



165

GOVERNMENT OF SIKKIM
DEPARTMENT OF HEALTH CARE, HUMAN SERVICES AND FAMILY WELFARE
TASHILING SECRETARIAT, GANGTOK

No. 114...../ HC - HS & FW/ 2019

Dated : 05/01/19..

NOTIFICATION

The following rules for open competitive examination conducted by the Sikkim Public Service Commission for appointment of Radiographer/ CT Scan Radiographer in the Sikkim State Subordinate Allied and Healthcare Service under Department of Health Care, Human Services and Family Welfare are notified here under, namely: -

01. The number of vacancies to be filled – up after the examination will be specified in the notice to be issued by the Sikkim Public Service Commission.
02. The examination will be conducted by the Sikkim Public Service Commission according to syllabus and procedure as indicated in the Appendix I appended to these rules.
03. The date and place of examination will be fixed by the Sikkim Public Service Commission.
04. The candidates must write the answer in his/ her own handwriting. Under no circumstances will he/ she be allowed the help of a scribe to write the answers.
05. A candidate must pay fees as may be prescribed by the Commission.
06. The decision of the Commission as to the eligibility of a candidate for admission to the examination shall be final. Their admission at all stages of examination for which they are admitted by the Commission, viz., main (written) examination and interview test will be purely provisional subject to their satisfying the prescribed eligibility conditions. If on verification at any time before or after the main (written) examination and interview test, it is found that they do not fulfilled any of the eligibility conditions, their candidature for the examination will be cancelled by the Commission.
07. No candidate will be admitted to the Examination Hall unless he/ she hold a certificate of admission issued by the Commission. Their admission to all the stages of the examination will be purely PROVISIONAL subject to satisfying the prescribed eligibility test. Mere issued of admission certificate to the candidates will not imply that his/ her candidature has been finally cleared by the Commission.
08. A candidate who is or has been declared by the Commission to be guilty or any attempt on his/ her part to obtain support his/ her candidature by any means shall render him/ her liable to be disqualified for admission to the competitive examination.
09. (a). Mobile phones/ pagers or any other communication devices are not allowed inside the premises where the examination is being conducted. Infringement of these instructions shall entail appropriate actions including ban from taking the examination.
(b). Candidate are advised in their own interest not to bring any of the banned items including mobiles/ phones/ pagers to the venue of the examination, as arrangement for safe keeping cannot be assured.
(c). Candidates are advised not to bring any valuable/ costly items to the Examination Hall, as safe keeping of the same cannot be assured. Commission will not be responsible for any loss in these regard.
10. The Commission shall have the discretion to fix the qualifying marks in any or all subjects in the written examination.
11. A Candidate, who obtains such minimum qualifying marks in the written examination, as may be fixed by the Commission, shall be called for interview. In the interview, marks shall be assigned by the Commission at their discretion.
12. The form and manner of announcement of results of the examination shall be decided by the Commission. The Commission will not enter into any correspondence with any candidate regarding results.

- 13. After the examination and interview, the names of the successful candidates will be arranged by the Commission in the order of merits based on marks awarded to each candidate. Candidates shall be considered for appointment to the available vacancies in the order in which their name appear in the merit list.
- 14. A candidate who is or has been declared by the Commission guilty of impersonation or of submitting false and fabricated documents which have been tampered with or of making statement which are incorrect or false or of suppressing material information or of attempting to use unfair means in the Examination Hall or otherwise, or resorting to any or other irregular or improper means for obtaining admission to the Examination Hall may, in addition to rendering himself liable to criminal procedures, be debarred: -
 - (a). by the Commission permanently or for specified period for admission to any examination or appearance at any of the interview held by Commission for selection of candidates
 - (b). by the State Government from any employment under them.
- 15. Candidates, already in Government Service or in Government owned Undertaking or similar Organization, whether in permanent or temporary capacity or as work charged employee shall be, required to submit their applications alongwith 'No Objection Certificate' of their employers.
- 16. Success in the examination confers no right to appointment unless Government is satisfied after such enquiry as may be considered necessary that a candidate having regard to his/ her character and antecedents is suitable in all respect for appointment.
- 17. A candidate must be in good health and free from any physical deficit likely to interfere with the discharge of his duties. A candidate who (after such medical examination as may be prescribed by the competent authority) is found not to satisfy these requirement will not be appointed.
- 18. If a candidate's handwriting is not legible, a deduction may be made in the account from the total marks otherwise accruing to him/ her.
- 19. No travelling and daily allowance will be paid for the journey performed in connection with the examination, interview and medical examination. All other matters not specified or for which no provision has been made in these rules shall be regulated by rules and orders applicable to the service to which recruitments are being made.
- 20. The candidate must obtain the qualifying marks decide by the Sikkim Public Service Commission in the written examination.
- 21. The Department/ Commission will not entertain any applications on review or RTI/ correspondence till the entire process of recruitment is completed.
- 22. The candidate on selection and during the period of probation/ apprenticeship/ training, pay shall be governed by the Notification No. 489/ GEN/ DOP; Dated : 31. 10. 2011.
- 23. Scheme/ Pattern of examination will be determined by the SPSC.

