

**QP Code: 107391**

**Reg. No.....**

**Post M.Sc Diploma in Radiological Physics Regular/Supplementary  
Examinations October 2022**

**Radiation Therapy**

**Time: 3 hours**

**Max. Marks: 100**

- *Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers • Indicate the question number correctly for the answer in the margin space*
- *Answer all parts of a single question together • Leave sufficient space between answers*
- *Draw table/diagrams/flow charts wherever necessary*
- *Use of Calculators/physical and mathematical tables permitted.*

**Essay:**

**(2x14=28)**

1. Explain the different steps involved in the output calibration of high energy  $\gamma$ -rays of a Co-60 machine using IAEA TRS 398 protocol. List the various correction factors used. What for we do apply the correction factors. An ion chamber used to calibrate a linear accelerator was calibrated at 20°C and 1013.2mbar. What would be the temperature and pressure correction factor need to be applied to the chamber reading if the average pressure and temperature at the time of output measurement were 1009.9 mbar and 25.5°C. (10+4)
2. Briefly describe the depth dose characteristics of a clinical electron beam. Explain Effective SSD. What will be the approximate energy of an electron beam at a depth of 3 Cm if its R50 is 4.8Cm and Rp is 6Cm. (10+4)

**Short Essays**

**(4x8=32)**

3. Explain PDD. What are the factors that affect the PDD.
4. What are the different types of wedges used in teletherapy. Briefly explain each.
5. Briefly discuss the specification of brachytherapy source strength. Explain the exposure rate calibration of brachytherapy source using well-type ionization chambers.
6. Briefly Explain the various Quality assurance tests that are to be carried out periodically in a HDR machine as per AERB protocol.

**Short Notes**

**(10x4=40)**

7. IGRT
8. MV Cone beam CT
9. X-knife
10. TMR
11. Magnetron
12. CT simulator
13. Proton therapy
14. Monte Carlo based algorithms in treatment planning
15. Bolus
16. SRS

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