

प्रदेश लोक सेवा आयोग

लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गतको स्वास्थ्य, रेडियोग्राफी समूह, पाँचौं तह, रेडियोग्राफर पदको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

पाठ्यक्रमको रूपरेखा:— यस पाठ्यक्रमको आधारमा निम्नानुसार चरणमा परीक्षा लिइने छः

प्रथम चरण:- लिखित परीक्षा

पूर्णाङ्क:- १००

द्वितीय चरण:- अन्तर्वार्ता

पूर्णाङ्क:- २०

प्रथम चरण:- लिखित परीक्षा योजना (Written Examination)

विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	प्रश्न संख्या × अङ्कभार	समय
सार्वजनिक व्यवस्थापन तथा सेवा सम्बन्धी	१००	४०	वस्तुगत बहुवैकल्पिक	५० प्रश्न × २ अङ्क = १००	४५ मिनेट

द्वितीय चरण:-

विषय	पूर्णाङ्क	परीक्षा प्रणाली
अन्तर्वार्ता	२०	बोर्ड अन्तर्वार्ता (Board Interview)

द्रष्टव्य:-

१. वस्तुगत बैकल्पिक परीक्षामा यथासम्भव निम्नानुसार प्रश्नहरू सोधिनेछ ।

एकाइ	१	२	३	४	५	६	७
प्रश्न संख्या	५	५	१५	५	१०	५	५

- वस्तुगत बहुवैकल्पिक (Multiple Choice) प्रश्नहरूको 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 ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भएतापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको विज्ञापन हुदाँका वखत (संशोधन भएका वा संशोधन भई हटाईएका वाथप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झन पर्दछ ।
- प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- परीक्षामा परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।
- पाठ्यक्रम लागू मिति:-

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(५० प्रश्न × २ अङ्क = १०० अङ्क)

1. सार्वजनिक व्यवस्थापन (Public Management)

1.1. कार्यालय व्यवस्थापन

1.1.1. कार्यालय (Office) परिचय, महत्व, कार्य र प्रकार

1.1.2. सहायक कर्मचारीका कार्य र गुणहरू

1.1.3. कार्यालय स्रोत साधन (Office Resources): परिचय र प्रकार

1.1.4. कार्यालयमा सञ्चारको महत्व, किसिम र साधन

1.1.5. कार्यालय कार्यविधि (Office Procedure) पत्र व्यवहार (Correspondence), दर्ता र चलानी (Registration & Dispatch), परिपत्र (Circular), तोक आदेश (Order), टिप्पणी लेखन र टिप्पणी तयार पार्दा ध्यान दिनुपर्ने कुराहरू

1.1.6. अभिलेख व्यवस्थापन (Record Management)

1.2. निजामती सेवा ऐन र नियमावलीमा भएका देहायका व्यवस्थाहरू

1.2.1. निजामती सेवा, प्रदेश निजामती सेवा र स्थानीय सरकारी सेवाको गठन, संगठन संरचना, पदपूर्ति गर्ने तरिका र प्रक्रियाहरू

1.2.2. नेपाल सरकार प्रदेश सरकारको स्वास्थ्य संगठन संरचनाको बारेमा जानकारी

1.2.3. कर्मचारीको नियुक्ति, सरुवा, बढुवा, बिदा, विभागीय सजाय र अवकाश

1.2.4. कर्मचारीले पालन गर्नुपर्ने आचरण र कर्तव्यहरू

1.3. सरकारी बजेट, लेखा र लेखापरीक्षण प्रणाली सम्बन्धी सामान्य जानकारी

1.4. सार्वजनिक सेवा प्रवाहको अर्थ, सेवा प्रवाह गर्ने निकाय, तरिका र माध्यमहरू

1.5. सार्वजनिक बडापत्र (Public Charter) महत्व र आवश्यकता

1.6. व्यवस्थापनको अवधारणा तथा सार्वजनिक व्यवस्थापनमा निर्देशन, नियन्त्रण, समन्वय, निर्णय प्रक्रिया, उत्प्रेरण र नेतृत्व सम्बन्धी जानकारी

