

**Post M.Sc Diploma in Radiological Physics Examinations  
October 2018**

**Radiation Dosimetry and Standardisation**

Time: 3 hours

Max. Marks: 100

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

**Essays****(2x14=28)**

1. Describe the absolute method for measuring thermal neutron flux using gold foil activation method.  
The RMM of a cobalt unit is 150. Calculate the activity of  $^{60}\text{Co}$  unit and the approximate output at 80 cm. (9+5)
2. Derive the relationship between kerma, exposure and absorbed dose  
Show that the roentgen to rad conversion factor for air is 0.876 under charged particle equilibrium condition (9+5)

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

3. Describe with neat diagram how exposure is measured using free air ionization chamber.
4. Describe precision long counter and its applications.
5. Explain the standardization methods used for brachytherapy sources.
6. Describe the reference conditions for absorbed dose measurements of high energy photon and electron beams

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

7. Comparison of TRS 398 and TG 51 protocols
8. Standardization of gamma emitters with scintillation spectrometers
9. Cross calibration of detectors
10. Calorimetry
11. Extrapolation chamber
12. Beam quality index
13. Free radicals and G-value
14. Beer-Lambert's law
15. Properties of Co-60 source
16. Mass energy transfer and mass energy absorption coefficients

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