाट्रिक्स समूह, पेडियाट्रिक मेडिसिन उपसमूह, कन्सल्टचान्ट पद, दशौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A): 50 %

1. **Growth and development**
   - 1.1. Physical and psychosocial growth and development of normal child
   - 1.2. Disorders of growth
   - 1.3. Delay and deviations of development
   - 1.4. Assessment of growth and development
   - 1.5. Disorders of psychological development
   - 1.6. Common behavioral problems of preschool children
   - 1.7. Common speech disorders

2. **Nutrition**
   - 2.1. Normal nutrition in infancy and childhood
   - 2.2. Common nutritional disorders in childhood
   - 2.3. Nutrition supplementation programs

3. **Preventive pediatrics**
   - 3.1. Immunizations
   - 3.2. Prevention and management of common disorders of childhood
   - 3.3. Prevention and management of poisonings and accidents

4. **Social pediatrics**
   - 4.1. School health services
   - 4.2. National health programmes related to maternal and child health
   - 4.3. Community health services for the maternal and childhood
   - 4.4. Organizing health care delivery and referral systems for children

5. **Genetics**
   - 5.1. Genetic and chromosomal disorders
   - 5.2. Inborn errors of metabolism
   - 5.3. Genetic counseling including antenatal diagnosis

6. **Neonatology**
   - 6.1. Management of normal, high risk and sick neonates
   - 6.2. Monitoring and ventilatory support of the sick neonates
   - 6.3. Foetal disorders
   - 6.4. Perinatology
   - 6.5. Preventive neonatology
   - 6.6. Organization of neonatal care service in health institution with secondary level of care

Section (B): 50 %

7. **Infectious diseases:** diagnosis of common infectious diseases in the pediatric age group
8. Immunity, allergy and related disorders
9. **System based pediatrics**

   Diagnosis and management of common disorders affecting digestive, hepatobiliary, cardiovascular, respiratory, endocrine system, blood and lymphoreticular system including malignancies, genitourinary, nervous, musculoskeletal system and skin.

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10. **Eye, Ear, Nose and Throat**
    Diagnosis and management of common disorders of eye, ear, nose and throat in the pediatric age group

11. **Pediatric Surgery**
    Diagnosis and supportive management of common surgical disorders of neonates, infants and children and appropriate referral

12. **Pediatric emergencies**
    Diagnosis and management of common pediatric emergencies such as coma, convulsions, shock, asthmatic attacks, cyanotic spells, poisonings, accidents etc. Pediatric advance life support skills, pediatric anesthesia, ventilatory support, cardiovascular support and stabilization

13. **Pediatric dermatology**
    Structure and function of skin, examination of skin, Infective dermatosis (bacterial, fungal, viral, parastitic), Non-infective dermatoses (congenital, eczema, immunological, nutritional and miscellaneous), Sexually transmitted diseases, AIDS.

14. **Neoplastic disorders and tumors**
    Epidemiology, principles of diagnosis and treatment, leukaemias, lymphomas, neuroblastoma, renal neoplasms, soft tissue sarcoma, retinoblastoma, benign tumors

15. **Child psychiatry**
    15.1. Assessment and interview
    15.2. Epidemiology and etiology of psychiatric disorders in children
    15.3. Behavioural and emotional disorders
    15.4. Neurotic, stress related and somatoform disorders
    15.5. Mood disorders
    15.6. Suicide and attempted suicide
    15.7. Psychosis in childhood
    15.8. Gender identify disorders in childhood
    15.9. Psychiatric aspects of mental retardation
    15.10. Treatment of psychiatric problems in children

16. **Radiodiagnosis:**
    16.1. Interpretation of
        16.1.1. Basic chest and abdominal and abdominal radiography in different views
        16.1.2. Contrast radiography of different organs like IVP, MCU, Ba-series and myelogram
        16.1.3. Radiology of bones and joints
        16.1.4. Ultrasonography of brain, abdomen and other organs
        16.1.5. Echocardiography
    16.2. Recent advances in radiology like CT, MRI, USG, radioisotope scanning and PET

17. Recent advance in pediatric physiology, molecular biology and genetics as well in the different diagnostic and therapeutic approaches in child health

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति : आ.व.२०७९/०८० देखि

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, रेडियोलोजी समूह, रेडियो डाइग्नोसिस एण्ड इमेजीङ उपसमूह, कन्सल्टचान्ट पद, दशौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **Physics in radiology**
   - 1.1 Production of x-rays
   - 1.2 Interaction of x-rays with metals
   - 1.3 X-ray tube
   - 1.4 Radiation protection
   - 1.5 Basic physics and advances in fluoroscopy/ imaging intensifier
   - 1.6 Basic physics and advances in CR/DR system
   - 1.7 Basic physics and advances in CT
   - 1.8 Basic physics and advances in MRI
   - 1.9 Basic physics and advances in USG
   - 1.10 Introduction to nuclear medicine

2. **Sectional and Imaging anatomy**
   - 2.1 Cross-sectional & imaging anatomy of brain
   - 2.2 Cross-sectional and imaging anatomy of chest
   - 2.3 Cross-sectional and imaging anatomy of Abdomen
   - 2.4 Anatomy of orbits and its bones
   - 2.5 Vascular anatomy of brain/head
   - 2.6 Vascular anatomy of abdominal aorta and its branches
   - 2.7 Vascular anatomy of upper and lower limbs
   - 2.8 Relevant Embryology

3. **Nervous system**
   - 3.1 Craniocerebral Trauma
   - 3.2 Imaging of non-traumatic SAH
   - 3.3 Imaging of non-traumatic ICH
   - 3.4 Imaging of stroke
   - 3.5 Cerebral ischemia
   - 3.6 Brain tumors and tumor like processes
   - 3.7 Extra-axial Tumors
   - 3.8 Imaging of sellar tumours
   - 3.9 Non-neoplastic and neoplastic spinal cord pathologies

4. **Head & Neck**
   - 4.1 Radiological imaging of diseases and conditions related to Ear, Nose, Throat
   - 4.2 Radiological imaging of diseases of thyroid, salivary gland and other soft tissue neck

5. **Paediatric imaging**
   - 5.1 Imaging of the kidneys and urinary tract in children
   - 5.2 Imaging of congenital CNS malformations
   - 5.3 Respiratory Distress

6. **Recent advances in radiology and imaging**
   - 6.1 Teleradiology, Radiology Information System & PACS
   - 6.2 Newer advances in CR/ DR system, Fluoroscopy and Mammogram
   - 6.3 Newer advances in CT and MRI

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प्राविधिक सेवा, रेडियोलोजी समूह, रेडियो डाइग्नोसिस एण्ड इमेजीङ उपसमूह, कन्सल्टचान्ट पद, दशौं तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Section (B) – 50 Marks

7. **CVS & Interventional**
   - 7.1 Radiological imaging of aortic and peripheral arterial diseases
   - 7.2 Radiologic approach to pulmonary thromboembolism
   - 7.3 Heart and pericardium
   - 7.4 Congenital and acquired heart disease
   - 7.5 Image guided radiological procedures and contrast media

8. **Musculoskeletal System**
   - 8.1 Skeletal trauma
   - 8.2 Radiological imaging of bone tumors
   - 8.3 Radiological imaging of large and small joints
   - 8.4 Haemopoietic bone disorder
   - 8.5 Osteomyelitis and septic arthritis

9. **Thoracic / respiratory system**
   - 9.1 Radiological imaging of Chest
   - 9.2 Chest trauma

10. **Gastrointestinal & hepatobiliary system**
    - 10.1 Imaging of non-neoplastic / neoplastic esophageal pathology
    - 10.2 Imaging of gastric pathology
    - 10.3 Liver neoplasms
    - 10.4 Inflammatory bowel disease
    - 10.5 Imaging and interventions in GI bleed
    - 10.6 Imaging of pancreatic neoplasm

11. **Genito-urinary system**
    - 11.1 Renovascular disease
    - 11.2 Gentiurinary trauma
    - 11.3 Genito-urinary tumor
    - 11.4 Urinary bladder & Prostate imaging

12. **Breast and diagnostic ultrasound**
    - 12.1 Breast imaging
    - 12.2 Role of USG in IUGR
    - 12.3 Diagnostic ultrasound

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प्राविधिक सेवा, एनेस्थेसियोलोजी समूह समूह, एनेस्थेसियोलोजी उपसमूह, सिनियर कन्सल्टचान्ट पद, एघारौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
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2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Clinical Practice of Anaesthesia (Including relevant basic sciences)**
   - 1.1 History of Anaesthesia. From open to modern anaesthesia, balanced anaesthesia, dissociative anaesthesia and total intravenous anaesthesia
   - 1.2 Anaesthesia machines and circuits
   - 1.3 Physics of pressure measurement, manometers and strain gauges
   - 1.4 Physiology of lung mechanics, compliance, resistance, surfactant
   - 1.5 Physics of flow, laminar and turbulent, viscosity and density
   - 1.6 Respirometers and rotameters
   - 1.7 Assessment of patients, effects on choice and technique of anaeshtesia
   - 1.8 Radiological assessment of lung disorders
   - 1.9 Pharmacokinetics of anaesthetic drugs
   - 1.10 Premedication, Pharmacology of premedicants
   - 1.11 Pharmacology of intravenous induction agents
   - 1.12 Inhalation anaeshtetic agents
   - 1.13 Vaporisers and humidification
   - 1.14 Oxygen therapy and toxicity
   - 1.15 The physics of the gas laws
   - 1.16 Pharmacology of analgesics and opioids
   - 1.17 Neuromuscular blocking agents
   - 1.18 Abnormal responses, pharmacogenetics
   - 1.19 Blood transfusion
   - 1.20 Pharmacology of local anaesthetic drugs
   - 1.21 Nerve blocks
   - 1.22 Epidural and spinal anaesthesia
   - 1.23 Resuscitation
   - 1.24 Acid-base balance
   - 1.25 Blood gases
   - 1.26 Pulse oximetry, capnography
   - 1.27 Emergency anaesthesia
   - 1.28 Drugs and the autonomic nervous system
   - 1.29 Drugs used in control of blood pressure
   - 1.30 Clinical trials
   - 1.31 Use and misuse of statistics

