

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला 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

परीक्षा योजना (Examination Scheme)

प्रथम चरण : लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- २००

पत्र	विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या × अङ्क	समय
प्रथम	सामान्य ज्ञान र सार्वजनिक व्यवस्थापन (General Awareness & Public Management)	१००	४०	वस्तुगत (Objective)	बहुवैकल्पिक प्रश्न (MCQs)	२० प्रश्न × २ अङ्क (४० अङ्क)	४५ मिनेट
	सेवा सम्बन्धित कार्य-ज्ञान (Job Based knowledge)					३० प्रश्न × २ अङ्क (६० अङ्क)	
द्वितीय	सेवा सम्बन्धित कार्य-ज्ञान (Job Based knowledge)	१००	४०	विषयगत (Subjective)	छोटो उत्तर (Short Answer) लामो उत्तर (Long Answer)	१२ प्रश्न × ५ अङ्क ४ प्रश्न × १० अङ्क	२ घण्टा १५ मिनेट

द्वितीय चरण : अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३०

पत्र / विषय	पूर्णाङ्क	उत्तीर्णाङ्क	परीक्षा प्रणाली	समय
अन्तर्वार्ता (Interview)	३०		बोर्ड अन्तर्वार्ता (Board Interview)	-

द्रष्टव्य :

- यो पाठ्यक्रमको योजनालाई प्रथम चरण र द्वितीय चरण गरी दुई भागमा विभाजन गरिएको छ ।
- लिखित परीक्षाको प्रश्नपत्रको माध्यम भाषा पाठ्यक्रमको विषयवस्तु जुन भाषामा दिइएको छ सोही भाषाको आधारमा नेपाली वा अंग्रेजी मध्ये कुनै एक मात्र भाषा हुनेछ । तर विषयवस्तुलाई स्पष्ट गर्नुपर्ने अवस्थामा दुवै भाषा समेत प्रयोग सकिने छ ।
- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुवै हुनेछ ।
- प्रथम पत्र र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ । तर एकैदिनमा परीक्षा लिइनेछ ।
- 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 ।
- वस्तुगत बहुवैकल्पिक हुने परीक्षामा परीक्षार्थीले उत्तर लेख्दा अंग्रेजी ठूलो अक्षरहरू (Capital letters): A, B, C, D मा लेख्नुपर्नेछ । सानो अक्षरहरू (Small letters): a, b, c, d लेखेको वा अन्य कुनै सङ्केत गरेको भए सबै उत्तरपुस्तिका रद्द हुनेछ ।
- बहुवैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको क्याल्कुलेटर (Calculator) प्रयोग गर्न पाइने छैन ।
- परीक्षामा परीक्षार्थीले मोबाइल वा यस्तै प्रकारका विद्युतीय उपकरण (विद्युतीय घडी लगायत) परीक्षा हलमा लैजान पाइने छैन ।

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परीक्षाको पाठ्यक्रम

९. विषयगत प्रश्नहरूको हकमा तोकिएको अंकको 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 टिप्पणीहरू (Short notes) सोध्न सकिने छ ।
१०. विषयगत प्रश्न हुनेका हकमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोहीखण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
११. परीक्षामा सोधिने प्रश्नसंख्या, अङ्क र अङ्कभार यथासम्भव सम्बन्धित पत्र/विषयमा दिइए अनुसार हुनेछ ।
१२. यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानून, ऐन, नियम तथा नीतिहरू परीक्षाको मिति भन्दा ३ महिना अगाडि (संशोधन भएका वा संशोधन भई हटाईएका वा थप गरी संशोधन भई) कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनु पर्दछ ।
१३. प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
१४. पाठ्यक्रम लागू मिति :- २०८२/०८/०९

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प्रथम पत्र (Paper I) :-

सामान्य ज्ञान र सार्वजनिक व्यवस्थापन तथा सेवा सम्बन्धित कार्य-ज्ञान

भाग-१ (Part I) :

सामान्य ज्ञान र सार्वजनिक व्यवस्थापन

(General Awareness and Public Management)

खण्ड-क (Section - A) : (१० प्रश्न×२ अङ्क = २० अङ्क)

१. सामान्य ज्ञान (General Awareness)

(२० अङ्क)

