



पूर्व मध्य रेल
EAST CENTRAL RAILWAY

कार्यालय
महाप्रबंधक (का.)
हाजीपुर

No.ECR-HQOPERS (RULE)/0013/2025 (Com.No.353304)

Date: As Signed

1. CAO (Con.)/उत्तर एवं दक्षिण/पटना।
2. सभी PHOD/CHOD/पूमरे/हाजीपुर।
3. DRM/पूमरे/दानापुर, डीडीयू, धनबाद, सोनपुर एवं समस्तीपुर।
4. मुख्य कार्मिक अधिकारी/आई.आर.एण्ड डब्ल्यू/पूमरे/हाजीपुर।
5. मुख्यालय के सभी कार्मिक अधिकारी।
6. CWM/पीडी/डीडीयू, यांत्रिक कारखाना/समस्तीपुर एवं हरनौत।
7. Dy.CPO/पीडी/डीडीयू।
8. Sr.DPO/पूमरे/दानापुर, डीडीयू, धनबाद, सोनपुर एवं समस्तीपुर।
9. उप महाप्रबंधक/विधि/पटना।
10. प्राचार्य/क्षेत्रीय रेल प्रशिक्षण संस्थान/मुजफ्फपुर एवं भूली।
11. सकाधि/यांत्रिक कारखाना/समस्तीपुर एवं हरनौत।
12. सभी मुकार्याधी/कार्याधी/पूमरे/हाजीपुर।

विषय:- Syllabus for Selection to the different Posts of Medical Department under PRQ/IAQ/LDCE.

विषयोक्त के संदर्भ में चिकित्सा विभाग के विभिन्न पदों के लिखित परीक्षा हेतु पाठ्यक्रम (Syllabus) सूलभ संदर्भ हेतु संलग्न किया गया है। पदों का विवरण निम्नवत है : -

1. Dresser / OTA-III
2. Radiographer / X-Ray Technician

Note : Optional Question of 10% of total marks on Rajbhasha Policy and Rules.

सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित किया जा रहा है।

उपरोक्त पर PCMD महोदय का अनुमोदन प्राप्त है।


20.1.2026

(अजित कुमार)

उप मुख्य कार्मिक अधिकारी/आई.आर.एण्ड.डब्ल्यू.
कृते महाप्रबंधक (कार्मिक)/पूमरे/हाजीपुर

प्रतिलिपि/- निम्नलिखित को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित:-

1. प्रमुकाधि के निजी सचिव - प्रमुकाधि महोदय को सादर सूचनार्थ।
2. महासचिव/ईसीआरईयू/पूमरे/हाजीपुर।
3. महासचिव/एस.सी.एवं एस.टी.एशोसिएशन/ओ.बी.सी.एशोसिएशन/पूमरे/हाजीपुर।
4. सकाधि (एम.पी.पी.)/पूमरे/हाजीपुर-कृपया इसे वेबसाइट पर अपलोड कराने की व्यवस्था करें।



East Central Railway
Syllabus for Dresser / OTA-III

1. To dressing of all types of wounds and injuries.
2. Sterilization of all instruments.
3. To autoclave all dressing material.
4. Preparation of patients for operation.
5. Management of all instruments and equipment.
6. Preparation and application of splints, plasters and undertake cutting and rolling of bandages including holding of ledger.
7. Maintenance of linen, Surgical instruments and other equipments.
8. Performance of vaccination.
9. Preparation of antiseptic lotions.
10. To give enema to patients.
11. Management of operation theatre and dressing room.
12. To help the anesthesiologist.
13. Removal of stitches, catheters etc.
14. To refill the first aid boxes.
15. Biomedical waste management.
16. Rajbhasha and Current affairs.
17. Railway HMIS.

Note : Rajbhasha

- Optional Question of 10% of total marks on Rajbhasha Policy and Rules.

SYLLABUS OF RADIOGRAPHER/X-RAY TECHNICIAN

A. 1. Gross Radiological and surface Anatomy of human body.

Introduction to Anatomy as a whole, structure of human cells and tissue types, connective tissue, muscle tissue, nervous tissue, epithelial tissue, etc. Skeleton, bones and joints formation of bone growth of skeleton Centers of ossifications, types of the joints. Thoracic contents and general location of the organs and vessels. Abdominal viscera and the location of major organs. Fracture and dislocations. Diseases of the bones and joints. Radiological Anatomy, Surface Anatomy.

