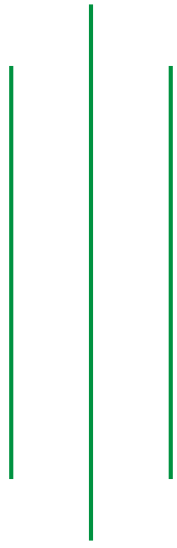
Syllabus for Licensing Examination of PCL Radiography/Diploma in X-Ray Technology 2021



Nepal Health Professional Council
Bansbari, Kathmandu

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1. Anatomy and Physiology

General introduction

The cell & Components of cell

The tissues

Epithelial tissue, Connective tissue, Muscular tissue and Nervous tissue

General pathology

Bacteria, Viruses, Tumors

Surface and regional anatomy

The anatomical position

The head, neck, thorax, abdomen and pelvic cavity

The skeleton

The structure& function of bone

The development and growth of bones

The healing of fractures

The skull

The skull viewed from above, front, side and below

The interior of the skullcap and base of the skull

The nasal cavity and accessory nasal sinuses

The individual bones of the skull

The vertebral column, ribs and sternum

The vertebral column, The ribs and sternum

The bones of the upper limb

The clavicle, scapula, humerus, radius, ulna, carpal bones, metacarpal bones and phalanges

Arteries and nerves related to the bones of the upper limb

Ossification of the bones of the upper limb

The bones of the lower limb

The hipbone, pelvis, femur, patella, tibia, fibula, tarsal bones, metatarsal bones And phalanges

The arches of the foot

Arteries and nerves related to the bone of the lower limb

Ossification of the bones of the lower limb

The joints & muscles

Types of joints

The muscles and joints of the head, neck and trunk, the upper limb, and lower limb

The circulatory system

The blood

The blood vessels & heart

The pulmonary &systemic circulation

The lymphatic system

Lymph, lymphatic vessels, lymph nodes

The lymphatic drainage of the body
Lymphatic tissue and spleen

The respiratory system

The nose, pharynx, larynx, trachea, bronchi and lungs
The physiology of respiration

The digestive system

The mouth, pharynx, esophagus, stomach, intestine and large intestine
The salivary glands, pancreas, liver, biliary apparatus
The function of the alimentary system

The urinary system

The kidneys, ureters, urinary bladder, urethra
The functions of kidneys
The control of micturition

The nervous system

Nervous tissue, The central nervous system- brain and spinal cord
The peripheral nervous system and autonomic nervous system

The endocrine system

The pituitary gland, thyroid gland, parathyroid gland, adrenal glands

The reproductive system

The male reproductive system
The female reproductive system

The skin and the organs of special sense

The skin, eye, ear, nose and tongue

2. Radiographic Technique

General radiography

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

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

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

Routine technique for the abdomen
(Abdomen and KUB)

Routine technique for the spine
(Cervical, thoracic, lumbar, sacrum and coccyx and sacroiliac joint)

Routine technique for the skull
The radiograph anatomical landmarks of the skull
The process of routine examination of the bones of skull
(Cranium, facial bone and mandible)

The supplementary views of the Upper & Lower limb ((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)

The supplementary views of the chest and abdomen (Apical views, lordotic view & decubitus, oblique views for heart size, inhaled or swallowed foreign body, imperforated anus)

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 sacroiliac joints, illum, a etabulum, pelvimetry, skeleton survey)

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

Registration process- The steps of registration of patients. The importance of a monthly and annual record, filling system and preparing the Performa invoices. Filling of radiographs and reports (x-ray No, hospital number, patient's name, cross reference bill, with patient's name)

Radiological Procedure

Contrast media

Definition of the contrast media

Types of contrast media

Methods of introducing the contrast media

Reactions of contrast media

Name of the emergency equipment’s and drugs needed to cope with reactions

Radiographic investigation of Gastro-intestinal tract using contrast media

Barium swallow, Barium meal, Barium follow through, Ba-enema,

Small bowel enema, Lopogram and Gastographic study

State the role of a radiographer during fluoroscopy

RadiographicInvestigation of Urogenital tract

Intravenous Urography (IVU), Cystography, Micturatingcysto Urethrography, Urethrogram,Retrograde pyelogram,Hystero-salpinogram (HSG)