- १.१ नेपालको भौगोलिक अवस्था, प्राकृतिक स्रोत र साधनहरु
- १.२ नेपालको ऐतिहासिक, सांस्कृतिक र सामाजिक अवस्था सम्बन्धी जानकारी
- १.३ नेपालको आर्थिक अवस्था र आवधिक योजना र गण्डकी प्रदेशको आवधिक योजना सम्बन्धी जानकारी
- १.४ जैविक विविधता, दिगो विकास, वातावरण, प्रदुषण, जलवायु परिवर्तन र जनसंख्या व्यवस्थापन
- १.५ मानव जीवनमा प्रत्यक्ष प्रभाव पार्ने विज्ञान र प्रविधिका महत्वपूर्ण उपलब्धिहरु
- १.६ जनस्वास्थ्य, रोग, खाद्य र पोषण सम्बन्धी सामान्य जानकारी
- १.७ नेपालको संविधान (भाग १ देखि ५ सम्म र अनुसूचीमा भएका व्यवस्थाहरु)
- १.८ नेपालमा संघीय लोकतान्त्रिक गणतन्त्रात्मक शासन प्रणाली सम्बन्धी जानकारी
- १.९ संयुक्त राष्ट्रसंघ र यसका विशिष्टीकृत संस्था सम्बन्धी जानकारी
- १.१० क्षेत्रीय संगठन (सार्क, बिमस्टेक, आसियान र युरोपियन संघ) सम्बन्धी जानकारी
- १.११ राष्ट्रिय र अन्तर्राष्ट्रिय महत्वका समसामयिक गतिविधिहरु
- १.१२ लैङ्गिक समानता, अपाङ्गता तथा सामाजिक समावेशीकरण (GEDSI) सम्बन्धी सामान्य जानकारी

खण्ड-ख (Section - B) : (१० प्रश्न×२ अङ्क = २० अङ्क)

२. सार्वजनिक व्यवस्थापन (Public Management)

(२० अङ्क)

२.१ कार्यालय व्यवस्थापन (Office Management)

- २.१.१ कार्यालय (Office) : परिचय, महत्व, कार्य र प्रकार
- २.१.२ सहायक कर्मचारीका कार्य र गुणहरु
- २.१.३ कार्यालय स्रोत साधन (Office Resources): परिचय र प्रकार
- २.१.४ कार्यालयमा सञ्चारको महत्व, किसिम र साधन
- २.१.५ कार्यालय कार्यविधि (Office Procedure) : पत्र व्यवहार (Correspondence), दर्ता र चलानी (Registration & Dispatch), परिपत्र (Circular), फाइलिङ, तोक आदेश (Order), टिप्पणी लेखन र टिप्पणी तयार पार्दा ध्यान दिनुपर्ने कुराहरु

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- २.१.६ अभिलेख व्यवस्थापन (Record Management)
- २.१.७ सार्वजनिक खरिद व्यवस्थापन (Public Procurement Management) सम्बन्धी सामान्य जानकारी
- २.१.८ कार्यालयमा सूचना प्रविधि (Windows, Word, Excel, PowerPoint, E-Mail, Internet and Social Media) र नवप्रवर्तन (Innovation) सम्बन्धी सामान्य जानकारी
- २.२ निजामती सेवा ऐन, गण्डकी प्रदेश निजामती सेवा ऐन, स्थानीय सेवा (गठन तथा सञ्चालन) ऐन र तत् तत् ऐन बमोजिमका नियमावलीहरूमा भएका देहायका व्यवस्थाहरू
 - २.२.१ सेवाको गठन, संगठन संरचना, पदपूर्ति गर्ने तरिका र प्रक्रियाहरू
 - २.२.२ कर्मचारीको नियुक्ति, सरुवा, बढुवा, बिदा, विभागीय सजाय र अवकाश
 - २.२.३ कर्मचारीले पालन गर्नुपर्ने आचरण र कर्तव्यहरू
- २.३ मुख्यमन्त्री तथा मन्त्रिपरिषद्को कार्यालय सम्बन्धी जानकारी
- २.४ स्थानीय सरकार संचालन ऐन, (संशोधन सहित) २०७४
- २.५ भ्रष्टाचार निवारण ऐन, २०५९
- २.६ अख्तियार दुरुपयोग अनुसन्धान आयोग, लोक सेवा आयोग र प्रदेश लोक सेवा आयोग सम्बन्धी सामान्य जानकारी
- २.७ सरकारी बजेट, लेखा र लेखापरीक्षण प्रणाली सम्बन्धी सामान्य जानकारी
- २.८ सार्वजनिक सेवा प्रवाहको अर्थ, सेवा प्रवाह गर्ने निकाय, तरिका र माध्यमहरू
- २.९ सार्वजनिक बडापत्र (Public Charter) : महत्व र आवश्यकता
- २.१० व्यवस्थापनको अवधारणा तथा सार्वजनिक व्यवस्थापनमा निर्देशन, नियन्त्रण, समन्वय, निर्णय प्रक्रिया, उत्प्रेरणा र नेतृत्व सम्बन्धी जानकारी
- २.११ मानवीय मूल्य मान्यता (Human Values), नागरिक कर्तव्य र दायित्व तथा अनुशासन