2. Physiology in Radiography.

Blood-its composition and function-nerve tissue-muscular tissue and types. Abnormalities in tissue-ulceration-sepsis-asepsis and antisepsis the nature of neoplasm, common tumors-Malignant tumors-dissemination of malignancy, primary and secondary spread.

Respiratory system-Nasal passages and para nasal sinuses-Pharynx and larynx-Trachea, Bronchus and lungs-The pleura-nature and functions of respiration-common terms relating to diseases and conditions of this systems. Lymphatic system-Lymph and tissue fluid main glands and drainage areas in the lymphatic system-Lymphoid tissue and the tonsils.

Reticulo-endothelial system-Liver and spleen-Bone marrow, Life cycle of red and white corpuscles of the blood, Alimentary systems-function of mouth, tongue and teeth, salivary glands-Pharynx and oesophagus-Stomach-small intestine (jejunum)-Large intestine colon-

Liver and biliary tract-pancreas-Functions of the alimentary system digestion and absorption of food-metabolism-common terms used in connection with abnormalities of this system.

Urinary tract-kidney, ureters and bladder-urethra-urinary excretion.

Reproductive system-Male genitalia-Female genitalia, Mammary glands-Menstruation, pregnancy and lactation-common terms related to abnormalities of this system.

Ductless glands (Endocrine system)-Anatomical location of pituitary, thyroid, parathyroid, adrenal, thymus, pancreas and gonads-their function & common term related to the system.

Nervous system- Main subdivisions, lobes and ventricles of the brain. Spinal cord meninges and cerebro-spinal fluid, common terms used in abnormalities of this system. Organs of sense:-Structure and function of the eye. Structure and function of the ear. Surface landmarks and topography in relating to organs on the body for radiographic positioning, positional terms, anatomical terminology with regard to location.

3. Basic Electricity and magnetism and Radiation Physics.

Revision of mathematics related to radiography, measurements and units of C.G.S. and M.K.S. system. Electrical charges, Potential difference, current and resistance. Ohm's law for electrical circuits, direct current. Conductor, insulators and semi-conductors. Electrical Power - ammeters and voltmeters. Electromagnetism, Electromagnetic induction self and mutual. Production of A.C. Generators, Transformers.

Thermionic emission, vacuum, diode-variation of tube current and anode voltage. The diode as rectifier and as an X-ray tube. Types of rectification and methods used in diagnostic, and therapy units H.T. Cables. Capacitor and Capacitance, generation and property of X-rays, interaction of X-ray with matter.

X-ray tube-diagnostic type method of heat dissipation, failure, measurement in Radiation exposure. Scattered-Radiation anti methods to reduce it. Inverse square law etc

4. Dark Room procedures.

Fundamental of photographic emulsion, light sensitive materials, construction and emulsion formation. Formation of latent image. Chemical development of the latent image. Storage of X-ray films & its transportation. Types of photography emulsions. Size of grain-speed of the films. Sensitometry-evaluation of emulsion characteristic-density, contrast and latitude - basic fog - characteristic curve - Luminiscence-fluorescence