By order and in the name of the Governor.

Principal Director Health Services
Department of Health Care, Human Services & Family Welfare

Copy to:

- 1. Controller of Examinations, S. P. S. C.
- 2. File and
- 3. Guard file.

SCHEME AND SYLLABUS OF EXAMINATION FOR THE PURPOSE OF FILLING UP THE
 POST OF RADIOGRAPHER/ CT SCAN RADIOGRAPHER UNDER THE SIKKIM STATE
 SUBORDINATE ALLIED AND HEALTHCARE SERVICE.

I. The mode of examination and setting-up of question-papers shall be both, i.e., conventional type and objectives type MCQs in paper I and II. The candidates are required to answer the objective type MCQs in the OMR Sheets and are required to follow the guidelines provided in the OMR Sheet while answering the questions.

II. The subject wise allotment of maximum marks shall be as under:

Syllabus:-		
General English	PAPER I	50 marks
General Knowledge		30 marks
Main Paper Radiographer/ CT Scan Radiographer course	PAPER II	100 marks
TOTAL		180 marks
Viva voce/ interview		20 marks
Grand Total		200 marks

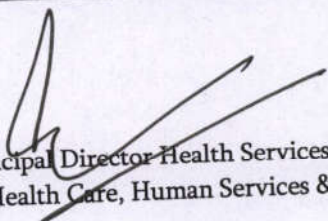
III. Syllabus for written examination for Radiographer/ CT Scan radiographer: -

Sl. No.	Course	
01	02	03
01	Preliminary Course	Anatomy: General Anatomical terms, Regions of the body. Bones and Joints. General structures and forms; Important ligaments and muscular attachments; skull, spine, pelvis, bones of upper and lower extremities. Bones of hand and foot to be learnt with articulated only without detail, except Oscalcis, Talus and scaphold. Structure of a typical joint and general descriptions of main joints, Synovial fluid; movements in joints and their limitation, chief relation, group movements of joints.
		Thorax and abdomen: Structure of thoracic cage; abdominal cavity; Diaphragm and Mediastinum
		Heart and vessels : Structure and function of heart. Names of main arteries and veins.
		Respiratory System: Accessory nasal sinuses; Larynx; trachea; bronchi; lungs; pleura.
		Alimentary system: Mouth, tongue, salivary glands, pharynx, tonsils, oesophagus, stomach, small and large intestine, liver and biliary tract, spleen, pancreas, mesentery, omentum. Urinary tract: Kidney, ureters, bladder and urethra.
		Reproductive system: Male genital tract, fallopian tubes, ovaries, uterus, mammary gland.
		Nervous system: Bones of the skull – general features. Names and position of bones of vault and base [articulatedony], Vertebral column – structure of a typical vertebra, Atlas Axis, Sacrum and coccyx. Brain – main sub-divisions and lobes ventricles, spinal cord. Surface anatomy in relation to Radiography. Ductless glands.
		Physics: Basic ideas of measurement and units. Graphical representation of data. Elementary explanation of exponential law. Radiation spectrum. Photo-electric effect. Compton effect. Fluorescence, photo-rescence. Atomic structure. Solenoids. Electromagnets. Electromagnetic induction – Generation and transmission of alternating current. RMS and peak values of current and coltage. Principles of construction of transformer – step up, step down, auto, Rectilinear propagation of light. Umbra and penumbra.