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परीक्षाको पाठ्यक्रम

भाग २ (Part II) :-

सेवा सम्बन्धित कार्य-ज्ञान (Job Based - Knowledge)

(३० प्रश्न X २ अङ्क = ६० अङ्क)

1. **Anatomy and Physiology**

1.1 **General introduction**

1.1.1 Cell & Reproduction of the individual

1.2 **Tissues**

1.2.1 Epithelial, Connective, Skeletal, Muscular & Nervous tissues

1.3 **General pathology**

1.3.1 Bacteria, Viruses & Tumors

1.4 **Surface and regional anatomy**

1.4.1 Anatomical position, head, neck, thorax, abdomen, pelvic cavity

1.5 **Musculoskeletal**

1.5.1 Structure and function of bone

1.5.2 Development and growth of bones

1.5.3 Healing of fractures

1.5.4 Types and Functions of Muscles

1.6 **Skull**

1.6.1 Skull viewed from above, skull viewed from the front, skull viewed from the side, skull viewed from the below

1.6.2 Interior of the skullcap, interior of the base of the skull

1.6.3 Nasal cavity, accessory nasal sinuses

1.6.4 Individual bones of the skull

1.7 **Vertebral column, ribs and sternum**

1.7.1 Vertebral column, ribs and sternum

1.8 **Bones of the upper limb**

1.8.1 Clavicle, scapula, humerus, radius, ulna

1.8.2 Carpal bones, metacarpal bones, phalanges

1.8.3 Arteries and nerves related to the bones of the upper limb

1.8.4 Ossification of the bones of the upper limb

1.9 **Bones of the lower limb**

1.9.1 Hipbone, pelvis, femur, patella, tibia, fibula

1.9.2 Tarsal bones, metatarsal bones, phalanges

1.9.3 Arches of the foot

1.9.4 Arteries and nerves related to the bone of the lower limb

1.9.5 Ossification of the bones of the lower limb

1.10 **Joints of the bones**

1.10.1 Types of joints

1.10.2 Muscles and joints of the head

1.10.3 Joints and muscles of the neck and trunk

1.10.4 Joints and muscles of the upper limb

1.10.5 Joint and muscles of the lower limb

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1.11 Circulatory system

- 1.11.1 Blood and blood vessels
- 1.11.2 Heart, pulmonary circulation, systemic circulation
- 1.11.3 Veins

1.12 Lymphatic system

- 1.12.1 Lymph, lymphatic vessels, lymph nodes, lymphatic drainage of the body
- 1.12.2 Lymphatic tissue
- 1.12.3 Spleen

1.13 Respiratory system

- 1.13.1 Nose, pharynx, larynx, trachea, bronchi, lungs
- 1.13.2 Physiology of respiration

1.14 Digestive system

- 1.14.1 Mouth, salivary glands, pharynx, oesophagus, stomach, small intestine, large intestine, pancreas, liver, biliary apparatus
- 1.14.2 Function of the alimentary system

1.15 Urinary system

- 1.15.1 Kidneys, ureters, urinary bladder, urethra
- 1.15.2 Functions of kidneys
- 1.15.3 Control of micturition

1.16 Nervous system

- 1.16.1 Nervous tissue
- 1.16.2 Central nervous system, brain, spinal cord
- 1.16.3 Peripheral nervous system
- 1.16.4 Autonomic nervous system

1.17 Endocrine system

- 1.17.1 Pituitary gland, thyroid gland, parathyroid gland
- 1.17.2 Adrenal glands