1.7. मानवीय मूल्य मान्यता (Human Values), नागरिक कर्तव्य र दायित्व तथा अनुशासन

1.8. Basics of Computer Science (MS Word, Excel, PowerPoint)

1.9. स्वास्थ्य सेवा ऐन २०५३, नियमावली २०५५ तथा स्वास्थ्य नीति २०७६

1.10. लुम्बिनी प्रदेश स्वास्थ्य नीति २०७७, प्रदेश स्वास्थ्य संस्था स्थापना सञ्चालन नविकरण तथा स्तरोन्नति ऐन २०७५ र प्रदेश स्वास्थ्य संस्था स्थापना सञ्चालन नविकरण तथा स्तरोन्नति नियमावली २०७७

1.11. स्वास्थ्यकर्मीहरूको पेशागत परिषद् सम्बन्धी जानकारी र आचारसंहिता

2. Anatomy and Physiology: -

2.1. General introduction

2.1.1. Cell & Reproduction of the individual

2.2. Tissues

2.2.1. Epithelial, Connective, Skeletal, Muscular & Nervous tissues

2.3. General pathology

2.3.1. Bacteria, Viruses & Tumors

2.4. Surface and regional anatomy

2.4.1. Anatomical position, head, neck, thorax, abdomen, pelvic cavity

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- 2.5. Skeleton
 - 2.5.1. Structure and function of bone
 - 2.5.2. Development and growth of bones
 - 2.5.3. Healing of fractures
- 2.6. Skull
 - 2.6.1. Skull viewed from above, Skull viewed from the front, Skull viewed from the side, Skull viewed from the below
 - 2.6.2. Interior of the skullcap, interior of the base of the skull
 - 2.6.3. Nasal cavity, accessory nasal sinuses
 - 2.6.4. Individual bones of the skull
- 2.7. Vertebral column, ribs and sternum
 - 2.7.1. Vertebral column, ribs and sternum
- 2.8. Bones of the upper limb
 - 2.8.1. Clavicle, scapula, humerus, radius, ulna
 - 2.8.2. Carpal bones, metacarpal bones, phalanges
 - 2.8.3. Arteries and nerves related to the bones of upper limb
 - 2.8.4. Ossification of the bones of the upper limb
- 2.9. Bones of the lower limb
 - 2.9.1. Hipbone, pelvis, femur, patella, tibia, fibula
 - 2.9.2. Tarsal bones, metatarsal bones, phalanges
 - 2.9.3. Arches of the foot
 - 2.9.4. Arteries and nerves related to the bone of the lower limb
 - 2.9.5. Ossification of the bones of the lower limb
- 2.10. Joints of the bones
 - 2.10.1. Types of joints
 - 2.10.2. Muscles and joints of the head
 - 2.10.3. Joints and muscles of the neck and trunk
 - 2.10.4. Joints and muscles of the upper limb
 - 2.10.5. Joint and muscles of the lower limb
- 2.11. Circulatory system
 - 2.11.1. Blood and blood vessels
 - 2.11.2. Heart, pulmonary circulation, systemic circulation
 - 2.11.3. Veins
- 2.12. Lymphatic system
 - 2.12.1. Lymph, lymphatic vessels, lymph nodes, lymphatic drainage of the body
 - 2.12.2. Lymphatic tissue
 - 2.12.3. Spleen
- 2.13. Respiratory system
 - 2.13.1. Nose, pharynx, larynx, trachea, bronchi, lungs
 - 2.13.2. Physiology of respiration
- 2.14. Digestive system
 - 2.14.1. Mouth, salivary glands, pharynx, esophagus, stomach, small intestine, large intestine, pancreas, liver, billiary tract apparatus
 - 2.14.2. Function of the alimentary system
- 2.15. Urinary system
 - 2.15.1. Kidneys, urethras, urinary bladder, urethra
 - 2.15.2. Functions of kidneys
 - 2.15.3. Control of micturition
- 2.16. Nervous system
 - 2.16.1. Nervous tissue