		Inverse square law.
		Electronics: Thermionic emission. Construction and function of diode and triode valves and their uses. Rectifier (Solid State).
02	Production of X-Rays, X-Ray tubes : Design	Diagnostic H.T. circuits, high tension generators, Half-wave, Full-wave, three phase, Condenser discharge, constant voltage. H.T. switches, control table, measuring instruments, voltmeters, ammeters, milliammeter. Focal spot, inherent filtration, tube holders. mAs meter, mains compensator, exposure timer, Inter-lock and safety devices. Grid: Ratio in relation to KV. Reciprocating and oscillating, Potter bucky diaphragms, stationary grids.
		Scattered radiation: Control of Scattered radiation, cones, Diaphragms and filters.
		Special equipments: Tomography, Magnification technique, Mobile units, portable units, image intensifier, Tele-radiography. Spot film devices. Stereoscopy
		Interaction of X-ray with matters, Energy absorption from X-rays. Measurement of X-rays. Rontgen and Rad, Simple principle of dosimeters, fluorescent effect, photographic effect.
		Protection: Code of practice for the protection of persons against ionizing radiation, protective materials, Lead, lead equivalent. Building material, personnel monitoring, International recommendations against hazards of ionizing radiation.
03	Radiographic Technique and Radiographic Anatomy	Contrast media: Barium preparation, Iodine preparation, Air-Oxygen.
		Skeletal system: Upper limb, lower limb, shoulder, girdle and thorax, vertebral column, pelvic girdle and hip region. Teeth jaw.
		Accessory nasal sinuses. Lachrymal system
		Cardiovascular system: Upper respiratory passage, lungs, pleura, diaphragmatic excursion, Mediastinum, bronchography, artificial pneumothorax.
		Genito-urinary system: Straight X-ray of abdomen, pyelography, cystography, urethrography, gas insufflation, pneumo-peritonium.
		Obstetrics and Gynaecology: Radiation protection, pregnancy, pelvimetry, hysteron salpingography, placentography.
		Central nervous system: Routine and special projections of skull, ventriculography and encephalography, cerebral angiography, myelograph.
		Alimentary system: Barium suspension, Barium-meal and follow through Barium emena.
		Biliary system: Cholecystography, Oral and I V Cholangiography - Direct and Indirect.
		Liver and spleen: Spleno-portal venography.
		Silvaryglands :Sialography.
		Arthrography, singraphy, Lymhpangiography, Operation theatre technique and ward radiography.
		Sterioscopy, Magnification, High and Low K.V. technique and Mammography.
04	Radiographic photography and Dark-room technique	X-Ray materials: Types of emulsion - characteristic and control, screen and non-screen films, dental films, X-ray paper under and over exposure, speed contrast.
		Intensifying screens: Fluorescence, application of fluorescence in Radiography, type of intensifying screens, intensifying factors, cleaning and general care of screens - after glow.
		X-ray cassettes: Testing and proving good screen contract, general care.
		X-Ray developers: Characteristics, Detail and contrast freedom from chemical fog and staining, function and constituent of developer, standardization by time and temperature, exhaustion of developer, Replenishers.
		Types - Powder and liquid solution, medium and high contrast developer, ultra-rapid development methods. Automatic processing.

