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

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

Radiation Detectors and Instrumentation

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*.**

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

1. • Describe the gas multiplication process in a GM counter including the requirement of quenching. Explain about resolving time and dead times, how you would correct the observed counts to obtain the true counts.
   • The dead time of a G.M counter is 80μs. Find the true counting rate if the measured rate is 10000 counts per min (9+5)
2. List the various personnel monitoring devices. Explain in detail the basic principle and working of Thermoluminiscent dosimeter and TLD Badge Reader

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

3. Explain in detail about the use of OPAMP as a differential amplifier
4. Gamma ray spectrometers and Multichannel analyser
5. Explain the working principle and basic features of Direct Ion Storage (DIS) systems
6. Briefly explain the calibration and maintenance of dosimeters used in radiotherapy.

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

7. Gamma zone monitor
8. Calorimetry
9. RIA counter
10. Whole body counter
11. Microprocessor
12. Requirements of activation neutron detectors
13. Radioisotope calibrator
14. Brachytherapy dosimeters
15. MOSFET Electrometer
16. Radiation field analyser

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