

QP Code: 106391

Reg. No.....

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

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. • Explain the basic principles involved in organic scintillation and inorganic scintillators. Mention their applications.
• A Current of 10^{-8} A is to be integrated for 60 ms on a capacitor, $C = 0.01\mu\text{F}$. Determine the output voltage. (10+4)
2. Explain the principle of MOSFET and CR39 with necessary diagrams. How they are used for slow and fast neutron detection.

Short Essays

(4x8=32)

3. Explain how an OPAMP can be used for addition, subtraction, integration and differentiation
4. Explain the reason for the need of cavity ionisation chambers and explain the characteristics of thimble chamber.
5. Radiographic and radiochromic films
6. Briefly explain the calibration and maintenance of dosimeters used in radiotherapy.

Short Notes

(10x4=40)

7. Photomultiplier tube
8. Pocket neutron monitors
9. Volume recombination and Columnar recombination
10. Liquid scintillator based counting systems
11. Portable counting system for alpha and beta radiation
12. Radioisotope calibrator
13. Brachytherapy dosimeters
14. Thermoluminescent dosimeter readers for medical applications
15. RIA counter
16. Radiation Field Analyser
