

**Post M.Sc Diploma in Radiological Physics Regular/Supplementary  
Examinations November 2020**

**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. Describe about the classification of neutrons based on energy.  
Calculate the exposure rate constant for  $^{60}\text{Co}$ . Determine the exposure rate in R/min from a 5000 Ci source of  $^{60}\text{Co}$  at a distance of 80cm. (9+5)
2. What are the corrections to be applied to the chamber reading during photon beam calibration. Discuss the limitations of TRS 277 over TRS 398 protocol.  
An ionization chamber of volume  $2\text{ cm}^3$  is placed in a radiation field of 100 R/s. Calculate the current generated in amperes. (9+5)

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

3. Describe manganese sulphate bath method for standardization of neutrons.
4. Mention how absorbed dose in air can be obtained from roentgen. Derive the equation to measure absorbed dose to any medium.
5. Define specific gamma ray constant and derive an expression for the same.
6. Describe FBX dosimeter and its applications in radiotherapy

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

7. Free radical dosimeter
8. Properties of Ir- $^{192}$  source
9. Timer error in tele cobalt unit
10. Optical density
11. Re-entrant ionization chamber
12. Ambient and directional dose equivalents
13. Reference Air Kerma Rate and Air Kerma strength
14. Cyclotron produced isotopes
15. Molar absorption coefficient
16. Transient charged particle equilibrium

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