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- 2.16.2. Central nervous system, brain, spinal cord
- 2.16.3. Peripheral nervous system
- 2.16.4. Autonomic nervous system
- 2.17. Endocrine system
 - 2.17.1. Pituitary gland, thyroid gland, parathyroid gland
 - 2.17.2. Adrenal glands
- 2.18. Reproductive system
 - 2.18.1. Male reproductive system
 - 2.18.2. Female reproductive system
- 2.19. Skin and the organs of special senses
 - 2.19.1. Skin, Eye, Ear, Nose, Tongue

3. Radiographic Technique

3.1. General radiography

- 3.1.1. Routine Radiography Technique for upper limb: Fingers, thumb, hand, wrist forearm, elbow, humerus, shoulder, scapula, clavicle
- 3.1.2. Routine Radiography Technique for the lower limb: Toes, foot, calcaneum, ankle, tibia, fibula, knee, femur, hip joint, neck of femur, pelvis
- 3.1.3. Routine Radiographic technique for thoracic cage and its contents (Chest, heart, ribs and sternum)
- 3.1.4. Routine technique for the abdomen: Routine technique of plain & erect abdomen x-ray
- 3.1.5. Routine technique for the spine (Cervical, thoracic, lumbar, sacrum and coccyx, sacroiliac joint)
- 3.1.6. Routine technique for the skull
 - 3.1.6.1. The radiograph anatomical landmarks of the skull
 - 3.1.6.2. The process of routine examination of the bones of skull (cranium, facial bone and mandible)
- 3.1.7. To locate the following by x-rays (saphed, foreign body in the hand, head of humerus & axial Shoulder, acromio-calvicular joints, sterno-calvicular joints, foreign body in the foot, lateral foot weight bearing, skyline view of patella, tibial Tuberosity)
- 3.1.8. 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); The purposes of these views
- 3.1.9. 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, skeleton survey)
- 3.1.10. Supplementary views for the skull (towne's view, submento vertical, sella turcica, temper-mandibular joint, nasal bones, paranasal sinuses, mastoids, orbits, optic foramina, foreign body in the eye, dental radiography)
- 3.1.11. Tomography
 - 3.1.11.1. Basic principle of tomogram
 - 3.1.11.2. Practical application of Tomography for the chest, kidney, gall bladder and skeletal system
- 3.1.12. Registration process
 - 3.1.12.1. The steps of registration of patients
 - 3.1.12.2. The importance of a monthly and annual record, filling system and preparing the Performa invoices
 - 3.1.12.3. Filling of radiographs and reports (x-ray No, hospital number, patient's name, cross reference bill, with patient's name)