Section (B): 50 Marks

2. **Clinical practice of Anaesthesia (Combined with relevant basic sciences)**
   - 2.1 Adrenal, pituitary, thyroid function
   - 2.2 Control of blood sugar
   - 2.3 Abnormalities of function
   - 2.4 Anaesthesia in endocrine disease
   - 2.5 Glycolysis, protein binding, fat utilization,
   - 2.6 Stress
   - 2.7 Nutrition
   - 2.8 Shock
   - 2.9 Acute and chronic pain control

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2.10 Anaeshtesia for general surgery
2.11 Obstetric anaesthesia / gynaecological surgery
2.12 Paediatric anaesthesia
2.13 Geriatric anaesthesia
2.14 Anaesthesia for thoracic surgery
2.15 Anaesthesia for neurosurgery
2.16 Cerebral blood flow and factors affecting
2.17 Anaesthesia for vascular surgery
2.18 Anaesthesia for trauma and orthopaedics
2.19 Anaesthesia for burns and plastic
2.20 Anaesthesia for head and neck surgery
2.21 Anaesthesia outside the operating theatre
2.22 Prolonged artificial ventilation
2.23 ICU organization, Special problems
2.24 Foetal circulation, changes at birth, neonatal ventilation
2.25 Neonatal and paediatric ICU problems
2.26 Anaesthesia for neonatal surgery

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प्राविधिक सेवा, मेडिसिन समूह, इन्टरनल मेडिसिन उपसमूह, सिनियर कन्सल्टचान्ट पद, एघारौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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निजामती कर्मचारी अस्पताल
प्राविधिक सेवा, मेडिसिन समूह, इन्टरनल मेडिसिन उपसमूह, सिनियर कन्सल्टचान्ट पद, एघारौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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निजामती कर्मचारी अस्पताल

प्राविधिक सेवा, मेडिसिन समूह, इन्टरनल मेडिसिन उपसमूह, सिनियर कन्सल्टचान्ट पद, एघारौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper II : Technical Subject

Section (A) – 50 Marks

1. **Anatomy**

1.1 **Neuro-Anatomy**

1.1.1 Neuron and its structure
1.1.2 Supportive cell type structure, cellular and myelin sheaths
1.1.3 Synapsis, neuro-effective junctions and receptors
1.1.4 Cerebrum: morphology, cerebral cortex, cortical neurons, cortical layers
1.1.5 Motorsystem: structure, corticospinal, rubrospinal,vestibulospinal and reticulospinal tracts
1.1.6 Basalganglia: structure
1.1.7 Cerebellum: morphology, cellular structure and organization
1.1.8 Brainstem: general organization
1.1.9 Spinal cord and ganglia: morphology, motor and sensory organization in the spinal cord

1.2 **Anatomy of neuro-muscular system**

1.2.1 LMN, structuring of voluntary muscles, motor units, types of muscle fibres
1.2.2 Muscle spindles and other muscles & tendon receptors
1.2.3 Sensory system
1.2.4 Reflex pathways: involving cranial nerves,and limb and trunk
1.2.5 Cranial nerves and special senses: pathways and structure of special sense organs
1.2.6 Anatomy of ventricular system and CSF production
1.2.7 Anatomy of meninges
1.2.8 Autonomic nervous system
1.2.9 Arterial and venous cerebral circulation
1.2.10 Blood brain barrier

1.3 **Pulmonology**

1.3.1 Gross anatomy of upper and lower respiratory tracts, lungs with lobes and fissureswith surface marking
1.3.2 Concept of bronch opulmonary segments and lobule or acinus aerated by aterminal bronchiole
1.3.3 Histology of alveolar lining cells
1.3.4 Pulmonary vascular bed
1.3.5 Pleura and pleural space, functions and histology
1.3.6 Media stinum and their structures
1.3.7 Thoracic cage and primary and secondary muscles of respiration
1.3.8 Thediaphragm its attachments, nerve supply and function
1.3.9 Lymphatic drainage of lungs and pleura
1.3.10 Innervation of the lungs
1.3.11 Thoracic receptors

1.4 **Cardiovascular system**

1.4.1 Gross anatomy of the heart and circulatory system
1.4.2 Histology of the cardiac muscles
1.4.3 Embryology of the heart and circulation
1.4.4 Coronary and pulmonary circulation

1.5 **Gastrointestinal tract**

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1.5.1 Gross anatomy of the gastrointestinal tract at different levels
1.5.2 Gross anatomy of the hepatobiliary system and pancreas
1.5.3 Histological aspects of GI tract at different levels
1.5.4 Blood supply and development aspects of GI tract and hepatobiliary system

1.6 **Kidney and urinary tract**
1.6.1 Gross anatomy of the kidney and urinary tract
1.6.2 Structure of nephron and function at different level
1.6.3 Development of kidney and urinary tract
1.6.4 Renal circulation

1.7 **Endocrinal organs**
1.7.1 Gross anatomy of different endocrinal organs and their development
1.7.2 Histology of different endocrinal organs

2. **Physiology**
2.1 Homeostatic behaviors of different fluid compartment in the body and implications during common clinical situations of burn, blood loss, diarrhea, vomiting, etc.
2.2 Role of pH in normal and in abnormal conditions e.g., diarrhea, vomiting, airway obstruction, medication, etc
2.3 Functions of micro/macro molecular, organelles and other structures of the cell
2.4 Nutritional requirements of normal people (different ages, male, female) and ill patients of all categories with their modality of supplement
2.5 Mechanisms of metabolic response to trauma and infection
2.6 Function of hemopoietic /R.E.system
2.7 Blood groups, methods of transfusion of blood & blood products & their hazards
2.8 Mechanism of haemostais, fibrinolysis & methods to control haemorrhage
2.9 Types of excitable tissues and methods of recording their activity e.g., EMG, EEG, ECG, etc
2.10 Cellular communication, chemical/neuronal/ electrical/synaptic transmission
2.11 Autonomic nervous system
2.12 Neuro transmitters, their synthesis and metabolism
2.13 Drugs affecting neurotransmitter activity
2.14 Cardiac and smooth muscles
2.15 Calcium metabolism
2.16 Pain and the mechanism of pain
2.17 Physiology of consciousness and sleep mechanism
2.18 Effect of injury to neurons
2.19 Different methods of monitoring of the heart functions
2.20 Drugs used for inotropic & chronotropic effects
2.21 Mechanism of blood pressure regulation
2.22 Physiology of circulation of different organ in the body
2.23 Pathophysiology of shock and principle of their management
2.24 Capillary exchange
2.25 Assess vascular functions
2.26 Respiration & cause of breathlessness
2.27 Measure blood flow
2.28 Measure/ assess blood gas
2.29 Mechanism of respiratory control
2.30 Mechanism of transport
2.31 Use of oxygen as therapy

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2.32 Mechanism of absorption from gut and physiology of gastrointestinal motility
2.33 Composition of GI and hepatobiliary secretions and methods for their assessment
2.34 Normal functions of the liver
2.35 Formation of urine
2.36 Mechanism of osmoregulation
2.37 Normal thermoregulation
2.38 Mechanism of hormone synthesis, secretion, metabolism

3. **Pathology**

3.1 Concept of cell injury, different types of degeneration & trauma
3.2 Principles of inflammation and the results of various types of inflammation
3.3 Acute and chronic inflammation
3.4 Tissue regeneration, wound healing and healing process
3.5 Various types of disorder of growth
3.6 Principles of neoplasia
3.7 Benign and malignant tumor
3.8 Mechanism of thrombosis, and embolism and their effects
3.9 Ischemia & infarction
3.10 Mechanism of blood clotting and different types of bleeding disorders
3.11 Principle of blood grouping system & complications of blood transfusion
3.12 Principle of shock
3.13 Principle of genetics and apply its concept in hereditary diseases
3.14 Principle of immune response
3.15 Humoral and cell mediated immunity
3.16 Principle of organ transplantation and causes of its rejection
3.17 Principle of Host Parasite relationship
3.18 Different types of micro-organism (Bacteria, Fungus, Parasite, and Virus)
3.19 Pathogenic and non-pathogenicmicro-organisms
3.20 Principle of asepsis & antisepsis, sterilization and disinfection
3.21 Principle of antibiotic and chemotherapy
3.22 Microbes that cause wound infection
3.23 Principle of Hospital infection (Nosocomial infection)

4. **Clinical Pharmacology**

4.1 **General clinical pharmacology**

4.1.1 Pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, drug use in childhood, pregnancy, lactation, and old age
4.1.2 Clinical trials
4.1.3 Rational drug use

4.2 **Neurosensory and musculoskeletal systems**

4.2.1 Parasympathomimetics and parasympatholytics, adrenergic and antiadrenergic drugs, narcotic and non-narcoticanalgesics, non-steroidalanti-inflammatory drugs, alcohol, sedative/hypnotics, anti-parkinsonism drugs, anesthetics (general and local), appetite suppressants
4.2.2 Drugs for psychiatric disorder, gout and rheumatoid arthritis, vertigo, and eye, ENT, and skin diseases

4.3 **Cardiovascular system**

4.3.1 Drugs for the treatment of heart failure, cardiac arrhythmias, angina pectoris, hypertension, shock, thromboembolic disorders, myocardial infarction, anemia

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4.3.2 Hemostatics, anti-coagulants, and lipid-lowering drugs

4.4 **Gastrointestinal system**
- 4.4.1 Drugs for peptic ulcer, diarrhoea, constipation
- 4.4.2 Antispasmodics, antiemetics

4.5 **Respiratory system**
- 4.5.1 Drugs for bronchial asthma
- 4.5.2 Antihistamines and other antiallergic agents
- 4.5.3 Cough preparation, nasal decongestants, and respiratory stimulants

4.6 **Reproductive/Endocrine systems**
- 4.6.1 Anti-diabetics, thyroid and anti-thyroid drugs, corticosteroids, sex hormones and antagonists, hypothalamic and pituitary hormones
- 4.6.2 Drugs used in labor and puerperium

4.7 **Renal/Electrolyte system**
- 4.7.1 Drugs for edema, and fluid/electrolyte and acid/base disturbances