1.18 Reproductive system

- 1.18.1 Male reproductive system
- 1.18.2 Female reproductive system

1.19 Skin and the organs of special senses

- 1.19.1 Skin, Eye, Ear, Nose, Tongue

2. Radiographic Technique

2.1 General radiography

- 2.1.1 Routine Radiography Technique for upper limb : Fingers, thumb, hand, wrist forearm, elbow, humerus, shoulder, scapula, clavicle
- 2.1.2 Routine Radiography Technique for the lower limb: Toes, foot, calcaneum, ankle, tibia, fibula, knee, femur, hip joint, neck of femur, pelvis
- 2.1.3 Routine Radiographic technique for thoracic cage and its contents (Chest, heart, ribs and sternum)
- 2.1.4 Routine technique for the abdomen: Routine technique of plain & erect abdomen x-ray
- 2.1.5 Routine technique for the spine (Cervical, thoracic, lumbar, sacrum and coccyx, sacro-illac joint)
- 2.1.6 Routine technique for the skull

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक

परीक्षाको पाठ्यक्रम

2.1.5.1 The radiograph anatomical landmarks of the skull

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

2.1.7 To locate the following by x-rays (scaphoid, 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)

2.1.8 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

2.1.9 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)

2.1.10 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)

2.1.11 Tomography

2.1.11.1 Basic principle of tomogram

2.1.11.2 Practical application of Tomography for the chest, kidney, gall bladder and skeletal system

2.1.12 Registration process

2.1.12.1 The steps of registration of patients

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

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

2.2 Radiographic examination with contrast media Special examination with contrast media

2.2.1 Contrast media

2.2.1.1 Definition and types of the contrast media

2.2.1.2 Methods of introducing the contrast media

2.2.1.3 Reactions of contrast media

2.2.1.4 Name of the emergency equipments and drugs needed to cope with reactions

2.2.2 Radiographic investigation of Gastro-intestinal tract using contrast media

2.2.2.1 Barium swallow

2.2.2.2 Barium meal

2.2.2.3 Barium follow through

2.2.2.4 Examination of GI tract

2.2.2.5 Ba-enema

2.2.2.6 Small bowel enema

2.2.2.7 Loopogram

2.2.2.8 State the role of a radiographer during fluoroscopy

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 2.2.3 Investigation of urinary tract and hysterosalpinogram
 - 2.2.3.1 Intravenous Urogram (IVU)
 - 2.2.3.2 Cystogram
 - 2.2.3.3 Micturating cystogram
 - 2.2.3.4 Urethrogram
 - 2.2.3.5 Retrograde pyelogram
 - 2.2.3.6 Hysterosalpinogram (HSG)
- 2.2.4 Radiographic procedure of the Biliary tract
 - 2.2.4.1 Oral cholecystography (OCG)
 - 2.2.4.2 Intravenous cholangiography (IVC)
 - 2.2.4.3 Percutaneous transhepatic cholangiography and drainage (PTC and PTCD)
 - 2.2.4.4 Endoscopic retrograde cholangio pancreatography (ERCP)
 - 2.2.4.5 Operative cholangiography
 - 2.2.4.6 T. Tube cholangiography
- 2.2.5 Use of portable/mobile x-ray in ward and operation theatre
 - 2.2.5.1 Uses of mobile machine
 - 2.2.5.2 Technique of using ward radiography
 - 2.2.5.3 Technique of using operating theatre radiography
 - 2.2.5.4 Technique to help in Hip pinning
 - 2.2.5.5 Technique of operative-cholangiography
- 2.2.6 Vascular and Neurological examinations
 - 2.2.6.1 Carotid and vertebral angiogram
 - 2.2.6.2 Femoral angiogram
 - 2.2.6.3 Aortogram
 - 2.2.6.4 Phlebogram
 - 2.2.6.5 Encephalogram
 - 2.2.6.6 Ventriculogram
 - 2.2.6.7 Myelogram
- 2.2.7 Special examinations
 - 2.2.7.1 Arthrogram
 - 2.2.7.2 Dacrocystogram
 - 2.2.7.3 Sinogram/Fistulogram
 - 2.2.7.4 Sialogram
 - 2.2.7.5 Mammogram
 - 2.2.7.6 Macro-radiography
 - 2.2.7.7 Soft tissue radiography

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

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौं तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक

परीक्षाको पाठ्यक्रम

- 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 Haemorrhage
 - 3.6.4 Burns, scalds
 - 3.6.5 Loss of consciousness
 - 3.6.6 Asphyxia
 - 3.6.7 Fractures
 - 3.6.8 Electric shock
- 3.7 Medico-legal aspects of the radiographer's work**
 - 3.7.1 Breach of professional conduct
 - 3.7.2 Negligence
 - 3.7.3 Procedure in the event of an accident
 - 3.7.4 The importance of records
- 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 Intensifying Screen
 - 4.2.2 Screen speed, sharpness, coating weight
 - 4.2.3 Fluorescent material and phosphorescence
 - 4.2.4 Fluorescent material, new phosphors