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- 3.2. Radiographic examination with contrast media
 - 3.2.1. Special examination with contrast media
 - 3.2.2. Contrast media
 - 3.2.2.1. Definition and types of the contrast media
 - 3.2.2.2. Methods of introducing the contrast media
 - 3.2.2.3. Reactions of contrast media
 - 3.2.2.4. Name of the emergency equipments and drugs needed to cope with reactions
 - 3.2.3. Radiographic investigation of Gastro-intestinal tract using contrast media
 - 3.2.3.1. Barium swallow
 - 3.2.3.2. Barium meal
 - 3.2.3.3. Barium follows through
 - 3.2.3.4. Examination of GI tract
 - 3.2.3.5. Ba-enema
 - 3.2.3.6. Small bowel enema
 - 3.2.3.7. Loopogram
 - 3.2.3.8. State the role of a radiographer during fluoroscopy
 - 3.2.4. Investigation of urinary tract and hysterosalpingogram
 - 3.2.4.1. Intravenous Urogram (IVU)
 - 3.2.4.2. Cystogram
 - 3.2.4.3. Micturating cystogram
 - 3.2.4.4. Urethrogram
 - 3.2.4.5. Retrograde pyelogram
 - 3.2.4.6. Hysterosalpingogram (HSG)
 - 3.2.5. Radiographic procedure of the Biliary tract
 - 3.2.5.1. Oral cholecystography (OCC)
 - 3.2.5.2. Intravenous cholangiography (IVC)
 - 3.2.5.3. Percutaneous transhepatic cholangiography and drainage (PTC and PTCd)
 - 3.2.5.4. Endoscopic retrograde Cholangio pancreatography (ERCP)
 - 3.2.5.5. Operative cholangiography
 - 3.2.5.6. T. Tube cholangiography
 - 3.2.6. Use of portable/mobile x-ray in ward and operation theatre
 - 3.2.6.1. Uses of mobile machine
 - 3.2.6.2. Technique of using ward radiography
 - 3.2.6.3. Technique of using operating theatre radiography
 - 3.2.6.4. Technique to help in Hip pinning
 - 3.2.6.5. Technique of operative-cholangiography
 - 3.2.7. Vascular and Neurological examinations
 - 3.2.7.1. Carotid and vertebral angiogram
 - 3.2.7.2. Femoral angiogram
 - 3.2.7.3. Aortogram
 - 3.2.7.4. Phlebogram
 - 3.2.7.5. Encephalogram
 - 3.2.7.6. Ventriculogram
 - 3.2.7.7. Myelogram
 - 3.2.8. Special examinations
 - 3.2.8.1. Arthrogram
 - 3.2.8.2. Dacryocystogram
 - 3.2.8.3. Sinogram/ Fistulogram
 - 3.2.8.4. Sialogram
 - 3.2.8.5. Mamogram

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3.2.8.6. Macro-radiography

3.2.8.7. Soft tissue radiography

4. Patient Care and Management

- 4.1. The hospital, the patient and the radiographer
 - 4.1.1. Clinical responsibility
 - 4.1.2. Legal responsibility
 - 4.1.3. The radiographer and the hospital
- 4.2. Features of general patient care
 - 4.2.1. General preliminaries to the examination
 - 4.2.2. Moving chair and stretcher patients
 - 4.2.3. The anaesthetized patient
 - 4.2.4. Hygiene in the x-ray department
 - 4.2.5. General comfort and reassurance for the patient
- 4.3. Drugs in the x-ray department
 - 4.3.1. Poisons and dangerous drugs
 - 4.3.2. Units of measurement
 - 4.3.3. Drugs used in preparation of the patient
 - 4.3.4. Contrast agents used in x-ray examinations
 - 4.3.5. Drugs used in resuscitation
 - 4.3.6. Labeling and issuing
- 4.4. Sterilization and sterile techniques
 - 4.4.1. Methods of sterilization
 - 4.4.2. Central sterile supply
 - 4.4.3. Preparation of the hands for aseptic procedures
- 4.5. Preparation of the patient
 - 4.5.1. General abdominal preparation
 - 4.5.2. Clothing of the patient
- 4.6. First aid in the x-ray department
 - 4.6.1. Radiological emergencies
 - 4.6.2. Shock
 - 4.6.3. Hemorrhage
 - 4.6.4. Burns, scalds
 - 4.6.5. Loss of consciousness
 - 4.6.6. Asphyxia
 - 4.6.7. Fractures
 - 4.6.8. Electric shock
- 4.7. Medico-legal aspects of the radiographer's work
 - 4.7.1. Breach of professional confidence
 - 4.7.2. Negligence
 - 4.7.3. Procedure in the event of an accident
 - 4.7.4. The importance of records

