QP Code: 107391 **Reg. No.....**

Post M.Sc Diploma in Radiological Physics Regular/Supplementary Examinations October 2021

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 an HDR brachytherapy source using AAPM TG-43 formalism. List the various physical factors used. What for we do apply these factors.
   • A well type ion chamber used to calibrate an HDR brachytherapy source was calibrated at 22°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 1010.2mbar and 23.5°C. (10+4)
2. Define PDD, BSF and TAR. What are the factors on which these depend. Obtain a relationship between TAR and PDD.
   • For a Co-60 beam with 10Cm X 10Cm field size and 80Cm SSD the percentage depth dose is 55.6. Estimate the percentage depth dose for the same field size and depth but for an SSD of 100Cm

Short Essays **(4x8=32)**

3. Explain the construction and working of a co-60 machine with the help of a neat diagram. What is meant by isocenter.
4. Discuss the central axis depth dose curves of clinical electron beams.
5. Explain the principle of IMRT. What are the different types of IMRT. What is the significance of patient specific QA in IMRT.
6. Briefly Explain the various Quality assurance tests that are to be carried out periodically in a Linear accelerator as per AERB protocol.

Short Notes **(10x4=40)**

7. SBRT
8. Cyber knife
9. Individualized and universal wedges
10. TPR
11. Electron gun
12. Virtual simulation
13. Skin Sparing effect
14. Clarkson method
15. Shielding blocks
16. TBI

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