QP Code: 108391 **Reg. No.....**

Post M.Sc Diploma in Radiological Physics Examination
January 2018

Radiation Safety

Time: 3 hours **Maximum Marks: 100**

- **Answer all questions**
- **Use of Calculators/physical and mathematical tables permitted.**

Essay: **(2x14 = 28)**

1. In Co-60 machine if source is out and dropped to the floor during patient treatment; as RSO what will be your immediate actions. Draw a neat sketch of Cobalt-60 teletherapy facility layout. (9 + 5)

2. What are the responsibilities of a radiological safety officer as mentioned in RPR 2014. What is the dose rate at 2 m from a 7.4GBq point source of Cs-137. What is the thickness of lead required to reduce the dose rate to less than 0.02mGy/h. If the source activity is increased to 29.6GBq, what additional thickness of lead would be required to keep the dose rate at the same level. Given: HVL of lead: 7mm. Dose rate constant of Cs-137 : 8.5 x 10-8 Gy-m2/MBq-h. (9+5)

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

3. Define equivalent dose and effective dose. Explain ALARA.
4. Draw neat diagram of layouts of linear accelerator and HDR facilities.
5. Explain general methods of disposal- management of radioactive waste in medical, industrial, agricultural and research establishments
6. Responsibilities of employers, licensees, radiological safety officer.

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

7. Define tissue weighing factors.
8. Annual dose limits of radiation workers and public.
9. Radiation protective equipment's in diagnostic radiology.
10. Classifications of radioactive waste.
11. What documents are required to transport radioactive material.
12. What is loading and unloading of source.
13. Radiation hazards in brachytherapy.
14. Design of transport container.
15. What are the radiation protection procedures in brachytherapy.
16. Explain safety and security of sources during storage.

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