and phosphorescence. Fluorescent screens, types of intensifying screens, mechanism-care of intensifying screens and cassettes, intensification factor, size of crystals, reciprocity failure and test for it. Cassettes-test for cassettes for screen-contrast and light leakage. Construction & types of films (X-rays, material, Etc.). X-ray Developer-characteristics-possibility of retaining standard results with regeneration-low fog and staining properties, long active life. Developing agents-function and constituents of the developer-standardization by time and temperature-Process of development, latitude-exhaustion of developer-regeneration by replenishment. Types of developer used in radiography-powders & liquid concentrates-standard, high contrast and high energy developers-Ultrarapid development methods-increased temperature, use of replenisher, special ultrarapid developer, combined developer/fixer solutions.Fixation-fixing agents-constituents of radiographic fixer and function of the chemicals-fixation time-exhaustion of fixer-silver recovery combined with generation of fixer (electrolysis)-other silver recovery methods-rapid fixer.Film rinse-acid stop bath-washing of films static bath-water flow and rate of change-test for washing film during methods.Practical processing-preparation of solutions-water supply-mixing vessels-order of mixing chemicals-stock solutions and storage-storage of dry chemicals and liquid concentrates.Processing apparatus-temperature control-immersion heaters-thermostat-ice cooling and refrigeration cooling.Theatre processing-ultra-rapid processing-dish and small tank techniques-ultra-rapid processing -dish and small tank techniques-special theatres processors-types and care of hangers.Technical and processing faults-fog, static, pressure, screen artefacts.Chemical reduction of film density-farmers reducer preparational and selective techniques-local application.The X-ray Dark Room-minimum dimensions-services required-planned circulation and layout-light proofing-ventilation-radiation protection-dooration and chemical proof materials-Bench design, film holders, film makers, hanger location-Location of processing unit-pass box-fixers or wash tanks-illumination and testing of illumination-separate drying room with drying cabinets-wet or dry viewing rooms following manual or automatic processing rapid drying apparatus-effects of circulation and layout planning on efficiency.The radiographic image-effects of exposure factors on contrast, detail and image sharpness-relationship between kilo voltage & exposure time and tube current (mAs)-effects of distance, filtration, collimation, screens, grids, film speed developers and processing techniques.Presentation of the radiograph identification orientation-technical information for film making-actinic markers using radiation sources preparation of stereo radiographs for straight or mirror viewing-mounting of dental films-use of lead letters and numbers-embossing machine-inscribing materials.Accessories viewing boxes-magnifier-high intensity localized viewers-projectors and viewing screens for miniature and cineradiography-film tremors-corner cutters-dental mounts, films envelopes-filling system and units-stores viewers.Fluorescent screen photography-photofluorography and cineradiography-optical principles lenses, speed, focal length, depth of field function of the diaphragm-focusing- Equipment for photofluorography (Radiophotography, Miniature radiography)-Conventional lens units-mirror lens units-cassettes types-film magazines-manual and automatic operation-automatic exposure control-optical identification devices-safety relays and interlocks, independent generators-design of static and mobile units-Units for battery operation-Battery ("reservoir"units).Fluorescent screen types spectral emission for maximum photographic efficiency-lens resolution and color sensitivity-halation, radiography technique and its role in preventive, epidemiological and diagnostic.System-exposure techniques to ensure uniformity with and without automatic exposure control-special protective measures-viewing and projection-filling system-records-organization of surveys.

5. Hospital practice and care of the patients.

Hospital staffing and administration records professional ethics in attitudes to patients. Cooperation with other staff and depts. Departmental organization. Handling of the patient, moving of injured patient. Normal pulse, temperature and respiration. Preparation of the patients for general and special examination. Supervision of patients undergoing special examinations. Supervision of patients undergoing special examination. Administration of enemas, aseptic and sterile procedures. Use of opaque media. Trolley setting for special X-ray examinations.

6. Apparatus for Radiography.

Basic circuits of X-ray machine, construction and functioning of each part, component. Construction and function of imaging equipment like X Rays, Ultrasound, CT scan and MRI etc.

7. Radiographic Techniques of Bones & Joints.

Individual bones of skeletal system of human body & its different projections. Special projection, whenever required & indicated as in skull including petrous, temporal, mastoids, accessory nasal arches, nasal bone, maxilla, mandible, temporomandibular joint, optic foramina, teeth, intra-oral and extra-oral projection-occlusal view. Projections of scaphoid, shoulder joint, sternum, SI joint, hip joint, Patella, Calcaneum, lordotic view, chest apicogram.

8. Radiographic Techniques (Special).

Salivary glands-routine projections for calculi, sialography with opaque media. macro-radiography, general & selective, angiography, peripheral angiography, cerebral angiography, venography with Valsalva.

Respiratory system-upper respiratory tract-nasopharynx-larynx-trachea-barium swallow. Thyroid & parathyroid glands-bronchus-tomographic techniques. Lungs-routine projections-evaluation of unilateral density, exposure on inspiration & expiration, Valsalva & Muller's maneuver, pleural techniques to demonstrate fluid levels, effusions & adhesions-oblique, lordotic & decubitus AP and Lateral projections-pneumothorax, expiration & inspiration. Diaphragmatic excursion-double exposure technique-fluoroscopy, mediastinum-routine projections.

Bronchography-dangers of anesthesia of larynx-inhibition of coughing-methods of introduction of opaque media-positioning and technique during introduction of media.

Genito-urinary system- Plain film examination of K.U.B. _ Differentiation of opacities especially in right hypochondrium. Erect, lateral, double exposure on inspiration and expiration. Excretory pyelography-intravenous pyelography (I.V.P.) - Drip infusion pyelography- pyelography in children.

Use or non-use of compression- Trendelenburg's position, High dose technique – appreciation of factors causing variation in concentration of media, contrast media to be used and quantities to be injected-supplementary techniques. Retrograde pyelography-position and identification of ureteric catheters.

Cystography- Introduction of the media-exposure in relaxed and straining micturition control by image intensifier and cineradiography- demonstration of fistulae, post micturition radiographs-urethrography-excretory or retrograde technique.