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

4.3 Image

4.3.1 Production of radiographic image

4.3.2 Component of radiographic image

4.1.1.1 Contrast, sharpness, resolution

4.1.1.2 Exposure factors

4.1.1.3 Absorption coefficient

4.4 Film processing

4.4.1 Manual film processing

4.1.1.1 Processing cycle

4.4.1.1.1 Development-constituents of developer, factors affecting control of development, developer replenishes maintenance of activity & level of developer

4.4.1.1.2 Rinsing

4.4.1.1.3 Fixation-constituents of fixer, factors affecting fixation and regeneration of the Fixer

4.4.1.1.4 Washing processing

4.4.1.1.5 Drying process

4.4.1.1.6 Tanks and containers for processing chemical, processing units

4.4.1.1.7 Mixing chemicals

4.4.1.1.8 storage of chemicals

4.4.1.1.9 Film hangers

4.4.2 Automatic processor

4.1.1.2 Basic principle & its 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

5.1.1 X-ray tube construction

5.1.2 Stationary and rotating x-ray tube

5.1.3 Recent advancement of an x-ray tube

5.1.4 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

5.3.1 Conventional fluoroscopy and image intensifier tube

5.4 Control of scatter radiation & beam restricting devices

5.4.1 Secondary radiation grids

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

5.4.2 Air gap technique

5.5 Portable and mobile x-ray units

5.5.1 Capacitor discharge and c-arm

5.6 Conventional tomography

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

5.8 Computed Radiography (CR) and Digital Radiography (DR)

6. Radiation Physics

6.1 Atomic structure

6.1.1 The Nucleus

6.1.2 Electron orbits and energy levels

6.2 Production of x-ray, properties of x-rays

6.2.1 General radiation (Bremsstrahlung),

6.2.2 Characteristic Radiation

6.2.3 Intensity of x-rays beams

6.2.4 Target material

6.2.5 voltage (kVp) applied

6.3 Basic interactions between X-rays and matter

6.3.1 Coherent scattering

6.3.2 Photoelectric effect

6.3.3 Compton scattering

6.3.4 Pair production

6.3.5 Photodisintegration

6.4 Radiation measurement and units

6.4.1 Construction & working of the free air ionization chamber

6.4.2 Thimble ionization chamber & condenser ionization chamber

6.5 Radiation protection

6.5.1 Historical introduction or why the protection is necessary against the radiation

6.5.2 Maximum permissible dose

6.5.3 Tabulation of the recommended maximum permissible doses for the different parts of the body

6.5.4 Following the code of practice

6.5.5 Identifying the protective materials

6.6 Personnel monitoring

6.6.1 The necessity of personnel monitoring & monitoring instruments (film badge, ionization chamber & thermoluminescent dosimeter)

6.7 Safety requirements for operating X-ray unit

7. Acts and Regulations

7.1 Current Health Policy (National and Gandaki Province)

7.2 Health Service Act 2053 and Regulation 2055

7.3 Health Professional Council Act 2053 and Regulation 2056

7.4 Local government operation act 2074 section 1-4 and 11

7.5 Health Insurance act 2074

7.6 Public Health Service Act, 2075 and Public Health Service Rule and Regulation 2077

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौं तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक

परीक्षाको पाठ्यक्रम

प्रथम पत्रको लागि यथासम्भव निम्नानुसार प्रश्नहरू सोधिने छ ।

प्रथम पत्र (वस्तुगत)					
भाग	खण्ड	विषयवस्तु	परीक्षा प्रणाली	अङ्कभार	प्रश्न संख्या × अङ्क
I	(A)	सामान्य ज्ञान (General Awareness)	बहुवैकल्पिक प्रश्न (MCQs)	२०	१० प्रश्न × २ अङ्क = २०
	(B)	सार्वजनिक व्यवस्थापन (Public Management)		२०	१० प्रश्न × २ अङ्क = २०
II	-	सेवा सम्बन्धित कार्य-ज्ञान (Job Based -knowledge)		६०	३० प्रश्न × २ अङ्क = ६०

प्रथम पत्रको भाग **(Part II)** सेवा सम्बन्धित कार्य-ज्ञान (Job based -knowledge) को पाठ्यक्रमका एकाइबाट परीक्षामा यथासम्भव देहाय बमोजिम प्रश्नहरू सोधिने छ ।

