



# All India Institute of Medical Sciences, Jodhpur

## Indicative Syllabus for the Post of Radiotherapy Technician Grade II

(Syllabus is only indicative. The questions related to the subject should examine predominantly clinical and practical skills and knowledge of the candidates with their registration as Radiotherapy Personnel in the eLORA of Atomic Energy Regulatory Board of India).

### Section A

40% Questions covering 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 (SUBJECT KNOWLEDGE)

60% Questions to be based on the subject specific to the post with following topics:-

1. General knowledge of important systems of body as Gastrointestinal, Nervous, Skeletal, Urinary system.
2. General Anatomical and Medical Terms as Medial, Sagittal, axial, dorsal and ventral etc.
3. Radiological Anatomy Particularly of Head and Neck and Pelvis
4. Tumors benign and malignant. Basic concept of what is cancer and the difference between benign and cancerous lesions. Full form and basic difference between terms as FNAC, Biopsy, IHC, NGS
5. Staging of Cancers – TNM in Head and Neck, FIGO in Cervix
6. Ionizing and Non Ionizing Radiations – real life examples and basic differences
7. Definition and basics of structure of Atom and charge and weight of Electron, Proton, Neutron. The concept of electron density of material.
8. X-rays and their production – only basics.
9. Half value Layer (HVL) and various shields. Cerro bend.
10. Interaction of matter with Radiations – particularly photoelectric effect and Compton Effect.
11. Introduction and basics of mechanism of action of ionizing radiations – direct and indirect effect, free radicles etc.
12. General terms in Electrical and Electronics important for RTT – Volt, Ampere, Ohms Law, capacitance, inductance and stepper motors (used in MLC and couch). Full form of MOSFET, PNP junction transistor.
13. Radiotherapy Equipment – Telecobalt Machine, Linear Accelerator, Ct Simulator
14. Immobilization techniques – Thermoplastic cast, Vaclocs etc.
15. Special requirements before CT Simulation of patients – The bladder protocol (Partial Bladder) for patients with uterine / cervical / prostate tumors.
16. Precautions in the usage of IV contrast during CT Simulation. The anaphylactic shock and knowledge of adrenaline and hydrocortisone during the same.
17. Room lasers and fiducial in the CT Simulation



18. Beam directing, modifying devices like wedge, MLCs, Breast Cone and Blocks etc.
19. Treatment Planning System – Definitions of contouring, Planning, Plan implementation etc.
20. The CT center, the Treatment Plan Isocenter.
21. The record and verification system including patient scheduling, names of fractionation as Conventional, Hypofractionation & Hyper fractionation, CHART
22. Differences between 2D, 3D Radiation Therapy, IMRT, IGRT etc.
23. SAD and SSD techniques
24. Image guidance in radiation therapy – Orthogonal X rays, Cone Beam CT Scan, MV imaging, EPID
25. Image registration and online verification using CBCT
26. Daily QA of a LINAC – Technologist as assistant to Medical Physicist
27. Patient Specific QA of LINAC
28. Patient motions -translational and rotational (Pitch, yaw and roll). Motion management technologies as RPM, ABC, Surface Guidance etc.
29. Brachytherapy particularly HDR brachytherapy, Ir-192 source & its half-life. The Fletcher Applicator and its parts. The inverse square law in Brachytherapy.
30. QA of Brachytherapy Machine
31. Radiation Safety – Concept of TDS, TLD, OSLD, Gamma Zone Monitor, Survey Meter, Ion Chamber, RFA, Pocket Dosimeter etc. Regulatory agencies in India as AERB.
32. Measurement and Units in Radiation – Roentgen, Gray, Sievert, Monitor Units
33. Phantoms in QA of Radiation Equipment including solid water
34. The 6MV and 15 MV photon beam, Dmax and practical knowledge.
35. The 5 Rs of Radiotherapy
36. Acute and Late side effects of Radiation particularly – Acute Skin and Mucosal Toxicity and RTOG grading. Late side effects as Xerostomia, Fibrosis and Myelopathy etc.
37. Palliative Radiation for - Single fraction and usual doses for bone metastasis, 300cGy/10Fr for various palliation as WBRT, Soft tissue mets etc. Hemibody Radiation in palliation.
38. Few standard portals as German Helmet for WBRT, portal for seminoma treatment, portal for 2D AP-PA Cancer cervix, portals for box technique for cancer cervix, tangential beams for cancer breast, The electron boost of breast tumor etc.
39. Introduction to concurrent chemotherapy using Cisplatin. Weekly and 3 weekly schedules. Requirement and normal values of Total Leucocyte Counts, Platelets, urea and creatinine values. Concurrent chemotherapy with Temozolomide for high grade brain tumor and time gap before treatment of such patients.
40. Prevention of cancer – awareness about tobacco and need to quit the same. Cancer screening for oral cancers using oral examination. Precancerous oral lesions as leukoplakia, Erythroplakia, submucosal fibrosis. Mammography and Self-Breast Examination. PAP smear. Risk factors as tobacco, pollution, obesity, alcohol etc.