Radiography of exposed kidney during surgical operation- Renal angiography during selective aortography-retroperitoneal and perinephric gas insufflation techniques.

Obstetrics and gynaecology- Pregnancy-techniques for evaluation of foetal development, maturity, abnormality, position and multiplicity-placentography- Use of compensating filters-contrast media and soft tissue techniques-cystography and arteriography- pelvimetry- Consideration of radiation hazard- Cephalometry-Hystero-salpingography- Preparation of patient- Alternative injection procedures – Radiation hazard in Obstetrics and gynaecological radiography.

Central Nervous System- Routine projection of skull and spine-ventriculography and co-cephalography- Injection of contrast media- Film series to cover all ventricular outlines- Cerebral angiography- Myelography- Methods of contrast injection.

Alimentary system- Barium swallow- Pharynx and oesophagus- contrast technique with Valsalva maneuver Barium meal- Procedure for fluoroscopic examination of stomach jejunum and colon appropriate timing- Diaphragmatic hernia-Post-operative examinations the Barium meal follow through- Plain film, erect, P.A, decubitus for abdominal obstruction- Barium enema- Preparation of the patient Administration of the opaque medium routine projections under fluoroscopic control, special techniques in colostomy. Hirschsprung's disease double contrast enema with insufflation technique Intussusception

Biliary system- Routine projections for plain film- differentiation of opacities in Right hypochondrium (see Genito-Urinary system) respiratory movements. Oral cholecystography- projection of the patient advice on talking of oral opaque medium- reasons for nonappearance of opaque medium in system- Intravenous cholecystography I.V.C. Action of fatty meal- Direct and indirect cholangiography- Demonstration of hepatic ducts.

Liver and spleen- Pneumoperitoneum - Fluoroscopy and radiography of diaphragmatic excursion- Selective Aortogram- splenohepatic venography.

Salivary glands- routine projections- sialography.

Arthrography- Media for visualizing joint space- asepsis, special projections.

Sinography- tracing of fistulae and inflammatory conditions by opaque media and fluoroscopic control.

Lymphatic system – Soft tissue differentiation for regions concerned – Classification of glands – technique for lymphography with colour tracer and opaque media.

Tomography – Advantages of various movements, Linear, circular elliptical, hypocycloidal – Basic of tomographic principles – effects of operational angle, F.F.D., vibration blur, magnification – Estimation of relevant layer of thicknesses and localization of required area by plain films and fluoroscopy – sequential tomography – Horizontal tomography – simultaneous multi – section tomography.

Fluoroscopy – General considerations of the role of the radiographer – dose hazard – limitation of K.V., mA, Focus – skin distance – fluoroscopic time – Radiation protection to staff during fluoroscopy and associated examination.

Stereography – Principles involved – Tube shift in relation to patient – Stereoscopic apparatus for viewing and orientation of films in relation to viewing methods correct making of stereographs.

Soft tissue techniques – Non – screen techniques – simultaneous screen and non – screen technique – Mammography.

High voltage technique – General principle – Relationship to patient dose – change in contrast, range and detail – elimination of scatter – Accessories for H.V. techniques – Radiographic factors.

Localization of foreign bodies – Necessity for removal of all clothing and other opaque objects from the region to be examined – Anatomical location by projections at right angles – Fluoroscopic control for alimentary tract – Principles of geometrical localization.

Techniques for intra ocular F.B. – Technique for swallowed bones and obstruction to Barium swallow – technique to locate non opaque F.B. – Technique for inhaled F.B.

9. Recent advances in Imaging and contrast media:

Radio Nuclide, scintigraphy, C.T. Scanning, Ultrasound, NMR, Digital radiography contrast Media types, Properties, reactions and commonly used in diagnostic radiology.

10. Radiation hazards and its protections and planning of the department:

Introduction, Hazard, protections, units, aims and objective, principles and methods, diagnostic X – Ray methods, design locations, layout, room size, shielding, illumination, control panels, waiting area, choice of equipment.

Wards mobile and domiciliary Radiography – Electrical supply – Radiation protection – cooperation with staff and care of ill patients – special considerations of patients having radioactive sources in the body.

Operating theatre techniques – revision of procedure in collaboration with theatre staff – Checking of mains supply and function of apparatus and selection of exposure factors prior to examination – Explosive risks – Asepsis in technique – Protection – rapid processing techniques.

Planning in Radiology Department, rating of X – Ray tubes.

B. Rajbhasha

Note:

- Optional Question of 10% of total marks on Rajbhasha Policy and Rules.

C. Basic Knowledge – Application of Railway HMIS