QP Code: 106391 **Reg. No.....**

Post M.Sc Diploma in Radiological Physics Examinations October 2018

Radiation Detectors and Instrumentation

Time: 3 hours **Max. Marks: 100**

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

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

1. Describe the gas multiplication process in a GM counter including the requirement of quenching. Explain about resolving and dead times, how would you correct the observed counts to obtain the true counts.
   The dead time of a G.M. counter is 100 μs. Find the true counting rate if the measured rate is 10,000 counts per min (9+5)
2. Explain the basic principles involved in liquid scintillation and plastic scintillation system. Mention their applications.
   A current of 10^{-8} A is to be integrated for 60 ms on a capacitor, C = 0.01 μF. Determine the output voltage. (9+5)

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

3. Desirable characteristics of thimble ionization chamber
4. Single channel analyzer and multi-channel analyzer
5. Principle of calorimetry
6. Principle of MOSFET and its application in radiotherapy

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

7. Characteristic curve of gas filled detector
8. Operational amplifier
9. Personnel monitoring dosimeters
10. Gamma zone monitor
11. RIA counter
12. Radio chromic film
13. Microprocessor
14. Townsend balance secondary standard dosimeter
15. Glow curve of TL dosimeter
16. Photomultiplier tube

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