



All India Institute of Medical Sciences, Jodhpur

Indicative Syllabus for the Examination for the Post of DARK ROOM ASSISTANT GRADE-II

(Syllabus is only indicative. The questions can assess any aspect of knowledge, aptitude, attitude and practical skills, which is expected from a trained person to work efficiently at the advertised post)

Section A

40% Questions to be based on General Aptitude from the following topics:-

General Intelligence & Reasoning: It would include questions of non-verbal type. The test will include questions on similarities and differences, space visualization, problem solving, analysis, judgment, decision making, visual memory, discriminating observation, relationship concepts, figure classification, arithmetical number series, non-verbal series etc. The test will also include questions designed to test the candidate's abilities to deal with abstract ideas and symbols and their relationship, arithmetical computation and other analytical functions.

Quantitative Aptitude: This paper will include questions on problems relating to Number Systems, Computation of Whole Numbers, Decimals and Fractions and relationship between Numbers, Fundamental arithmetical operations, Percentages, Ratio and Proportion, Averages, Interest, Profit and Loss, Discount, use of Tables and Graphs, Mensuration, Time and Distance, Ratio and Time, Time and Work, etc.

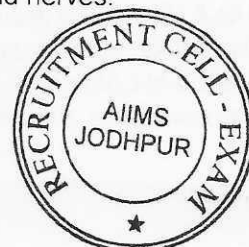
Computer Knowledge: Candidates' understanding of the Basics of Computer Knowledge, its parts, functions, emails, MS office, etc.

Section B

60% Questions to be based on Subject/Domain knowledge from the following topics:-

Anatomy and Physiology:

- Structure of the body—cells, tissues. Musculoskeletal System: Skull, Vertebral column, Shoulder Girdle Bones of upper extremities, Bones of lower extremities, pelvis and its muscles, Ossification.
- Cardiovascular System: Heart—blood— Arteries—Veins.
- Lymphatic System: Circulation of Lymph, Lymph glands
- Respiratory System: Nose, Larynx Trachea-Lungs Bony-case.
- Nervous System: Brain-meninges ventricles-Spinal cord and nerves.



- Eye: Structure and its function.
- Ear: Structure and function.
- Surface Anatomy and Cross-sectional Anatomy.
- Reproductive System: Female & Male organs.
- Urinary System: Kidneys, Ureters, Bladder, Prostate and Urethra.
- Skin: Structure and its function.
- Endocrine System: Pituitary gland, Penial gland, Thymus gland, thyroid and parathyroid gland, suprarenal glands

Dark Room Techniques:

- Photographic Process: Light image, Image produced by radiation, Light Sensitive materials, latent image.
- Film Material: The structure of X-ray & Imaging films, Resolving power, Grains of films, sensitivity of film, contrast of films, Type of films.
- X-ray Film Storage: Storage of unexposed films.
- Screens: Construction of intensifying screens.
- Choice of fluorescent material.
- Intensification factor, Detail, Sharpness. Speed, Screen contact, care of intensifying screens, Types of Screens. Cassettes: Cassette designs, Care of cassette, mounting of intensifying screen in the cassettes, various types of cassettes.
- Safe Light: Constituents, filter, testing. Film Processing: Constituents of processing solution and replenishes.
- Factors affecting the development. Types of developer and fixer, Factors affecting the use of fixer. Silver recovery methods.
- Film Rinsing, Washing and
- Drying: Intermediate rinse-washing and drying.
- Film Processing Equipment: Manual and Automatic processing. Dark Room Design: Outlay and materials used.
- Radiographic Image: The sharpness, contrast, detail, definition, viewing conditions & artifacts.
- Miscellaneous: Trimming, identification of films, legends, records filing, report distribution.

General Physics:

- Elementary idea of thermionic emission, Electron-idea of mass and nature of charge, Coulomb's law, Electric field, Unit of potential.
- Ohm's law, Units of resistance, potential and current, Earthing of electrical equipment.
- Magnetic fields, Lines of force, Construction and working of galvanometer, voltmeter, A.C. and D.C. currents-effective current, Electromagnetic induction – Laws, fields, influence. Transformers – Principles, construction, and uses of step down and High tension transformers.
- Diode values and their use in rectifiers solid-state rectifiers, its various rectifying circuits uses in X-ray machines, production of X-rays and their properties, X-ray tube-Stationary anode and rotating anode & therapy tubes, X-ray circuit, interlocking circuits, relay and timers.

Radiographic Techniques:

- Upper Limb: Fingers individual and as a whole hands, Carpal bones wrists, Forearm, elbow-head of radius, humerus, shoulder joint, Acromioclavicular joint, scapula, sternoclavicular joint, small joints.
 - Lower Limb: Toes, foot, calcaneum & other tarsal bones, ankle joint, legs, knees, patella, fibula, femur, intercondylar notch.
 - Hip & Pelvis: Hip, Neck of femur, threatre procedure, for hip pinning or reduction, pelvis, sacro-iliac joints, pubic bones, acetabulum.
- Vertebral Column: Curves, postures, relative levels atlanto, occipital region, odontoid process, Cervical spine, thoracic Inlet, Cervico, thoracic spine,



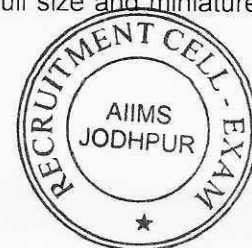
- lumbosacral spine, sacrum, coccy scoliosis, kyphosis, flexion, extension and neutral.
- Bones of the thorax: Sternum ribs. Skull: Land marks, Cranium, facial bones, maxilla, mandible, zygoma, T.M.
- joints, mastoids, petrous bones, optic foramen, sella turcica, P.N.S.
- Chest: Chest in telerradiography, chest supine & portable, Lordotic, apicogram and MMR.
- Abdomen: Preparation, indication and contraindication, acute abdomen, pregnancy abdomen for multiplicity maturity and foetal abnormality.
- Pelvirnetry.
- Soft tissue: Neck and breast.
- Emergency Radiography: Bedside radiography, O.T. Radiography.
- Radiography for age evidence: Bone age evidence.
- Dental Radiography: Occlusal view, Dental X-ray, Panoramic view.

