QP Code: 105391 **Reg. No.....**

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

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 in detail about the measurement of absorbed dose to water for high energy photon beams using TRS 398 protocol
   • Find the absorbed dose to water at d_{max} for high energy photon beam if the meter reading for 200MU at 10cm depth is 27.22 nC, N_{DW} = 4.836 x 10^7 Gy/C, K_Q = 0.9957, T= 21ºC, P= 1007mbar, M_+ = 28.26nC, M- = 28.3nC, M1 (for 300V) = 28.26nC, M2 (for 100V) =28.05nC, PDD_{10cm} = 66.07 (Given a_0= 1.198, a_1= -0.1875, a_2=0.677) (9+5)
2. • Explain Burlin and Spencer – Attix cavity theory. Discuss its merit and demerits over Bragg-Gray cavity theory
   • Alpha source of 100Bq activity with 6 MeV energy is kept inside the gas filled detector. If all particles completely absorb their energy inside the detector, calculate the average current form each detector (Given W/e= 33.3eV and e = 1.6 x 10-19 C) (9+5)

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

3. Describe Fricke dosimeter and its application in radiotherapy
4. Describe in detail about the classification of neutron sources and dosimetry procedures
5. Describe the standardisation of beta emitters with proportional, GM and scintillation counters
6. Explain the steps involved in the cross calibration of therapy dosimeters

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

7. Radiation chemical yield
8. Relation between absorbed dose and kerma
9. Natural and artificial radioactive sources
10. Preparation of tracers and labelled compounds
11. Properties of I-125 source\
12. Neutron field around medical accelerator
13. Dead time correction in a counting system
14. Radiation polymerisation
15. FBX dosimeter
16. Air Kerma Strength

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