4.8 **Infections**
- 4.8.1 General principle of chemotherapy
- 4.8.2 Antibacterial, antiprotozoal, anthelminthic, antifungal, and antiviral drugs

4.9 **Miscellaneous drugs**
- 4.9.1 Drugs for malignant diseases and immunosuppression
- 4.9.2 Vaccines
- 4.9.3 Vitamins and minerals
- 4.9.4 Antidotes

5. **Recent Advances in Internal Medicine and Emergencies**

5.1 Recent advances in all disciplines of Internal Medicine

5.2 Cardiovascular emergencies: Cardiac arrest, Acute MI, Cariogenic shock, Cardiacarrhythmias, Pulmonary edema, Hypertensive crisis, Acute cardiac tamponade, DVT & pulmonary embolism

5.3 Respiratory emergencies: Hemoptysis, Acute respiratory failure, Pneumothorax, Statusasthmaticus, ARDS

5.4 Gastrointestinal emergencies: G.I. bleeding, Acute gastroenteritis and food poisoning, Acute pancreatitis, Hepatic failure, Acute abdomen

5.5 Neurological emergencies: CVA including SAH, Hypertensive encephalopathy, Meningitis, Encephalitis, Unconscious patient, Status epilepticus, Myastheniagravis

5.6 Endocrine and metabolic emergencies: DKA and coma, Hypoglycemia, Hyperosmolar non ketotic diabetic coma, Thyroid crisis, Myxoedema coma, Pheochromocytoma, Acuteadrenocorticalcrisis, Hypopituitarism

5.7 Hematological emergencies: Aplastic anaemia, Agranulocytosis, Acutethromocythpenicpurpur, Leukemia, Hemophiliaandallieddisorders

5.8 Renal emergencies: Renalcolic, Renalfailure, Hematuria

5.9 Miscellaneous emergencies:
- 5.9.1 Emergencies in fluid and electrolyte balance
- 5.9.2 Acute emergencies in infectious and tropicaldisease
- 5.9.3 Malaria
- 5.9.4 Septicemia
- 5.9.5 Tetanus
- 5.9.6 Snakebite
- 5.9.7 Dog bite & rabies
- 5.9.8 Poisonings

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5.9.9 Drowning
5.9.10 Electrocution
5.9.11 High altitude sickness

Section (B) – 50 Marks

6. **Principles and Practice of Internal Medicine**

6.1 **Gastroenterology**

6.1.1 Acid peptic diseases
6.1.2 Gastrointestinal bleeding: upper (nonvariceal/variceal) and lower
6.1.3 Gastroesophageal reflux disease (GERD)
6.1.4 Dysphagia in relation to malignancy and achalasia
6.1.5 Malabsorption syndrome
6.1.6 IBD: ulcerative colitis and Crohn's disease
6.1.7 Diverticular diseases
6.1.8 Irritable bowel syndrome
6.1.9 Acute abdomen
6.1.10 Ascites
6.1.11 Liver disorders
6.1.12 Hepatitis: acute and chronic
6.1.13 Cirrhosis with special reference
6.1.14 Hepatic cellular cancer
6.1.15 Jaundice: obstructive and non-obstructive
6.1.16 Liver failure: acute and chronic
6.1.17 Pancreas
6.1.18 Acute, recurrent & chronic pancreatitis
6.1.19 Pancreatic tumor (exocrine & endocrine)
6.1.20 Cystic fibrosis & other childhood disorder of the pancreas
6.1.21 Hereditary pancreatitis
6.1.22 Pancreatic transplantation

6.2 **Respiratory Medicine**

6.2.1 Anatomy and applied physiology of the respiratory system
6.2.2 Understanding of basic pathophysiology and be able to manage the disease processes mentioned below considering the relevant differential diagnosis:
6.2.2.1 Pneumonias
6.2.2.2 Lung abscess
6.2.2.3 Tuberculosis
6.2.2.4 Fungal infections
6.2.2.5 Bronchial asthma
6.2.2.6 Chronic bronchitis, emphysema and cor-pulmonale
6.2.2.7 Cystic fibrosis
6.2.2.8 Pulmonary eosinophilia
6.2.2.9 Bronchiectasis (including its postural drainage management)
6.2.2.10 Pulmonary oedema (cardiogenic and non-cardiogenic including ARDS)
6.2.2.11 Interstitial lung disease (including fibrosingalveolitis, extrinsical veolitis, lung fibrosis, sarcoidosis and pneumoconiosis)
6.2.2.12 Carcinoma lung and other neoplasms
6.2.2.13 Mediastinal masses
6.2.2.14 Pleural diseases (e.g.,drypleurisy, pleural effusion,empyema)

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6.2.2.15 Pneumothorax
6.2.2.16 Sleepapnoea syndrome
6.2.2.17 Acute and chronic respiratory failure

6.3 **Hematology**

6.3.1 Physiology and pathophysiology of bloodcell formation and haemostasis
6.3.2 Pathophysiology, causes and management of:
6.3.2.1 Anaemia: iron deficiency (with iron metabolism), megaloblastic, haemolytic anaemia and aplastic anaemia
6.3.2.2 Haemoglobinopathy and Polycythemia
6.3.2.3 Leukaemia: myeloid (acute and chronic) and lymphoid (acute and chronic)
6.3.2.4 Myeloproliferative diseases
6.3.2.5 PV(Polycythemia Vera)
6.3.2.6 Myelofibrosis
6.3.2.7 Essential thrombocytosis
6.3.2.8 Bleeding Disorders
6.3.2.9 Plateletes Disorders
6.3.2.10 Lymphomas: Hodgkin's and NonHodgkin's
6.3.3 Explain the underlying principles and complications of:
6.3.3.1 Blood Transfusion, Blood group and Rh factor, Principles of cross match, Hazards of transfusion, Blood–platelets component, Bone MarrowTransplantation
6.3.3.2 Infectious and Tropicaldiseases
6.3.4 Understanding of the following procedures:
6.3.4.1 Peripheral blood smear
6.3.4.2 Splenicaspiration
6.3.4.3 Z– N staining
6.3.4.4 Gram's staining
6.3.4.5 Bone marrow examination
6.3.4.6 Stool examination
6.3.4.7 Aldehyde test
6.3.4.8 Liver biopsy
6.3.5 Microbiological aspects of various infectious disease
6.3.6 Underlying pathogenesis of various infectious/tropical disorders
6.3.7 Basic pharmacokinetics of drugs used for treatment of tropical and infectious diseases
6.3.8 Diagnose and manage following emergencies:
6.3.8.1 Septicemia, septic shock
6.3.8.2 Cerebral malaria/black waterfever
6.3.8.3 Tetanus/gasgangrene
6.3.8.4 Acute viral encephalitis
6.3.8.5 Hepatic Encephalopathy
6.3.8.6 Enteric Encephalopathy
6.3.8.7 HIV&AIDS

6.4 **Rheumatology**

6.4.1 Common clinical presentations of rheumatic disease
6.4.2 Systemic perspective of rheumatic diseases in different systems
6.4.3 Genetics and rheumatic diseases
6.4.4 Inflammatory arthritides (RA, SpA, crystal arthritis and others)

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6.4.5 Infection and joints (Septic arthritis and others)
6.4.6 Connective tissue diseases (SLE, systemic sclerosis and others)
6.4.7 Vasculitides
6.4.8 Diseases of bones and cartilages (osteoarthritis, osteoporosis and others)
6.4.9 Regional musculoskeletal pain syndromes
6.4.10 Miscellaneous conditions (autoinflammatory diseases, sarcoidosis & others)
6.4.11 Bone marrow aspiration
6.4.12 Bone marrow biopsy
6.4.13 Z-N staining
6.4.14 Muscle biopsy
6.4.15 Skin biopsy
6.4.16 Arthrocentesis
6.4.17 Intra–articularinjections
6.4.18 Anatomicalandphysiologicalaspectsofjointsmuscleandbloodvesselsin relation to rheumatologic conditions
6.4.19 Basisofcellularandhumoralimmuneresponse,autoimmunityandgenetherapyin rheumatological disorders
6.4.20 Interpret the results of various tests such as LEcell, ANF, antids DNA, electrophoresis, complement system
6.4.21 Analysis of synovial fluid
6.4.22 Interpret the X-ray findings of bones and joints
6.4.23 Interpretation of the results of:
6.4.23.1 Muscle biopsy
6.4.23.2 Skin biopsy
6.4.23.3 Kidney biopsy
6.4.24 To diagnose and manage rheumatologic emergencies

6.5 **Endocrinology and metabolic diseases**

6.5.1 Understanding of the following procedures:
6.5.1.1 Arterial puncture for blood gas analysis
6.5.1.2 Use of glucometer and stripes for blood sugar
6.5.1.3 Urine examination for sugar, Ketones, Specific gravity
6.5.2 Interpret the findings of the followingprocedures/tests:
6.5.2.1 Arterial blood gas analysis
6.5.2.2 Pulse oximetry
6.5.2.3 Thyroid function tests
6.5.2.4 Pituitary function tests
6.5.2.5 Parathyroid function tests
6.5.2.6 Adrenal gland functiontests
6.5.2.7 G.T.T
6.5.2.8 Sex hormone analysis
6.5.2.9 Plain X-ray of various parts concerned
6.5.3 Interpret the finding of:
6.5.3.1 FNAC report of thyroid gland
6.5.3.2 CT scan reports of various endocrine organs
6.5.4 Diagnose and manage following emergencies:
6.5.4.1 D.K.A. and comaand hyperosmolarnon ketoticcoma
6.5.4.2 Hypoglycaemia
6.5.4.3 Thyroidcrisis
6.5.4.4 Myxoedemacoma

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6.5.4.5 Phaeochromocytoma
6.5.4.6 Hypopituitarism
6.5.4.7 Hypocalcaemia
6.5.4.8 Acuteadrenocorticalcrisis
6.5.4.9 Hypopituitarism

6.5.5 Explain the structural and functionalbasis:
6.5.5.1 Various endocrine glands, homeostatic control mechanism of hormone regulation, and the genetic basis of various endocrine disorders