		X-ray fixers and fixing: Fixing agents, acid and preservative in fixer, inclusion of hardner, time of fixation, silver recovery.
		Rinsing, washing and drying: Object, methods employed, method of drying films.
		Processing: Preparation of solution, suitable water supply, nature of mixing vessels, order mixing solutions, filtrations, making of stock solutions, storage of dry chemicals, storage of solution.
		Processing apparatus: Processing units, hangers, care of hangers, refrigeration and use of ice.
		Operation theatre processing : Dish units.
		Technical and processing faults: Chemical reduction. Chemistry and characteristics of Farmer's reducer, local and general application.
		X-ray dark room: Size, light proof entrancer, hatches, construction of walls for protection against chemicals and radiation, ceiling, colour schemes, water proofing of floors, loading bench design, disposition of processing and accessory equipment for efficient working, arrangement of drying cabinets in dark-room or in adjacent rooms, dark-room illumination and testing for safety, ventilation.
		The Radiographic image: Radiographic factors affecting image contrast and sharpness, variation in exposure time in accordance with quality of radiation filters, distance, intensifying screens, grids, film speed, developer and development.
		Presentation of radiograph: Identification of film, aspect for direct and stereo [univeraprismatic] viewing, mounting dental films.
		Accessories: Viewing boxes, spot-light, illuminators, projectors and viewing screens for miniature and cine-radiography, magnifiers, film identification, lead letters and numbers, actinic makers, embossing machine, film trimmers, corner-cutters, dental mounts and cutter, filling units.
05	Care and maintenance of equipment	General principles and routine use of charts supplied by manufacturer, Radiographic calibration procedure, Tube rating chart.
06	First Aid	Shock, convulsion, asphyxia, artificial respiration, Administration of Oxygen, Burns and scalds. Electric shock and burns. Wound, haemorrhage, pressure points, Tourniquet, Injuries to Bones, Joints and muscles, Dressing of Bandages, Plaster of Paris technique, Splints, Drug reaction, Poisons, Basic Nursing.
		Drug in Department: Storage labeling. Checking, Regulation regarding dangerous drugs, Units of measurement.
		Medical Ethics: Ethical law and professional etiquettes applied to members of profession associated with medicine.
		Nursing and Handling of patients: Hospital and Departmental procedure, Hospital staffing and organization. Records and departmental statistics. Medico-legal aspects. Appoints. Stock taking and stock keeping.
		Care of patients: Reception, Elementary hygiene.
		Nursing Care: Temperature, pulses and respiration. Application of sterile dressings.
		Preparation of patients for General X-ray examination: Departmental instructions to out-patients or ward-staff. Instructions for various special investigations. Nursing care before and after special X-ray. Drug allergy.
		Principles of asepsis: Methods of sterilization. Care and identification of instruments. Setting of trays and trolleys. Elementary operating theatre procedure.
		Computed Tomography- More classes should be allotted for CT & MRI History: Basic principle and data acquisition/C.T. generations, Gantry and patient table - Travel Speed, Load capacity, X-ray tubes. Rotating anode; cooling system; Collimeter; Pencil beam; Fan beam

	<p>Anode heat storage capacity; Detector system : Type, number, Efficiency Rectifier Scan parameters; Scan time, Number of views per second, Reconstruction time, scan cycle time, Acquisition matrix, Display matrix, Slice thickness. Image reconstruction; Pixel & Voxel; C.T. Number & Hounsfield Number. Image display; matrix, pixel, voxel, Window level, Window width, Double Window, Partial Volume phenomenon. Image quality: Patient exposure; Resolution Ultrafast C.T., Dynamic C.T. & C.T. angiography, C.T. guided FNAC. 3D C.T./Artefacts Radiation dose aspects. Clinical application – Scan planes specially in Cranial C.T. [Gross anatomy of conventional planes] Indication and contra-indication; Patient preparation and positioning Contrast enhanced C.T.</p>
	<p>Magnetic Resonance Imaging BASIC PHYSICS WITH PRACTICAL APPLICATIONS: Magnets – types, powers, magnetism Radio Frequency (RF) pulse T1 (longitudinal relaxation time) T2 (transverse relaxation time) Basic sequences, basic parameters and basic tissue (like fat and water) Different types of coils. Contrast agents, MR angiography and dynamic MR. Spectroscopy. Hazards, safety and limitations.</p>
	<p>Ultrasonography – Basic Physics : Characteristic of sound; Propagation of sound; Interaction between ultrasound and matter attenuation and reflection; Transducers; Ultrasound display, A, TM, B-mode Grayscale imaging; Scanning methods; Doppler techniques; Artefacts Safety Application.</p>


Principal Director Health Services,
Department of Health Care, Human Services & Family Welfare.