

QP Code: 105391

Reg. No.....

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

**Radiation Dosimetry and Standardisation**

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

**Essays**

**(2x14=28)**

1. • Explain in detail about Free Air Ion Chamber with a diagram and derive the formula for the Exposure at the plane of the aperture  
• Calculate the minimum electrode spacing in Free Air Ion Chamber for gamma ray energy of 5MeV. (The continuous slowing down approximation (CSDA) for electron in air for 5MeV is  $2.754 \text{ g/cm}^2$ ) (9+5)
2. • Describe in detail about the measurement of absorbed dose to water for high energy electron beams using TRS 398 protocol  
• Find the depth of measurement for a 9 MeV electron beam ( $R_{50} = 3.5\text{cm}$ ) (10+4)

**Short Essays**

**(4x8=32)**

3. Radiation chemistry of water and aqueous solutions
4. Explain how gamma emitters are standardised with scintillation spectrometers
5. Explain how neutron flux is measured using activation method and absorption methods
6. Explain the steps involved in the cross calibration of therapy dosimeters

**Short Notes**

**(10x4=40)**

7. Beer - Lamberts Law
8. Spectrophotometry
9. Role of sodium chloride in Fricke dosimeter
10. Dead time correction in a counting system
11. Beta- Gamma coincidence counting
12. Air Kerma strength
13. Transient charged particle equilibrium
14. Roentgen and absorbed dose
15. Neutron Yield
16.  $4\pi$  counting

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