7. **Cardiology**

7.1 Diagnose order and interpret appropriate investigations and manage the following clinical conditions:
7.1.1 Acute Rheumatic Fever
7.1.2 Valvular heart disease: rheumatic and non-rheumatic
7.1.3 Common congenital heart diseases
7.1.4 Hypertension and hypertensive heart disease
7.1.5 Ischaemic heart disease:
7.1.5.1 Stable and unstable angina
7.1.5.2 Acute myocardial infraction
7.1.6 Cardiomyopathies: dilated cadiomyopathy, hypertrophic cardiomyopathy, restrictive cardiomyopathy
7.1.7 Pericardial diseases: pericarditis, pericardial effusion and constrictive pericarditis
7.1.8 Diseases of great arteries: coarctation of aorta, aortitis,aneurysm
7.1.9 Deepveinthrombosis: thromboembolism & pulmonaryembolism
7.1.10 Arrhythmias
7.1.10.1 Bradyarrhythmia (SA, AVblocks)
7.1.10.2 Tachyarrhythmias (SVT, VT, VF, WPW, AF, AVF)
7.1.10.3 Infective Endocarditis

7.2 Interpret the investigative of following procedures:
7.2.1 ECG with various arrhythmias
7.2.2 Stress electrocardiomyopathy
7.2.3 Echocardiogram of common acquired and congenital heart disease
7.2.4 Cardiac enzymes, pericardial fluid analysis

7.3 Diagnose and manage
7.3.1 Pulmonary oedema and cardiogenic shock
7.3.2 Dyslipidaemias
7.3.3 Corpulmonale and pulmonaryarterioal hypertension
7.3.4 Electrolyte imbalance
7.3.5 Basic science applied to cardiology
7.3.6 Fetal circulation
7.3.7 Coronary circulation
7.3.8 Pulmonary circulation
7.3.9 Embryogenesis of congenital heart diseases
7.3.10 Valvularapparatus
7.3.11 Conduction system
7.3.12 Pharmacology of cardiac drugs
7.3.13 Exercisephysiology
7.3.14 Etiopathogenesis and pathophysiology of various cardiac diseases in relation to clotting system, lipid abnormalities, infectious diseases

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7.3.15 Hemodynamics (exercise, high altitude, metabolic and hormonal disorders, fetal circulation)

8. **Nephrology**
- 8.1 Diagnose, investigate and treatment of following renal emergencies:
  - 8.1.1 Acute renal failure
  - 8.1.2 Renal colic
  - 8.1.3 Haematuria
  - 8.1.4 Fluid, electrolyte and acid-basic imbalance
- 8.2 Diagnose, investigate and treatment of following common renal diseases:
  - 8.2.1 Acute glomerulonephritis
  - 8.2.2 Nephrotic syndrome
  - 8.2.3 Urinary tract infection
  - 8.2.4 Chronicrenal failure
  - 8.2.5 Adult polycystic kidney disease, Alperts syndrome
  - 8.2.6 Diabetic Nephropathy
  - 8.2.7 Renal tubular acidosis (RTA)
  - 8.2.8 Interstitial Nephropathy
  - 8.2.9 Toxic Nephropathy
  - 8.2.10 Lupus Nephritis
  - 8.2.11 Nephrocalcinosis and Nephrolithiasis
  - 8.2.12 Renal arterystenosis (RAS)
- 8.3 Interpret investigations of:
  - 8.3.1 Renal function test(RFT)
  - 8.3.2 Blood gas analysis
  - 8.3.3 Renal biopsy report
- 8.4 Basic principles of haemodialysis and peritoneal dialysis and their specific indications

9. **Neurology**
- 9.1 Perform following procedures independently:
  - 9.1.1 Lumbar puncture
  - 9.1.2 Intrathecal injection
  - 9.1.3 Administration of IV contrastagent
- 9.2 Understanding of the following procedures
  - 9.2.1 EEG, EMG, Nerve conduction studies
- 9.3 Interpretation of the findings of:
  - 9.3.1 CT scan / MRI scan of:
    - 9.3.1.1 Subdural haematoma
    - 9.3.1.2 Intracranial haemorrhage including subarachnoid haemorrhage
    - 9.3.1.3 Infarction
    - 9.3.1.4 Obstructive hydrocephalus
  - 9.3.2 Myelogram:
    - 9.3.2.1 Complete obstruction
    - 9.3.2.2 Intramedullary compression
    - 9.3.2.3 Extramedullary compression
  - 9.3.3 Interpretation of theresults of:
    - 9.3.3.1 Muscle biopsy
    - 9.3.3.2 Nerve biopsy
    - 9.3.3.3 EEG

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9.3.3.4 EMG
9.3.3.5 Nerve conduction study
9.3.3.6 Carotid and vertebral angiogram
9.3.3.7 CT myelography

9.4 Diagnose and management the following neurological emergency:
- 9.4.1 CVA including subarachnoid haemorrhage
- 9.4.2 Meningitis
- 9.4.3 Encephalitis
- 9.4.4 Unconscious patient
- 9.4.5 Status epilepticus
- 9.4.6 Myastheniagravis
- 9.4.7 Increased Intracranialpressure
- 9.4.8 Guillain–Barre syndrome
- 9.4.9 Hypoxicencephalopathy

10. **Oncology**
- 10.1 Etiopathogenesis of cancer
- 10.2 Epidemiology of cancer
- 10.3 Cancer prevention & screening
- 10.4 Diagnosis & diagnostic tools in cancer
- 10.5 Principles of cancer management
- 10.6 Common cancers: Oesophagus, stomach, colorectum, hepatocellular cancer, cancers of the biliary tree, pancreas, breast, lung, renal cell carcinoma, prostate, testicular, GIST, ovarian, endometrial, hematological & lymphoid malignancies, cancers of the endocrine system, HIV-associated cancers, tumors of the mediastinum etc
- 10.7 Oncological emergencies & paraneoplastic syndromes
- 10.8 Anticancer therapeutics

11. **Dermatology**
- 11.1 Scabies
- 11.2 Superficial mycoses
- 11.3 Superficial bacterial infections
- 11.4 Diagnosis and management of drug induced cutaneous eruptions

12. **Psychiatry**
- 12.1 Diagnose anxiety neurosis, depression and schizophrenia
- 12.2 Differentiate between functional and organic psychoses (simple and uncomplicated)
- 12.3 Treat cases of anxiety neurosis and depression
- 12.4 Diagnose and manage substance abuse

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प्राविधिक सेवा, अबस्ट्रेटिक्स एण्ड गाइनेकोलोजी समूह, अबस्ट्रेटिक्स एण्ड गाइनेकोलोजी उपसमूह, सिनियर कन्सल्टचान्ट पद, एघारौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject

Part I: Management

(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
     - 1.7.3 Leadership: Concept, function, leadership styles, leadership and management
     - 1.7.4 Coordination: Concept, types, techniques of effective coordination
     - 1.7.5 Communication and counselling: Concept, communication processes and barrier to effective communication, techniques for improving communication
     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
     - 1.7.9 Conflict management: Concept, approaches to conflict, levels of conflict, causes of conflict and strategies for conflict management
     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues

(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
2.14. International Health Agencies: Roles and responsibilities of WHO, UNICEF, UNFPA, Inter-agency relationships, Government-agency coordination: Joint Annual Review meeting
2.15. Supervision, types and its usage in health sector
2.16. Monitoring and evaluation system in health sector
2.17. National Health Training Centre
2.18. National and International Disaster Plan, Coordination
2.19. General introduction of Civil Service Hospital and its Bylaws

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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Obsterics**
   - 1.1 Anatomy: Knowledge of anatomy of abdomen and pelvis applied to surgical procedures undertaken by the obstetrician and gynaecologist.
   - 1.2 Pathology: Infection, inflammation therapeutic intervention (especially by the use of irradiation, cytotoxic drugs and hormones), disturbances in blood flow, loss of body fluids and neoplasia. Knowledge about changes in haemostasis in health and disease of a pregnant women.
   - 1.3 Pharmacology: Knowledge of those drugs used in obstetrics and gynaecology Hormonal contraceptives in pregnancy and gonadotrophins and drugs contraindicated in pregnancy.
   - 1.4 Immunology: Immunological changes in pregnancy; fetal development of the immune system, with particular knowledge of rhesus and isoimmunisations.
   - 1.5 Infectious diseases: Knowledge of infectious diseases affecting pregnant and non-pregnant woman and fetus in utero. Knowledge of epidemiology, diagnostic techniques, prophylaxis, immunization and the use of antibiotics and antiviral agents.
   - 1.6 Epidemiology and statistics: Collect data apply methods of statistical analysis. Knowledge of setting up clinical trials and the ability to interpret data through commonly used terms and techniques, interpretation of results of research, investigations, clinical trials design and medical audit.
   - 1.7 Diagnostic imaging: Understand the application of ultrasound, computerized tomographic scanning and magnetic resonance imaging.
   - 1.8 Radiodiagnosis: Basic chest skull and abdominal radiography in different views. Contrast radiography of different organic like IVP, Ba-series, Hysterosalphingography. Radiology of bones and joints.
   - 1.9 Recent advances in radiology like CT, MRI and radioisotope scanning, Genetics and embryology. Detailed knowledge of normal and abnormal karyotypes, of the inheritance of genetic disorders and of the genetic causes of early abortion to diagnosis fetal abnormality, intrauterine treatment of the fetus genetics and embryology. Demonstrate the ability to explain to patients and discuss its practical and ethical implications.
   - 1.10 Normal pregnancy: Changes maternal and fetal physiology during normal pregnancy, antepartum care its, aim and methods changes of implementation, i.e. organization of intrapartum care, including obstetrical analgesia and anaesthesia and anaesthesia, and of the normal puerperium. Importance of Nutrition during pregnancy and puerperium. Understand the importance of breast feeding and postpartum contraception.
   - 1.11 Abnormal pregnancy: Knowledge of all aspects of abnormality during pregnancy, labor and puerperium and their management. Understand effects of pre-existing disease (obstetrical, gynaecological medical or surgical) on pregnancy and demonstrate the ability to provide informative counseling before, during and after pregnancy. Knowledge of neonatal resuscitation and of the principles of neonatal management, Respiratory distress syndrome (RDS), prematutity and congenital abnormality.

