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

Post M.Sc Diploma in Radiological Physics Supplementary Examinations March (October), 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. Describe the construction and working principle of condenser type ion chamber with schematic diagram.
   A radioactive sample is counted for 1 minute and produces 900 counts. The background is counted for 10 minutes and produces 100 counts. Calculate the net count rate and net standard deviation. (9+5)
2. Explain the dosimetric features of radiographic and radio chromic films. List the advantages of radio chromic film.
   A radiation detection system has a mean background counting rate of 2 counts per second. A 30 min counting for an unknown radioactive sample led to the gross counts of 4,000 counts. Compute the net count and its uncertainty. (9+5)

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

3. Phenomenon of luminescent dosimetry based on band gap theory
4. Working principle of solid state nuclear track detectors
5. Proportional counter
6. Well type ion chamber for brachytherapy source calibration

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

7. Principle OP-AMP
8. Quenching of GM counter
9. Principle of gas filled detector
10. Characteristics of a thimble ionization chamber
11. Gamma ray spectrometry
12. Radiophoto luminescent dosimeter
13. Survey meter
14. Decoders and encoders
15. Dead time and recovery time
16. Teletector

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