पाठ्यक्रमका एकाइ	1	2	3	4	5	6	7
प्रश्न संख्या	6	7	3	5	4	4	1

प्रदेश लोक सेवा आयोग
गण्डकी प्रदेश
प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक
परीक्षाको पाठ्यक्रम
द्वितीय पत्र (Paper II) :-
सेवा सम्बन्धित कार्य-ज्ञान (Job based -knowledge)

खण्ड-क (Section-A) : - ५० अङ्क

1. **Anatomy and Physiology**
 - 1.1 **General introduction**
 - 1.1.1 Cell & Reproduction of the individual
 - 1.2 **Tissues**
 - 1.2.1 Epithelial, Connective, Skeletal, Muscular & Nervous tissues
 - 1.3 **General pathology**
 - 1.3.1 Bacteria, Viruses & Tumors
 - 1.4 **Surface and regional anatomy**
 - 1.4.1 Anatomical position, head, neck, thorax, abdomen, pelvic cavity
 - 1.5 **Musculoskeletal**
 - 1.5.1 Structure and function of bone
 - 1.5.2 Development and growth of bones
 - 1.5.3 Healing of fractures
 - 1.5.4 Types and Functions of Muscles
 - 1.6 **Skull**
 - 1.6.1 Skull viewed from above, skull viewed from the front, skull viewed from the side, skull viewed from the below
 - 1.6.2 Interior of the skullcap, interior of the base of the skull
 - 1.6.3 Nasal cavity, accessory nasal sinuses
 - 1.6.4 Individual bones of the skull
 - 1.7 **Vertebral column, ribs and sternum**
 - 1.7.1 Vertebral column, ribs and sternum
 - 1.8 **Bones of the upper limb**
 - 1.8.1 Clavicle, scapula, humerus, radius, ulna
 - 1.8.2 Carpal bones, metacarpal bones, phalanges
 - 1.8.3 Arteries and nerves related to the bones of the upper limb
 - 1.8.4 Ossification of the bones of the upper limb
 - 1.9 **Bones of the lower limb**
 - 1.9.1 Hipbone, pelvis, femur, patella, tibia, fibula
 - 1.9.2 Tarsal bones, metatarsal bones, phalanges
 - 1.9.3 Arches of the foot
 - 1.9.4 Arteries and nerves related to the bone of the lower limb
 - 1.9.5 Ossification of the bones of the lower limb
 - 1.10 **Joints of the bones**
 - 1.10.1 Types of joints
 - 1.10.2 Muscles and joints of the head
 - 1.10.3 Joints and muscles of the neck and trunk
 - 1.10.4 Joints and muscles of the upper limb
 - 1.10.5 Joint and muscles of the lower limb
 - 1.11 **Circulatory system**
 - 1.11.1 Blood and blood vessels

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक

परीक्षाको पाठ्यक्रम

- 1.11.2 Heart, pulmonary circulation, systemic circulation
- 1.11.3 Veins
- 1.12 **Lymphatic system**
 - 1.12.1 Lymph, lymphatic vessels, lymph nodes, lymphatic drainage of the body
 - 1.12.2 Lymphatic tissue
 - 1.12.3 Spleen
- 1.13 **Respiratory system**
 - 1.13.1 Nose, pharynx, larynx, trachea, bronchi, lungs
 - 1.13.2 Physiology of respiration
- 1.14 **Digestive system**
 - 1.14.1 Mouth, salivary glands, pharynx, oesophagus, stomach, small intestine, large intestine, pancreas, liver, biliary apparatus
 - 1.14.2 Function of the alimentary system
- 1.15 **Urinary system**
 - 1.15.1 Kidneys, ureters, urinary bladder, urethra
 - 1.15.2 Functions of kidneys
 - 1.15.3 Control of micturition
- 1.16 **Nervous system**
 - 1.16.1 Nervous tissue
 - 1.16.2 Central nervous system, brain, spinal cord
 - 1.16.3 Peripheral nervous system
 - 1.16.4 Autonomic nervous system
- 1.17 **Endocrine system**
 - 1.17.1 Pituitary gland, thyroid gland, parathyroid gland
 - 1.17.2 Adrenal glands
- 1.18 **Reproductive system**
 - 1.18.1 Male reproductive system
 - 1.18.2 Female reproductive system
- 1.19 **Skin and the organs of special senses**
 - 1.19.1 Skin, Eye, Ear, Nose, Tongue
- 2. **Radiographic Technique**
 - 2.1 **General radiography**
 - 2.1.1 Routine Radiography Technique for upper limb : Fingers, thumb, hand, wrist forearm, elbow, humerus, shoulder, scapula, clavicle
 - 2.1.2 Routine Radiography Technique for the lower limb: Toes, foot, calcaneum, ankle, tibia, fibula, knee, femur, hip joint, neck of femur, pelvis
 - 2.1.3 Routine Radiographic technique for thoracic cage and its contents (Chest, heart, ribs and sternum)
 - 2.1.4 Routine technique for the abdomen: Routine technique of plain & erect abdomen x-ray
 - 2.1.5 Routine technique for the spine (Cervical, thoracic, lumbar, sacrum and coccyx, sacro-illac joint)
 - 2.1.6 Routine technique for the skull
 - 2.1.5.1 The radiograph anatomical landmarks of the skull