Section (B): 50 Marks

2. **Gynaecology**
   - 2.1 Prepubertal gynaecology: Knowledge of normal and abnormal sexual development paediatric pathology and its management, normal puberty and its disorders and their management.
   - 2.2 Adolescent gynaecology: Disorder of behaviour and sexual function counseling for safe

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2.3 Menstruation: Physiology of normal menstruation, pathophysiology of menstrual disorders their investigation and management. Menopause and its management.

2.4 Infertility: Causes of infertility, investigation and management of the infertile couple, techniques involved in assisted reproduction.

2.5 Infection: Sexually transmitted diseases including AIDS.

2.6 Abortion: Cause of abortion, its management, complication of therapeutic abortion and its legal aspects.

2.7 Contraception: Various method of permanent and temporary contraceptives, their uses and side effect.

2.8 Psychosexual medicine: Management of psychosexual problems including puerperal psychosis and the psycho social impact of violence against women

2.9 Urogynaecology: Surgical and non- surgical management urogynaecological problems.

2.10 Gynaecological oncology: Epidemiology and aetiology and the principles of carcinogenesis, tumor immunology and pathology. Diagnostic techniques and staging of gynaecological tumors. Treatment including surgery, radiotherapy, chemotherapy, and terminal care of patients dying due to gynaecological malignancy.

2.11 Breast: Problems of lactation and its management, Breast Lump and its management.

2.12 Obstetrical and Gynaecological surgery: Principle of obstetric and gynaecological (surgery) procedures preoperative assessment and post operative care.

2.13 Ethics and the law: Basic ethical and legal issues involved in contemporary obstetrical and gynecological practice, Introduction to ethical theories, medical ethics, Professional ethics, Ethics in research, Ethics in health policy.

2.14 Recent advances and subspeciality: Uro-gynaecology, Infertility, Gynaecology oncology,

2.15 Community obsterics and gynaecology:

2.15.1 Knowledge about basics community disease profile

2.15.2 Definitions and causes of maternal morbidity and mortality and perinatal mortality, neonatal mortality and infant mortality rate

2.15.3 Effect of socio cultural behavior in Reproductive health.

2.15.4 National Health Programmes related to Maternal and child health, continuing health services for maternal care and child health, organizing health care delivery and referral system.

2.15.5 Future vision to reduce maternal morbidity and mortality and perinatal mortality.

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प्राविधिक सेवा, सर्जरी समूह, अर्थोपेडिक सर्जरी उपसमूह, सिनियर कन्सल्टचान्ट पद, एघारौं तहको खुला तथा आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
   - 1.3. Effective hospital management principles
   - 1.4. Purpose of medical and non-medical data and records
   - 1.5. Ethics and responsibility of management
   - 1.6. Concept of management and its application in health care including hospital
     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
     - 1.7.2 Planning: Concept, principles, nature, types, instruments and steps
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     - 1.7.6 Decision making: Importance, types, rational process of decision making, problem solving techniques, improving decision making
     - 1.7.7 Participative management: Concept, advantage and disadvantage, techniques of participation
     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
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     - 1.7.10 Stress management: Concept, causes and sources of stress, techniques of stress management
     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
     - 1.7.12 Appreciative inquiry: Concept, basic principle and management
     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
   - 2.3. Professional council and related regulations
   - 2.4. National Health Policy
   - 2.5. Health Service Act and Regulation
   - 2.6. Second Long term health plan
   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
2.12. Alternative health care system: Ayurveda, homeopathy, Unani, Chinese etc.
2.13. Indigenous and traditional faith health and health practices
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Paper II : Technical Subject

Section (A): 50 %

1. **General Principles of Trauma**
   - 1.1 Polytrauma, Mass casualty, Disaster management
   - 1.2 Metabolic Response to trauma
   - 1.3 Blood transfusion and its products
   - 1.4 Fluid and Electrolyte balance
   - 1.5 Shock
   - 1.6 Nutritional support in surgical patient
   - 1.7 Wounds and Fracture healing

2. **Fractures and Joint Injuries**
   - 2.1 Principle of fracture, types grades, complication and its management
   - 2.2 Compartment syndrome, VIC and its management
   - 2.3 Infected Nonunion
   - 2.4 Reflex sympathetic dystrophy/ Fracture diseases.
   - 2.5 Fracture of lower extremity
   - 2.6 Fracture of hip and pelvis
   - 2.7 Fracture of upper extremity and shoulder
   - 2.8 Spinal injury
   - 2.9 Dislocation and Subluxation of joints
   - 2.10 Traumatic disorders of joints, knee, shoulder, wrist and hands
   - 2.11 Hand injury
   - 2.12 Fracture and dislocations in children

Section (B): 50 %

3. **Operative Surgery**
   - 3.1 Arthodesis
     - 3.1.1 Arthodesis of lower extremities and Hip
     - 3.1.2 Arthodesis of upper extremities
     - 3.1.3 Arthodesis of spine
   - 3.2 Arthroplasty
     - 3.2.1 Arthroplasty of Hip
     - 3.2.2 Arthroplasty of Knee
   - 3.3 Arthroscopy
     - 3.3.1 Arthroscopy of Knee
     - 3.3.2 Arthroscopy of shoulder
   - 3.4 Spinal Surgery
     - 3.4.1 Surgery for Spinal Trauma
     - 3.4.2 Surgery for Spinal infection e.g. T.B.
     - 3.4.3 Anterior and posterior instrumentation of spine
     - 3.4.4 Other Procedures described in Campbell's Operative Surgery

4. **General Orthopaedics**
   - 4.1 Diagnosis in Orthopaedics

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4.2 Infections
4.3 Rheumatic disorders
4.4 Osteoarthritis and related disorders
4.5 Osteonecrosis and Osteochondiritis
4.6 Metabolic and Endocrine disorders
4.7 Genetic disorders, dysplasia and malformations
4.8 Tumors
4.9 Neuromuscular disorders
4.10 Peripheral Nerve Injury

5. **Regional Orthopaedics**
5.1 The shoulder
5.2 Elbow
5.3 Hand
5.4 Neck
5.5 Back
5.6 Hip
5.7 Knee
5.8 Ankle and foot

6. **Recent advances in Orthopaedics Surgery**

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजनगरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

१. प्रथम चरण (First Phase): **परीक्षा योजना** (Examination Scheme)

Paper	Subject		Marks	Full Marks	Pass Marks	No. Questions & Weightage	Time
I	General Subject	Part I: Management	50	100	40	6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	3.00 hrs
		Part II: General Health Issues	50			6 × 5 = 30 (Short answer) 2 × 10 = 20 (Long answer)	
II	Technical Subject			100	40	4 × 15 = 60 (Critical Analysis) 2 × 20 = 40 (Problem Solving)	3.00 hrs

२. द्वितीय चरण (Second Phase)

Subject	Full Marks	Examination System
Interview	30	Oral

द्रष्टव्य :

१. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुन सक्नेछ ।

२. अस्पतालको प्राविकि सेवा अन्तर्गतका सबै समूह/सबै उपसमूहहरुको लागि प्रथमपत्रको पाठ्यक्रमको विषयवस्तु एउटै हुनेछ । तर द्वितीयपत्र Technical Subject को पाठ्यक्रम समूह/उपसमूह अनुरुप फरक फरक हुनेछ ।

३. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । परीक्षामा सोधिने **प्रश्नसंख्या र अङ्कभार** यथासम्भव सम्बन्धित पत्र, विषयमा दिईए अनुसार हुनेछ ।

४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

७. विषयगत प्रश्नहरुको हकमा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

८. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

९. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम, विनियम तथा नीतिहरु परीक्षाको मितिभन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

१०. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

११. पाठ्यक्रम लागु मिति :

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Paper I: General Subject
Part I: Management
(6 × 5) + (2 × 10) = 50 Marks

1. **Management**
   - 1.1. Health care management system in Nepal and other parts of the world
   - 1.2. Fundamental principles of healthcare institution and hospital management.
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   - 1.4. Purpose of medical and non-medical data and records
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     - 1.7.1 Management: Concept, principles, functions, scope and role, level and skills of manager
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     - 1.7.8 Time management: Concept, essential factors and strategies for effective time management
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     - 1.7.11 Change management: Concept, sources of organizational change, resistance to change, management of resistance to change
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     - 1.7.13 Human resource management: Concept, functions and different aspects
     - 1.7.14 Health manpower recruitment and development
     - 1.7.15 Financial management: Concept, approaches, budget formulation and implementation, Auditing and topics related to fiscal administration

Part II: General Health Issues
(6 × 5) + (2 × 10) = 50 Marks

2. **General Health Issues**
   - 2.1. Present constitution of federal republic of Nepal (including health and welfare issues)
   - 2.2. Organizational structure of Ministry of Health at national/federal, regional/state, district (if applicable), municipal and village council level
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   - 2.7. Health Management Information System, forms, indicators, annual reports
   - 2.8. Human Development Indices, Sustainable Development Goals
   - 2.9. Health volunteers in the national health system, its rationale, use and effectiveness

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2.10. Local governance and community participation in health service delivery
2.11. Health Insurance and financing in health care
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Paper II : Technical Subject

Section (A) – 50 Marks

1. **Basic & Applied**
   - 1.1 **Applied Surgical Anatomy**
     - 1.1.1 Required to have acknowledge of the structure and function of all system of the body (where applicable to common clinical conditions in surgery)
     - 1.1.2 Knowledge of histology to understand the function to tissue and organs as well as growth, degeneration and repair
     - 1.1.3 Embryological basis of common congenital anomalies
   - 1.2 **System**
     - 1.2.1 Nervous system
     - 1.2.2 Respiratory system
     - 1.2.3 Cardiovascular system
     - 1.2.4 Digestive system
     - 1.2.5 Endocrine system
     - 1.2.6 Musculoskeletal system
     - 1.2.7 General – e.g. Acid-base balance, fluid and electrolyte balance, nutrition, metabolic response to trauma and sepsis, etc.