Radiographic Procedures:

- Contrast media.
- Urinary Tract: I.V.P., Retrograde Pyelography, Cystourethrography. Presacral Insufflation.
- Biliary Tract: Oral cholecystography, I.V.C, Trans hepatic percutaneous cholangiography preoperative cholangiography – T-tube cholangiography, E.R.C.P.
- Tomography: Principle, equipment and types of movements, procedure.
- Venography:
- Mammography and Xeroradiography.
- Female Genital Tract: Hystero Salpingography, Gynecography, Placentography & Pelvimetry.
- Angiography: Carotid angiography, Femoral arteriography, Aortography, Selective angiography etc.
- Sialography
- Sinography
- Arthrography

Radiation Physics and related equipments:

- Latent images formation and its processing.
- Various units used for measuring radiation—Roentgen, rad and rem. Construction of X-ray tube, X-rays—its production and properties.
- Ionization chambers, G.M. Counter and Scintillation Counter, Interaction of X-ray with matter.
- Quality and quantity of X-rays, HVT, linear absorption coefficient, Grid, Cones and Filters.
- Inverse square law, scattered radiations and appliances used to reduce it.
- II. Radioactivity
- Curie, Half-life, decay factor. Details about radium, cobalt and caesium.
- Doses—dose and dose rate, exposure dose, exit dose, surface dose, depth dose, isodose charts and their uses.
- Radiation Hazards, Protection against it, film badge, pocket ionization chamber, maximum permissible dose.
- High-tension control equipment – Diagnostic H.T. circuits,
- Production of X-ray tubes and high tension circuits for the production of control panel and control safety device and interlocks, basic principles of mega voltage X-ray machines.
- Fluoroscopy – Tube filtration, diaphragm, tilting couch screen grid and exploratory and control safety devices, compressors, protection, electrical radiographic and mechanical control, use and care of couch accessory fittings. Special equipment – body section radiography, apparatus and controls simultaneous multi section accessories specialized couches, skull table, mobile units. Image intensifiers, principles, optical systems, for viewing and recording final image electrical and x-ray supply protection, applications, including cine radiography, mass miniature radiography, special radiography, equipment for high speed serial techniques (etc.) rapid cassette changer rapid films changer, roll films, full size and miniature, biplane



- equipment, grids, protection, problems of processing and presentation, care and maintenance – general principle and routine use of charts supplied by manufactures, radiographic calibration procedure.
- Care of patient: - first contact with patient in the department handling of chair and stretcher patients, lifting of ill and injured patients, elementary hygiene, personal cleanliness, hygiene in relation to patients. E.g. clean linen and receptive nursing care, temperature. First Aid: - Shock, asphyxia, convulsions, artificial respiration, electric shock, burns, scalds,
 - Haemorrhage, pressure point, tourniquet, fractures, splints, bandaging, foreign bodies, poisons, drug, reactions, administration of oxygen.
 - Preparation of a patient for general X-ray examinations. Departmental instruction to out patients or ward staff, use of aperients, enema and colonic irrigation, flatulence and flatus causes and methods of relief, principles of catheterization and intubations, premeditation, its uses and methods, anaesthetised patients, nursing care before and after special X-ray examinations e.g. in neurological, vascular and respiratory conditions diabetic patients, special attention to food, trauma hazards.
 - Preparation of patients for special x-ray examinations barium enema, barium meal, intravenous pyelography cholecystography etc. and their administration.
 - Principles and aspects: - Methods of sterilization, care and identification of instruments and surgical dressings in common use, setting of trays and trolleys for various examinations etc.
 - Intravenous pyelography, biopsy, elementary operating theatre produce. Drugs in department- storage, labelling checking, regulations regarding
 - Contrast media- barium preparations, iodine
 - Radiographic Photography:
 - Photographic aspects of radiography– the fundamentals of the photographic process, light sensitive salts of silver, the photographic emulsion gelatin as suspension medium, size and frequency of the silver halide grain in relation to sensitivity and contrast, formation of the latent image, chemical development, construction of x-ray film base material, substratum coating, emulsion, coating anti-abrasive super coating sensitivity, storage of unexposed film.
 - Characteristics and detail freedom from chemical fog and staining, long life possibility of degeneration.

Specialized investigations:

- Computed Tomography
- Principles of CT – Basic Physics
- Recent developments, applications etc.
- Positioning in CT
- Different types of contrast materials.
- Emergency treatment.
- Radiation hazards
- Disposal of unused matter. Magnetic Resonance Imaging Principle – Physics – Techniques
- Types of coils – Basic term used in MRI Operations, Applications, etc.
- Positioning in MRI.
- Different types of contrast materials.
- Emergency treatment.
- MRI hazards.
- Factors affecting quality of imaging. Ultrasound
- Physics – Types of ultrasound – Techniques of ultrasound scanning in different parts – positioning and filming – Principles of Doppler effect and colour Doppler.