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 2.1.5.2 The process of routine examination of the bones of skull (cranium, facial bone and mandible)
- 2.1.7 To locate the following by x-rays (scaphoid, 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)
- 2.1.8 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
- 2.1.9 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)
- 2.1.10 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)
- 2.1.11 Tomography
 - 2.1.11.1 Basic principle of tomogram
 - 2.1.11.2 Practical application of Tomography for the chest, kidney, gall bladder and skeletal system
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 - 2.1.12.1 The steps of registration of patients
 - 2.1.12.2 The importance of a monthly and annual record, filling system and preparing the Performa invoices
 - 2.1.12.3 Filling of radiographs and reports (x-ray No, hospital number, patient's name, cross reference bill, with patient's name)

2.2 Radiographic examination with contrast media Special examination with contrast media

- 2.2.1 Contrast media
 - 2.2.1.1 Definition and types of the contrast media
 - 2.2.1.2 Methods of introducing the contrast media
 - 2.2.1.3 Reactions of contrast media
 - 2.2.1.4 Name of the emergency equipment's and drugs needed to cope with reactions
- 2.2.2 Radiographic investigation of Gastro-intestinal tract using contrast media
 - 2.2.2.1 Barium swallow
 - 2.2.2.2 Barium meal
 - 2.2.2.3 Barium follow through
 - 2.2.2.4 Examination of GI tract
 - 2.2.2.5 Ba-enema
 - 2.2.2.6 Small bowel enema
 - 2.2.2.7 Loopogram
 - 2.2.2.8 State the role of a radiographer during fluoroscopy
- 2.2.3 Investigation of urinary tract and hysterosalpinogram

प्रदेश लोक सेवा आयोग

गण्डकी प्रदेश

प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक

परीक्षाको पाठ्यक्रम

- 2.2.3.1 Intravenous Urogram (IVU)
- 2.2.3.2 Cystogram
- 2.2.3.3 Micturating cystogram
- 2.2.3.4 Urethrogram
- 2.2.3.5 Retrograde pyelogram
- 2.2.3.6 Hysterosalpinogram (HSG)
- 2.2.4 Radiographic procedure of the Biliary tract
 - 2.2.4.1 Oral cholecystography (OCG)
 - 2.2.4.2 Intravenous cholangiography (IVC)
 - 2.2.4.3 Percutaneous transhepatic cholangiography and drainage (PTC and PTCD)
 - 2.2.4.4 Endoscopic retrograde cholangio pancreatography (ERCP)
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- 2.2.5 Use of portable/mobile x-ray in ward and operation theatre
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 - 2.2.6.1 Carotid and vertebral angiogram
 - 2.2.6.2 Femoral angiogram
 - 2.2.6.3 Aortogram
 - 2.2.6.4 Phlebogram
 - 2.2.6.5 Encephalogram
 - 2.2.6.6 Ventriculogram
 - 2.2.6.7 Myelogram
- 2.2.7 Special examinations
 - 2.2.7.1 Arthrogram
 - 2.2.7.2 Dacrocystogram
 - 2.2.7.3 Sinogram/Fistulogram
 - 2.2.7.4 Sialogram
 - 2.2.7.5 Mammogram
 - 2.2.7.6 Macro-radiography
 - 2.2.7.7 Soft tissue radiography

खण्ड-ख (Section- B) : - ५० अङ्क

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

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प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