2. **Applied Physiology**

3. **Surgical Pathology**
   - 3.1 Knowledge of the surgical pathology and microbiology in the context of surgery including inflammation, infection, neoplasm, response on the tissues to injury, disturbance of growth, degeneration processes, repair and regulation
   - 3.2 Immunology and Genetics
   - 3.3 Neoplastic diseases
   - 3.4 Gross and histopathology of common surgical conditions
   - 3.5 Nervous system
   - 3.6 Respiratory system
   - 3.7 Cariovascular system
   - 3.8 Genito-urinary system
   - 3.9 Gastrointestinal system
   - 3.10 Muscleskeletal system

4. **Critical Care**
   - 4.1 Basics of pathophysiology, approach and management of critical surgical situation e.g. Trauma, shock, sepsis, organfailure
     - 4.1.1 Clinical pictures
     - 4.1.2 Investigation
     - 4.1.3 Diagnosis confirmation
     - 4.1.4 Management–use of equipments
     - 4.1.5 Monitoring–complications
     - 4.1.6 Counseling – communication
     - 4.1.7 Follow-up

5. **Recent advance**
   - 4.2 Research-inside country
   - 4.3 Recent advance–international

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4.4 Not published research work
4.5 Future national vision

Section (B) – 50 Marks

6. **Surgical Management**
   - 6.1 Principle of management of common general surgical conditions
     - 6.1.1 Clinical practice (History and examinations)
     - 6.1.2 Investigation
     - 6.1.3 Provisional Diagnosis and differentials
     - 6.1.4 Treatment-Conservative, operative, palliative
     - 6.1.5 Monitoring
     - 6.1.6 Follow-up–of the patients with general surgical condition of following systems
       - 6.1.6.1 Nervous system
       - 6.1.6.2 Respiratory system
       - 6.1.6.3 Cardiovascular system
       - 6.1.6.4 Gastrointestinal system
       - 6.1.6.5 Genitourinary system
       - 6.1.6.6 Endocrine and breast
       - 6.1.6.7 Musculo-skeletal system and soft tissue
       - 6.1.6.8 Trauma/Polytrauma

7. **Principles of Surgery**
   - 7.1 Knowledge of the General principle and practice of Surgery
     - 7.1.1 Imaging techniques/interventional Radiology
     - 7.1.2 Endoscopy/Laparoscopy
     - 7.1.3 Surgery at extremes of life
     - 7.1.4 Theatre techniques
       - 7.1.4.1 Aseptic techniques–sterilization
       - 7.1.4.2 Anesthesia in general, maintenance of homeostasis
       - 7.1.4.3 Basic techniques–suturing material dressing plaster
       - 7.1.4.4 Diathermy and electrosurgical devices
       - 7.1.4.5 Tourniquet
     - 7.1.5 Wound healing, dehiscence, scar, contractures
     - 7.1.6 Post operative complication and management
     - 7.1.7 Sepsis's surgery
       - 7.1.7.1 Acute and Chronic, inflammation
       - 7.1.7.2 Wound infection and septicemia
       - 7.1.7.3 TB, Leprosy, AIDS, Bacterial infection
       - 7.1.7.4 Antiseptic, Antibiotic policies

8. **OperationSurgery**
   - 8.1 **Nervous System**
     - 8.1.1 Exposure to extradural haematoma
     - 8.1.2 Skull traction
     - 8.1.3 Nerve repair and transplant
     - 8.1.4 Trauma–skull, strive
   - 8.2 **Respiratory System**
     - 8.2.1 F.B. in respiratory tract
     - 8.2.2 Tracheostomy, cricothyroidotomy

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8.2.3 Chest Drainage
8.2.4 Thoractomy
8.2.5 Chesttrauma (variety of injuries)

8.3 **Cardiovascular**
8.3.1 Cardiac Tamponade
8.3.2 Exposure to artery and vein,embolectomy
8.3.3 Amputations

8.4 **Gastrointestinal System**
8.4.1 All type of GI Surgery of all magnitude and types
8.4.2 Different combination of operation
8.4.3 Except-transplantation

8.5 **Genitourinary system**
8.5.1 Suprapublic bladder drainage
8.5.2 Cystocscopy
8.5.3 Exposure of kidney, calculus, obstructive uropathy
8.5.4 Perinephric abscess
8.5.5 Scrotal/testicular operation
8.5.6 Ectopic pregnancy/otherpelvicsurgery

8.6 **Endocrine and breast**
8.6.1 Thyroid/parathyroid
8.6.2 Breast surgery (noreconstruction)

8.7 **Musculoskeletal and soft tissue**
8.7.1 Simple skeletal traction
8.7.2 Compartmental syndrome
8.7.3 Bone infection

8.8 **Plastic**
8.8.1 Simple ceftlip repair
8.8.2 Skin grafting /flaps
8.8.3 Skin lesion
8.8.4 Lymph node and biopsy

8.9 **Other**
8.9.1 Venesection centralline
8.9.2 Laryngoscope, E Tintubation
8.9.3 FNAC /tru-cut needle biopsy
8.9.4 Defibrillation

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यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– ५०
द्वितीय चरण :– प्रयोगात्मक परीक्षा पूर्णाङ्क :– ५०
अन्तर्वार्ता (Interview) पूर्णाङ्क :– २०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	५०	२०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x १ अङ्क	४५ मिनेट

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		समय
प्रयोगात्मक परीक्षा	५०	२५	प्रयोगात्मक/ अभ्यास		
अन्तर्वार्ता	२०	–	मौखिक		

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।
२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
३. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।
४. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
५. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।
६. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।
११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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Paper I : Technical subject

१. सुरक्षित यातायात सम्बन्धी ज्ञान

१.१ सवारी चलाउँदा साथमा राख्नु पर्ने कागजपत्रहरु सम्बन्धी ज्ञान (सवारी चालक अनुमती पत्र, सवारी दर्ता प्रमाण पत्र, प्रदूषण मुक्त प्रमाण पत्र (तोकिएका सडकको लागि) , बाटो इजाजत पत्र, सवारी जाँचपास प्रमाणपत्र, आदि)

१.२ सवारी चालकको अवस्था (स्वस्थ, नथाकेको, राम्ररी देख्न सक्ने, रक्सी तथा लागू पदार्थ सेवन नगरेको)

१.३ सवारी चलाउँदा ध्यान दिनुपर्ने (सवारी सडकको वायाँ तर्फ चलाउने, सकभर वायाँ साइड च्याप्ने, अन्य सडक प्रयोगकर्ताले बुझ्ने संकेत दिने, उपयुक्त गतिमा सवारी चलाउने, ट्राफिक चिन्ह तथा संकेतको पालना, हर्नको सकभर कम प्रयोग, पदयात्रुको ख्याल राख्ने)

१.४ सवारी साधन रोक्ने ठाउँ (तोकिएको ठाउँमा मात्र, जेब्रा क्रसिङ्गको १५ मीटर दुबै तर्फ नरोक्ने, सडकको एकदम छेउ च्यापेर रोक्ने, मोडमा, पुलमा र सिंगललेन सडकमा नरोक्ने

१.५ चोकहरुमा सवारी चलाउँदा,राती सवारी चलाउँदा, सवारी पछाडि हटाउँदा, सवारी बिग्रँदा उछिन्ने (ओभरटेक) कार्य जस्ता कार्यहरु गर्दा के के कुराहरुमा ध्यान दिनुपर्छ सो सम्बन्धी जानकारी ।

१.६ सवारीको भार (सवारी साधनको कानूनी अधिकतम भार, .सामान सुरक्षित रुपमा राख्ने तरिका, सवारीको बढी भारको असरहरु, सवारीको लम्बाई, सिट क्षमता)

१.७ दुर्घटना परेमा गर्ने कार्यहरु

२. ट्राफिक ज्ञान

२.१ प्रहरीले दिने हातको संकेत

२.२ ट्राफिक चिन्ह (आदेशमूलक, चेतावनीमूलक र जानकारीमूलक)

२.३ सडक रेखाहरु (लम्बाई भागका रेखाहरु, सडक छेउका रेखाहरु, चौडाई भागका रेखाहरु, पदयात्रुले बाटो काट्ने ठाउँ जनाउने रेखाहरु)

२.४ ट्राफिक बत्तीका संकेतहरु

२.५ ऐनाको प्रयोग

२.६ हर्नको प्रयोग

२.७ उछिन्ने कार्य

२.८ मोडहरु लिने (दायाँ, बायाँ र पूरा मोड्ने)

२.९ लेन अनुशासन

२.१० प्राथमिकता (गोल घुम्तीमा, बत्ती संकेत भएको चोकमा, मूल सडकमा, प्राथमिकता प्राप्त सवारीहरु)

३. यान्त्रिक ज्ञान

३.१ परिचय

३.१.१ सवारीको फ्रेम तथा चेसिसको भिन्नता बारे जानकारी

३.१.२ सवारी तथा यातायात व्यवस्था नियमावली, २०५४ अनुसारको यात्रुवाहक सवारीको वर्गीकरण

३.१.३ सवारी तथा यातायात व्यवस्था नियमावली, २०५४ अनुसारको मालवाहक सवारीको वर्गीकरण

३.१.४ सवारीको तौलको आधार हलुका सवारी र भारी सवारी

३.२ इन्जिन

३.२.१ पेट्रोल इन्जिन तथा डिजेल इन्जिन स्टार्ट हुने र चल्ने तरिका

३.२.२ विभिन्न किसिमका इन्धनहरु र त्यसबाट हुने प्रदूषणका बारेमा परिचयात्मक जानकारी

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३.२.३ स्पार्क प्लगको काम

३.२.४ मोबिल पुरानो भयो वा कम भयो भने इन्जिनमा हुनसक्ने विकृति बारे ज्ञान

३.३ क्लच : परिचय र काम, त्यसमा आउनसक्ने त्रुटीहरु र समाधानका उपायहरु

३.४ गियर : काम र परिचय, त्यसमा आउनसक्ने त्रुटीहरु र समाधानका उपायहरु

३.५ फ्लाई ह्वील (Fly wheel): काम वा प्रयोजन

३.६ प्रोपेलर शाफ्ट (Propeller shaft): यसको काम

३.७ डिफ्रेन्सियल (Differential): काम र प्रयोजन

३.८ एक्सेल (Axle): काम

३.९ ब्रेक (Brake): प्रयोजन र किसिम

३.१० टायर (Tyre): प्रयोजन, टायरको साइज, टाायर भित्र हावाको चाप बारे ज्ञान

३.११ स्टियरिङ्ग (Steering): प्रयोजन, स्टयरिङ्ग फ्रि प्ले र यसको आवश्यकता बारे ज्ञान

