ANNEXURE-III
SCHEME AND SYLLABUS FOR THE POST OF LECTURER IN RADIOLOGICAL PHYSICS & PHYSICIST IN HM & FW DEPARTMENT

Scheme of Examination

<table>
<thead>
<tr>
<th>Part-A: WRITTEN EXAMINATION (Objective Type)</th>
<th>No.of Questions</th>
<th>Duration (Minutes)</th>
<th>Maximum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper-I: General Studies and General Abilities</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>Paper-II: Radiological Physics / Medical Physics (Post M.Sc Diploma Level)</td>
<td>150</td>
<td>150</td>
<td>300</td>
</tr>
</tbody>
</table>

Part-B: Interview

Total 500

Syllabus

PAPER-I: GENERAL STUDIES AND GENERAL ABILITIES


2. Society, Heritage and Culture, Polity, Economy, Human Development Indices and the Development Programmes in India and Telangana.

3. Natural Resources in India and Telangana: their distribution, exploitation, conservation and related issues.

4. Basic concepts of Ecology and Environment and their impact on health and economy; Disasters and Disaster management.

5. Impact of changing demographic trends on health, environment and society.

6. Agriculture, Industry, Trade, Transportation and Service sectors in India and Telangana.

7. Food adulteration, Food processing, food distribution, food storage and their relevance to public health.

8. Recent trends in Science and Technology.

9. Telangana Statehood movement and formation of Telangana State.

10. Moral values and Professional ethics.

11. Logical Reasoning: Analytical Ability and Data Interpretation.

PAPER-II: Radiological Physics / Medical Physics (Post M.Sc Diploma Level)

Unit-1: Radioactivity
Natural and artificial radioactivity, Modes of radioactive decay, Exponential decay, Physical, biological and effective half-lives, mean life, decay constant, Types of nuclear reactions and Principles of radionuclide production.
Interaction of Radiation with matter: Interaction of Photons with matter- types, properties and their relative importance, mass, electronic and atomic attenuation coefficient – Total attenuation coefficient, Total transfer and absorption coefficient. Interaction of heavy

Unit-2: Radiobiology

Unit-3: Radiation Quantities, Units and Detection

Unit-4: Diagnostic Radiology

Unit-5: Special Imaging devices in Radiology

Unit-6 : Nuclear Medicine

Unit-7: External Beam Radiation Sources

Unit-8: Brachytherapy

Unit-9: Dosimetry and Networking

Unit-10 : Photon beam therapy
Characteristics of Photon beams. Variation of percentage depth dose and output with field size and SSD. Methods of compensation for patient contour variation and/or tissue inhomogeneity and shielding of dose-limiting tissues. Static and dynamic Wedges, bolus, build-up material, compensating filters, multileaf collimators (MLC). Treatment Planning and Advances in Radiotherapy Delivery: Patient positioning and Immobilization methods – lasers – SSD and SAD treatment deliveries. Treatment verification Methods: Electronic portal imaging devices (EPID), kV cone beam CT, MV Cone beam CT, RPM-gating and other IGRT techniques. Adaptive radiotherapy and on-line treatment verification. Treatment delivery protocols of 3DCRT, IMRT, SRS/SRT, VMAT and SBRT treatments.
Unit-11: Electron Beam Therapy
Energy spectra, Energy specification, Variation of mean energy with depth, Suitability of measuring instruments for electron beam dosimetry, Characteristics of electron beams, Surface dose, percentage depth dose, beam profiles, isodose curves and charts, Flatness and symmetry, Beam collimation, Variation of percentage depth dose and output with field size and SSD, Photon contamination, Treatment planning - energy and field size choice, air gaps and obliquity. Tissue inhomogeneity - lung, bone, and air filled cavities. Bolus, Field junctions (with either electron or photon beams), Internal shielding and Arc therapy.

Unit-12: Treatment Planning systems and dose distribution

Unit-13: Special Procedures of Radiotherapy

Unit-14: Fundamentals of Radiation Protection

Unit-15: Safe handling of Radioactive Materials and Responsibilities