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 Haemorrhage

3.6.4 Burns, scalds

3.6.5 Loss of consciousness

3.6.6 Asphyxia

3.6.7 Fractures

3.6.8 Electric shock

3.7 Medico-legal aspects of the radiographer's work

3.7.1 Breach of professional conduct

3.7.2 Negligence

3.7.3 Procedure in the event of an accident

3.7.4 The importance of records

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 Intensifying Screen

4.2.2 Screen speed, sharpness, coating weight

4.2.3 Fluorescent material and phosphorescence

4.2.4 Fluorescent material, new phosphors

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4.3 Image

4.3.1 Production of radiographic image

4.3.2 Component of radiographic image

4.1.1.1 Contrast, sharpness, resolution

4.1.1.2 Exposure factors

4.1.1.3 Absorption coefficient

4.4 Film processing

4.4.1 Manual film processing

4.1.1.1 Processing cycle

4.4.1.1.1 Development-constituents of developer, factors affecting control of development, developer replenishes maintenance of activity & level of developer

4.4.1.1.2 Rinsing

4.4.1.1.3 Fixation-constituents of fixer, factors affecting fixation and regeneration of the Fixer

4.4.1.1.4 Washing processing

4.4.1.1.5 Drying process

4.4.1.1.6 Tanks and containers for processing chemical, processing units

4.4.1.1.7 Mixing chemicals

4.4.1.1.8 storage of chemicals

4.4.1.1.9 Film hangers

4.4.2 Automatic processor

4.1.1.2 Basic principle & its 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

5.1.1 X-ray tube construction

5.1.2 Stationary and rotating x-ray tube

5.1.3 Recent advancement of an x-ray tube

5.1.4 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

5.3.1 Conventional fluoroscopy and image intensifier tube

5.4 Control of scatter radiation & beam restricting devices

5.4.1 Secondary radiation grids

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प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

5.4.2 Air gap technique

5.5 Portable and mobile x-ray units

5.5.1 Capacitor discharge and c-arm

5.6 Conventional tomography

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

5.8 Computed Radiography (CR) and Digital Radiography (DR)

6. Radiation Physics

6.1 Atomic structure

6.1.1 The Nucleus

6.1.2 Electron orbits and energy levels

6.2 Production of x-ray, properties of x-rays

6.2.1 General radiation (Bremsstrahlung),

6.2.2 Characteristic Radiation

6.2.3 Intensity of x-rays beams

6.2.4 Target material

6.2.5 voltage (kVp) applied

6.3 Basic interactions between X-rays and matter

6.3.1 Coherent scattering

6.3.2 Photoelectric effect

6.3.3 Compton scattering

6.3.4 Pair production

6.3.5 Photodisintegration

6.4 Radiation measurement and units

6.4.1 Construction & working of the free air ionization chamber

6.4.2 Thimble ionization chamber & condenser ionization chamber

6.5 Radiation protection

6.5.1 Historical introduction or why the protection is necessary against the radiation

6.5.2 Maximum permissible dose

6.5.3 Tabulation of the recommended maximum permissible doses for the different parts of the body

6.5.4 Following the code of practice

6.5.5 Identifying the protective materials

6.6 Personnel monitoring

6.6.1 The necessity of personnel monitoring & monitoring instruments (film badge, ionization chamber & thermoluminescent dosimeter)

6.7 Safety requirements for operating X-ray unit

7. Acts and Regulations

7.1 Current Health Policy (National and Gandaki Province)

7.2 Health Service Act 2053 and Regulation 2055

7.3 Health Professional Council Act 2053 and Regulation 2056

7.4 Local government operation act 2074 section 1-4 and 11

7.5 Health Insurance act 2074

7.6 Public Health Service Act, 2075 and Public Health Service Rule and Regulation 2077

द्वितीय पत्रको लागि यथासम्भव निम्नानुसार प्रश्नहरु सोधिनेछ ।

प्रदेश लोक सेवा आयोग

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प्रदेश/स्थानीय स्वास्थ्य सेवा, रेडियोग्राफी समूह, पाँचौ तह, रेडियोग्राफर पदको खुला प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

द्वितीय पत्र (विषयगत)					
पत्र	विषय	खण्ड	अङ्कभार	छोटो उत्तर	लामो उत्तर
द्वितीय	सेवा सम्बन्धित कार्य-ज्ञान (Job Based-Knowledge)	(A)	५०	६ प्रश्न × ५ अङ्क = ३०	२ प्रश्न × १० अङ्क = २०
		(B)	५०	६ प्रश्न × ५ अङ्क = ३०	२ प्रश्न × १० अङ्क = २०

खण्ड	छोटो उत्तर Section A		छोटो उत्तर Section B					लामो उत्तर Section	
पाठ्यक्रमका एकाइ	1	2	3	4	5	6	7	A	B
प्रश्न संख्या	3	3	1	2	1	1	1	2	2