३.१२ इग्निसन प्रणाली (Ignition System): पेट्रोल र डिजेल इन्जिनको गाडीमा हुने यसको त्रुटीबारे जानकारी

३.१३ रेडियटर र पंखा (Radiator & Fan) तथा ब्याट्री (Battery)

३.१४ सवारी मर्मत बारे छोटो जानकारी : दैनिक मर्मत, गाडी चलेको आधारमा गरिने मर्मत, ओभरहल (Overhaul) तथा यी मर्मत संभारको आवश्यकता तथा फाइदाहरु

४. निजामती कर्मचारी अस्पताल र यसको नियमावली सम्बन्धी सामान्य जानकारी

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प्रयोगात्मक परीक्षाको लागि

अभ्यास १: राजमार्गमा कम्तीमा ५ कि. मी. को दूरीसम्म चलाउने (१५)

- प्रति घण्टा ६० कि. मी. भन्दा कम गतिमा एकनासले चलाउने
- गियरहरु आवश्यकता अनुसार बदल्ने
- ढिलो चलिरहेका गाडीहरुलाई उपयुक्त ठाउँमा उछिन्ने
- आफू भन्दा छिटो गाडीहरुलाई सुरक्षित तरिकाले साइड दिने
- गाडी रोक्ने, यू-टर्न गर्ने, ब्याक गर्ने र फिर्ता चलाई ल्याउने

अभ्यास २: शहरी सडकमा कम्तीमा ५ कि. मी. चलाउने (१५)

- प्रति घण्टा ४० कि. मी. भन्दा कम गतिमा एकनासले चलाउने
- गियरहरु आवश्यकता अनुसार बदल्ने
- कम्तिमा ३/३ वटा दायाँमोड (right turn), वायाँमोड (left turn) र पुरामोड (U–turn) लिने
- उपलब्ध भएमा ट्राफिक संकेत (traffic Signal) भएको चोकबाट भएर गाडी चलाउने

अभ्यास ३ : उकालोमा पार्क गर्ने र पुनः चलाउने (१०)

- सडकको किनारा लगाएर सवारी रोक्ने
- इग्निसन बन्द गर्ने
- इग्निसन पुनः चालु गर्ने र सवारी अगाडि बढाउने

अभ्यास ४: ग्यारेज पार्क गर्ने (१०)

- नियन्त्रित तरिकाले सवारी हाँक्ने
- ब्याक गरी सवारी चलाउने र ग्यारेजको तोकिएको ठाउँमा लगेर पार्क गर्ने ।

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सवारी चालक प्रयोगात्मक परीक्षा निरीक्षकको लागि निर्देशिका

अभ्यास १: राजमार्गमा कम्तीमा ५ कि. मी. को दूरीसम्म चलाउने (१५)

- परीक्षार्थीले सफल भएमा धेरैजसो सवारी चलाउनुपर्ने राजमार्गको खण्डमा प्रयोगात्मक परीक्षा लिने व्यवस्था मिलाउने ।
- सडकमा रहेका ट्राफिक चिन्हहरुलाई ध्यान दिन परीक्षार्थीलाइ सुरुमै निर्देशन दिनु पर्दछ ।
- अङ्कहरु निम्नानुसार दिने :
  - सडक बीच सेतो लामो धर्सा भएमा त्यसलाई नकाटेमा (२)
  - आफ्ना लेनमा नचलाउनु, घुम्तीमा विपरित लेनमा नचलाएमा (२)
  - बस्ती भित्र, घुम्तीमा र ठाडो ओरालोमा उछिन्ने काम नगरेमा (२)
  - घुम्तीमा, ओरालोमा र सडकका चौडाई कम भएको ठाउँमा गाडीहरुलाई साइड नदिएमा (१)
  - घुम्ती, साँघुरो बाटो, पुल र चौबाटोमा नरोकेमा (२)
  - जहिले पनि सडक भन्दा बाहिर छेउ लगाई रोक्नु पर्नेमा सडकमै सवारी नरोकेमा (२)
  - गाडी मोड्दा र यू-टर्न गर्दा ऐनाहरुको प्रयोग नगरी भ्यालबाट टाउको बाहिर निकालेर नहेर्ने गरेमा (२)
  - यू-टर्न गर्नु अघि सडकमा अन्य सवारी आएका छन् कि भनी हेर्ने गरेमा (२)

अभ्यास २: शहरी सडकमा कम्तीमा ५ कि. मी. चलाउने (१५)

- परीक्षार्थीले सफल भएमा धेरै जसो सवारी चलाउनुपर्ने शहरी सडकको व्यस्त भागमा प्रयोगात्मक परीक्षा लिने व्यवस्था मिलाउने ।
- शहरमा ट्राफिक संकेत भएको चोक भएमा त्यहाँबाट समेत सवारी चलाउन लगाउने ।
- अङ्कहरु निम्नानुसार दिने :
  - सडकमा रहेका आदेशमूलक ट्राफिक चिन्हहरु (जस्तैः प्रवेश निषेध, पार्क निषेध, रोक्न निषेध, दायाँ मोड्न इत्यादि) लाई वास्ता गर्नु पर्ने (१)
  - सडक बीचमा भएको सेतो लामो धर्सालाई काटेर उछिन्ने काम नगर्ने (१)
  - आफ्नो लेनमा चलाउने (१)
  - चौबाटोको धेरै नजिक, रोक्न निषेध गरेको ठाउँ र जेब्रा क्रसिङ्गमा नरोक्ने (१)
  - जेब्रा क्रसिङ्गमा उभिएका पदयात्रुलाई पहिले जान दिएर गाडी चलाएमा (२)
  - धेरैजसो हर्न बजाउनु सट्टा सवारीको गति घटाउनु प्रभावकारी हुन्छ त्यसैले अति आवश्यक परेको समयमा वाहेक अन्य समयमा हर्न नबजाएमा (१)
  - ट्राफिक संकेत पहेंलो भएको समयमा जेब्रा क्रसिङ्ग वरै गाडी भएतापनि नरोकी गाडी अगाडि नबढाउने (संकेत पहेंलो भएको समयमा गाडीले जेब्रा क्रसिङ्ग पार गरिसकेको अवस्थामा भने गाडी रोक्न हुँदैन) (२)
  - ट्राफिक संकेत रातो भएको समयमा नचलाउने (२)
  - गाडी मोड्दा र पछाडि लग्दा ऐनाको प्रयोग नगरी भ्यालबाट टाउको निकालेर नहेर्ने (२)
  - गाडी मोड्दा साइडलाइट र पछाडि लग्दा ब्याक लाइटको प्रयोग नगर्ने (२)

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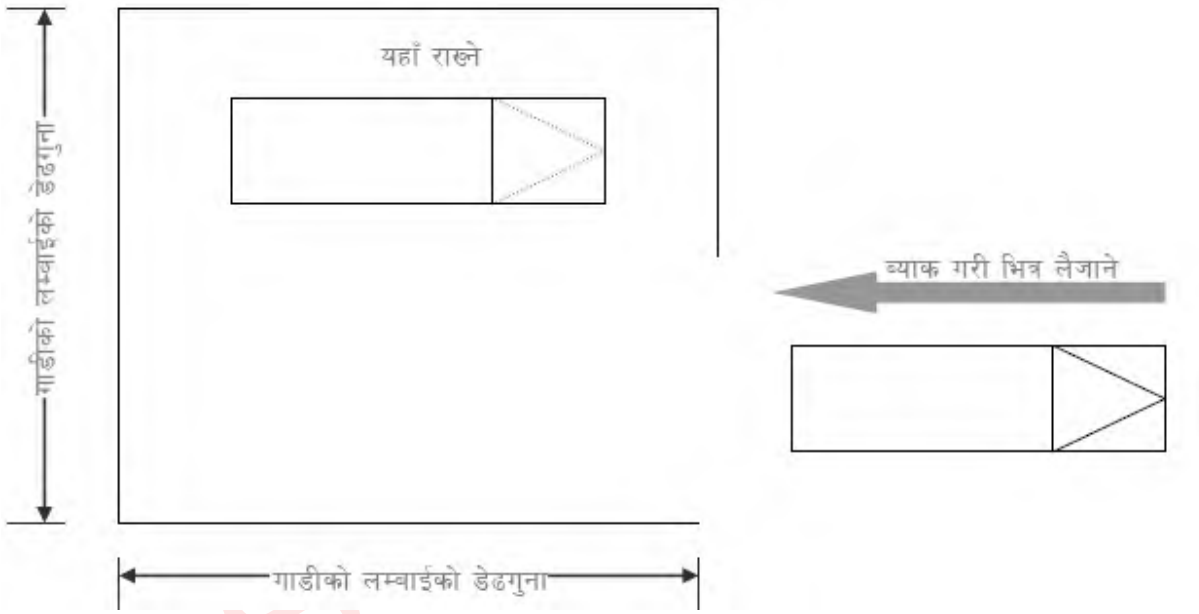
प्रशासन सेवा, सवारी समूह, सवारी चालक पद, प्रारम्भिक तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

अभ्यास ३: उकालोमा पार्क गर्ने र पुनः चलाउने (१०)

- उकालो सडकमा सवारी रोक्न लगाउने र इग्निसन बन्द गर्न लगाउने
- इग्निसन पुनः चालु गर्न र सवारी अगाडि बढाउन लगाउने
- अङ्कहरु निम्नानुसार दिने :
  - सडकको सकभर छेउमा नरोकी अन्य सवारीको आवागमनमा बाधा पुग्ने गरी रोक्न नहुने (२)
  - स्टार्ट बन्द गरी इग्निसनबाट साँचो झिकुन्जेल निम्न काम गरेको हुनुपर्ने ह्याण्ड ब्रेक लगाएको, पहिलो गियरमा राखेको, पाङ्ग्रामा टेका दिएको, अगाडिको पाङ्ग्राहरु सिधा नराखि बङ्ग्याएको, सडकमा पेटी भए अगाडिको पाङ्ग्राहरुलाई त्यसमा अड्चाएको (३)
  - इग्निसन पुनः चालु गरी सवारी अगाडि बढाउन खोज्दा स्टार्ट बन्द हुन नदिने (२)
  - सवारी अगाडि बढाउन खोज्दा केही पछाडि नसर्नुपर्ने (३)

