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MPH 451

**Second Semester M.Sc. Degree Examination, September/October 2022
(CBCS)**

**MEDICAL PHYSICS
Radiation Detection and Measurement**

Time : 3 Hours

Max. Marks : 70

Instructions : Number the answers **properly**. Give illustrations **wherever** necessary.

PART – I

Answer **any five** of the following questions : **(5×4=20)**

1. Write a note on medical applications of gold seeds, tantalum wire and iodine radioisotopes.
2. Describe the construction and working principle of condenser type ionization chamber.
3. What is quench ? Explain quench correction in LSC.
4. Explain the salient feature of a good dosimeter system.
5. Explain the application of whole body counters of internal radiation hazard detection.
6. The radiation dose level at a particular distance from a lead container having an Ir-192 source is 1 mSv/h. Determine the additional lead shielding thickness required to reduce the radiation level at the same location to 5 μ Sv/h. Instead, if 3.8 cm shielding material is removed what would be the radiation level at the same location ? Given TVT = 1.9 cm, HVT = 0.55 cm.

PART – II

Answer the following : **(5×10=50)**

1. How radioactive isotopes can be produced in reactors and cyclotron ? Explain with two examples.

OR

- a) Write a note on telecobalt and brachy Cesium sources.
- b) Explain about the preparation of tracers and labelled compounds. Give examples for each.

P.T.O.



2. Explain the working principle and construction of GM counter in detail. Explain dead time, recovery time and efficiency of GM counter.

OR

- a) Explain the working of thimble chamber with the help of Bragg-Gray cavity theory.
 - b) Explain the V-I characteristics of proportional counter.
3. What are scintillators ? Give the classification of scintillators and their characteristics in detail with suitable examples in each case.

OR

With the help of a neat block diagram, explain the principle and working of a HPGe gamma spectrometer. With a neatly drawn diagram, explain a typical gamma spectrum for a Co-60 gamma source and briefly explain the observed peaks.

4. Discuss about brachy therapy dosimeter systems.

OR

Explain briefly the working principle of farmer type dosimeter.

5. Write detailed note on principle of radiation detection using film dosimeter. Explain its construction and principle of detection of different types of nuclear radiation.

OR

Explain in detail about area monitoring, area classification and air monitoring.