Radiographic procedure of the Biliary tract

Oral cholecystography (OCG), Intravenous cholangiography (IVC) , Percutaneous transhepatic cholangiography and drainage (PTC and PTCD), Endoscopic retrograde cholangiopancreatography (ERCP), Operatice cholangiography and T. Tube cholangiography

Radiographic procedure ofVascular system

Carotid and vertebral angiogram, Femoral angiogram and Aortogram

Phlebogram

Ward and Theatre Radiography

The uses of mobile machine

The technique of using ward radiography

The technique of using operating theatre radiography

Technique to help in Hip pinning

Other Special examinations

Myelogram, Arthrogram,Dacryocystogram, Sinogram/Fistulogram Sailogram, Mammogram, Macro-radiography and Soft tissue radiography

3. Radiographic Photography

X-ray Film

Construction and composition of x-ray film and types of x-ray film

Characteristic curve, special sensitivity & role of dyeing,Film speed, density, contrast, sensitometry

Artifacts and its causes

Intensifying screen

Construction and composition of I.S. Screen speed, sharpness, coating weight

Fluorescent material, phosphorescence and new phosphors- rare earth phosphor

Radiographic Image

Production of radiographic image

Component of radiographic image- Contrast, sharpness, resolution and noise

Exposure factors and Absorption coefficient

Film processing

Manual film processing

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

Rinsing

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

Washing processing and Drying process

Tanks and containers for processing chemical, processing units,

Mixing chemicals, storage of chemicals and Film hangers

Automatic processor- Basic principle & it's functioning

Dark room planning

Location, layout, radiation protection, safelight filter & sensitivity range

Identification

Methods and Importance

Silver recovery

General introduction with different methods

4. Radiographic equipment

Historical background of x-ray and its production

X-ray tube construction,Stationary and rotating x-ray tube

Recent advancement of an x-ray tube, Tube rating cooling and care of x-ray tube and its faults

Control panel, x-ray table and tube column

Type of x-ray table, Different metering equipment and X-ray tube support

Fluoroscopic equipment

Conventional fluoroscopy, image intensifier tube, Construction and uses

Control of scatter radiation & beam restricting devices

Secondary radiation grids and its types, Air gap technique

Portable and mobile x-ray units

Types and use of portable and mobile unit, Construction, Capacitor discharge and c-arm

Conventional tomography

Definition Principle and types of movement

Introduction to modern modalities (CR, DR, CT, MRI, mammography)

Basic introduction and use of modern imaging equipment

5. Radiation Physics

Atomic structure

The Nucleus, Electron orbits and energy levels

Production of x-ray, properties of x-rays

General radiation (Bremsstrahlung), Characteristic Radiation

Intensity of x-rays beams, Target material and voltage (kVp) applied

Basic interactions between x-rays and matter

Coherent scattering, Photoelectric effect, Compton scattering, Pair production

And Photodisintegration

Radiation measurement and units

Construction & working of the free air ionization chamber

Thimble ionization chamber & condenser ionization chamber

Radiation protection

Historical introduction or why the protection is necessary against the radiation

Maximum permissible dose and Tabulation of the recommended maximum

Permissible doses for the different parts of the body

Following the code of practice and identifying the protective materials

Personnel monitoring

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

6. Patient Care and Management

The hospital, the patient and the radiographer

Clinical responsibility, Legal responsibility of radiographer with patient and hospital

Features of general patient care

General preliminaries to the examination
Moving chair and stretcher patients
The anaesthetized patient
Hygiene in the x-ray department
General comfort and reassurance for the patient

Drugs in the x-ray department

Poisons and dangerous drugs
Units of measurement of drugs
Drugs used in preparation of the patient
Drugs used in resuscitation
Labeling and issuing

Sterilization and sterile techniques

Methods of sterilization &Central sterile supply
Preparation of the hands for aseptic procedures

Preparation of the patient

General abdominal preparation &Clothing of the patient

First aid in the x-ray department

Radiological emergencies, Shock, Hemorrhage, Burns, scalds, Loss of Consciousness, Asphyxia, Fractures and Electric shock

Medico-legal aspects of the radiographer's work

Breach of professional confidence, Negligence, Procedure in the event of an Accidentand importance of records

7. Ethics, code of practices, law and regulations

Ethics and code of practices of radiographer
Nepal Health Professional Council
Nepal Health Service Act, 2053 and Regulation,