अभ्यास ४: ग्यारेज पार्क गर्ने (एल पार्किङ्ग गर्ने) (१०)



नोटः

- यो परीक्षाका लागि सवारीको डेढ गुणा लम्बाई र डेढ गुणा नै चौडाई भएको चिन्ह लगाउनु पर्दछ । यसरी चिन्ह लगाईएको ठाउँ (ग्यारेज) भित्र परीक्षार्थीलाई गाडी ब्याक गर्न लगाइ पार्क गर्न लगाउनु पर्दछ ।
- परीक्षा लिइने स्थान समतल हुनु पर्दछ ।
- अङ्कहरु निम्नानुसार दिने :
  - सिधा तोकिएको रेखामा उल्टा हाक्न सक्ने हुनुपर्ने (केन्द्र भन्दा टाढा किनारा, किनारा लग्नु) (२)
  - उल्टा हाँक्दा चारैतिर दृष्टि पुऱ्याउन सक्नुपर्ने (१)
  - लगाइएको चिन्हको ट्राफिक कोन, डण्डा वा डोरी वा टेपलाई छुन नहुने (२)
  - स्टेयरिङ्ग एकनासले घुमाउन सक्नुपर्ने (१)
  - सवारीलाई पार्क गर्न तोकिएको स्थानको माझमा राख्न सक्ने हुनुपर्ने (२)
  - पार्क गर्न अति लामो समय लिन नहुने (१)
  - ऐनाहरुको प्रयोग नगरी भ्यालबाट टाउको बाहिर निकालेर हेर्न नहुने (१)

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प्राविधिक सेवा, ईञ्जिनियरिङ एण्ड मेन्टेनेन्स समूह, सेनिटेशन उपसमूह, प्लम्बर पद, प्रारम्भिक तहको खुल्ला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :– लिखित परीक्षा (Written Examination) पूर्णाङ्क :– २००

द्वितीय चरण :– अन्तर्वार्ता (Interview) पूर्णाङ्क :– ३०

प्रथम चरण (First Phase) : **परीक्षा योजना (Examination Scheme)**

पत्र	विषय	पूर्णाङ्क	उतीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	Technical Subject	१००	४०	वस्तुगत	बहुवैकल्पिक प्रश्न	५० प्रश्न x २ अङ्क	४५ मिनेट
द्वितीय		१००	४०	विषयगत		१० प्रश्न x १० अङ्क	३ घण्टा

द्वितीय चरण (Second Phase)

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	३०	मौखिक

द्रष्टव्य :

१. यो परीक्षा योजनालाई प्रथम चरण (लिखित परीक्षा) र द्वितीय चरण (अन्तर्वार्ता) गरी दुई चरणमा विभाजन गरिएको छ ।

२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।

३. प्रथम र द्वितीय पत्रको पत्रको विषयवस्तु एउटै हुनेछ ।

४. प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।

५. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा तोकिए अनुसार हुनेछ ।

६. वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरुको गलत उत्तर दिएमा प्रत्येक गलत उत्तर बापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस बापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।

७. वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षर (Capital letter) A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षर(Small letter) a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।

८. बहुवैकल्पिक प्रश्नहरु हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।

९. विषयगत प्रश्नका लागि तोकिएका १० अङ्कका प्रश्नहरुको हकमा १० अङ्कको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुई भन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरु (Short notes) सोध्न सकिने छ ।

१०. विषयगत प्रश्नमा प्रत्येक पत्र/विषयका प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरु हुनेछन् । परिक्षार्थीले प्रत्येक खण्डका प्रश्नहरुको उत्तर सोही खण्डका उत्तरपुस्तिकामा लेख्नुपर्नेछ ।

११. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरु परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्क्रममा परेको सम्झनु पर्दछ ।

११. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरुलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।

१२. पाठ्यक्रम लागू मिति :– आ.व.२०७९/०८० देखि

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प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

Paper I and II: Technical subject

Section (A): 50 % Marks

१. खानेपानी र खानेपानी आयोजना सम्बन्धी

१.१ ग्रेभिटी फ्लो सिस्टम

१.१.१ योजना अवधि, जनसंख्या तथा पानीको माग
- परिचय
- योजना अवधि
- दैनिक पानीको माग

१.१.२ खानेपानी आयोजना
- परिचय
- पानीको मुहानको छनौट

१.१.३ इन्टेक
- परिचय
- इन्टेकका किसिम
- इन्टेकको सुरक्षा वा मर्मत सम्भार

१.१.४ ब्रेक प्रेसर ट्याङ्की (बि.पि.टी.)
- परिचय तथा आवश्यकता
- ब्रेक प्रेसर ट्याङ्की बनाउने ठाउँ
- ब्रेक प्रेसर ट्याङ्कीको किसिम
- ब्रेक प्रेसर ट्याङ्कीको निर्माण कार्य

१.१.५ रिजर्भ्वाएर ट्याङ्की
- परिचय तथा आवश्यकता
- रिजर्भ्वाएर ट्याङ्की बनाउने ठाउँ
- रिजर्भ्वाएर ट्याङ्की निर्माण कार्य

१.१.६ फेरो सिमेण्ट रिजर्भ्वाएर ट्याङ्की
- परिचय
- फाइदा र बेफाइदाहरु
- फेरो सिमेण्ट ट्याङ्कीको निर्माण

१.१.७ पाइपलाइन
- परिचय
- पाइप लाइनका किसिम
- पाइप लाइन बिछ्याउन, खन्ने र पुर्ने काम
- पाइप गाड्नु पर्ने आवश्यकता
- पाइप लाइनमा हुने रोकावटहरु
- पाइप लाइनमा रोकावट पत्ता लगाउने तथा हटाउने उपायहरु

१.१.८ सार्वजनिक धारा
- परिचय
- धारा बनाउने ठाउँ
- सार्वजनिक धाराको निर्माण कार्य

१.२ निर्माण

१.२.१ परिचय

१.२.२ सिमेण्ट
- हाइड्रेशन
- जम्ने प्रकृया
- कडा हुने प्रकृया
- सिमेण्ट राख्ने तरीका

१.२.३ बालुवा

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१.२.४ गिट्टी
१.२.५ पानी
१.२.६ सिमेण्ट मसाला
१.२.७ ढुंगाको गारो
१.२.८ कंक्रीट
- कंक्रीट ओसार्ने काम
- फर्मा तयार पार्ने
- कंक्रीट खन्याउने तरिका
- कंक्रीट खाँद्ने तरिका
- कंक्रीट क्योरिङ गर्ने काम
- फर्मा हटाउने काम

१.२.९ टिपकार (प्वाइन्टिङ्ग गर्ने काम)
१.२.१० प्लाष्टर गर्ने काम
१.२.११ सिमेण्ट पनिङ्ग लगाउने काम

१.३ पाइप फिटिङ्ग
१.३.१ पाइप
- परिचय
- पाइपका किसिम
- पाइपका गुण तथा अवगुण

१.३.२ सि.आई/जि.आई/एच.डि.पि. फिटिङ्ग
- परिचय
- प्रकार
- काम र महत्व

१.३.३ पाइप फिटिङ्ग तथा जडान
१.३.४ ट्यूबवेल
- परिचय
- भूमिगत जल
- स्यालो तथा डिप ट्यूबवेल
- ट्यूबवेलमा प्रयोग हुने सामग्री
- ट्यूबवेल जडानको विधि
- मर्मत तथा सम्भार

१.३.५ इनार
- परिचय
- प्रकार
- निर्माण विधि
- मर्मत तथा सम्भार

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Section (B): 50 % Marks

२. खानेपानी र सरसफाइ सम्बन्धी

२.१ पानी
- २.१.१ परिचय
- २.१.२ पानीका श्रोत
- २.१.३ स्वस्थ पानी

२.२ पानी सुरक्षित राख्ने तरिका, मुहान देखि मुखसम्म पानी कसरी सुरक्षित गर्ने

२.३ सरसफाइ
- २.३.१ परिचय
- २.३.२ किसिम र आवश्यकता
- २.३.३ सरसफाइको महत्व
- २.३.४ घरबाट निस्किएको फोहर पानीको व्यवस्थापन
- २.३.५ फोहर मैलाको व्यवस्थापन
- २.३.६ ठोस, प्लाष्टिक र सिसा जस्ता फोहरको व्यवस्थापन

२.४ पानीजन्य सरुवा रोग
- २.४.१ परिचय
- २.४.२ सरुवा रोगको किसिम
- २.४.३ रोग सर्ने माध्यम
- २.४.४ सरुवा रोगबाट बच्ने उपाय
- २.४.५ खोप, पौष्टिक आहार, झाडापखाला र जुका सम्बन्धी जानकारी

२.५ चर्पी
- २.५.१ परिचय
- २.५.२ चर्पीको आवश्यकता
- २.५.३ चर्पीको किसिम
- २.५.४ चर्पीको निर्माण विधि
- २.५.५ चर्पीको फाइदा
- २.५.६ चर्पीको मर्मत सम्भार
- २.५.७ चर्पीको प्रयोग विधि

२.६ सुधारिएको चुल्हो
- २.६.१ परिचय
- २.६.२ फाइदा र बेफाइदा
- २.६.३ बनाउने तरिका

२.७ खानेपानी तथा सरसफाइ व्यवस्थापन
- २.७.१ परिचय
- २.७.२ खानेपानी आयोजना तथा जनसहभागिता
- २.७.३ उपभोक्ता समितिको छनौट, काम कर्तव्य र जिम्मेवारी
- २.७.४ मर्मत तथा सम्भार कार्यकर्ताको काम कर्तव्य
- २.७.५ खानेपानी सरसफाइ टेक्निसियनको काम कर्तव्य र अधिकार

३. निजामती कर्मचारी अस्पताल र यसको नियमावली सम्बन्धी सामान्य जानकारी

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