5. Radiographic Photography

- 5.1. Film
 - 5.1.1. Construction and composition of x-ray film
 - 5.1.2. Types of x-ray film
 - 5.1.3. Characteristic curve, special sensitivity & role of dyeing
 - 5.1.4. Film speed, density, contrast, sensitometry
 - 5.1.5. Artifacts and its causes

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5.2. Intensifying screen

- 5.2.1. Construction and composition of I.S.
- 5.2.2. Screen speed, sharpness, coating weight
- 5.2.3. Fluorescent material and phosphorescence
- 5.2.4. Fluorescent material, new phosphors

5.3. Image

- 5.3.1. Production of radiographic image
- 5.3.2. Component of radiographic image
 - 5.3.2.1. Contrast, sharpness, resolution
 - 5.3.2.2. Exposure factors
 - 5.3.2.3. Absorption coefficient

5.4. Film processing

5.4.1. Manual film processing

5.4.1.1. Processing cycle

- 5.4.1.1.1. Development-constituents of developer, factors affecting control of development, developer replenishes maintenance of activity & level of developer
- 5.4.1.1.2. Rinsing
- 5.4.1.1.3. Fixation-constituents of fixer, factors affecting fixation and regeneration of the Fixer
- 5.4.1.1.4. Washing processing
- 5.4.1.1.5. Drying process
- 5.4.1.1.6. Tanks and containers for processing chemical, processing units
- 5.4.1.1.7. Mixing chemicals
- 5.4.1.1.8. storage of chemicals
- 5.4.1.1.9. Film hangers

5.4.2. Automatic processor

5.4.2.1. Basic principle & its functioning

5.5. Dark room planning

- 5.5.1. Location, layout, radiation protection, safelight filter & sensitivity range

5.6. Identification

- 5.6.1. Methods
- 5.6.2. Importance

5.7. Silver recovery

- 5.7.1. General introduction

6. Radiographic equipment

6.1. Historical background of X-ray and its production

- 6.1.1. 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

6.2. 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 and image intensifier tube

6.4. Control of scatter radiation & beam restricting devices

- 6.4.1. Secondary radiation grids
- 6.4.2. Air gap technique

प्रदेश लोक सेवा आयोग

लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गतको स्वास्थ्य, रेडियोग्राफी समूह, पाँचौं तह, रेडियोग्राफर पदको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 6.5. Portable and mobile x-ray units
 - 6.5.1. Capacitor discharge and c-arm
- 6.6. Conventional tomography
- 6.7. Introduction to modern modalities (CT, MRI, mammography)

7. Radiation Physics

- 7.1. Atomic structure
 - 7.1.1. The Nucleus
 - 7.1.2. Electron orbits and energy levels
- 7.2. Production of x-ray, properties of x-rays
 - 7.2.1. General radiation (Bremsstrahlung)
 - 7.2.2. Characteristic Radiation
 - 7.2.3. Intensity of x-rays beams
 - 7.2.4. Target material
 - 7.2.5. voltage (kVp) applied
- 7.3. Basic interactions between X-rays and matter
 - 7.3.1. Coherent scattering
 - 7.3.2. Photoelectric effect
 - 7.3.3. Compton scattering
 - 7.3.4. Pair production
 - 7.3.5. Photodisintegration
- 7.4. Radiation measurement and units
 - 7.4.1. Construction & working of the free air ionization chamber
 - 7.4.2. Thimble ionization chamber & condenser ionization chamber
- 7.5. Radiation protection
 - 7.5.1. Historical introduction or why the protection is necessary against the radiation
 - 7.5.2. Maximum and Minimal permissible dose
 - 7.5.3. Tabulation of the recommended maximum permissible doses for the different parts of the body
 - 7.5.4. Following the code of practice
 - 7.5.5. Identifying the protective materials
- 7.6. Personnel monitoring
 - 7.6.1. The necessity of personnel monitoring & monitoring instruments (film badge, ionization chamber & thermo luminescent dosimeter)
- 7.7. Safety requirements for operating X-ray unit
