K25P 2910

Reg. No. : .....

Name : .....

III Semester M.Sc. Degree (CBCSS – OBE – Reg./Supple./Imp.) Examination, October 2025
(2023 Admission Onwards)
PHYSICS/PHYSICS WITH COMPUTATIONAL AND NANO SCIENCE SPECIALISATION
Open Elective Course
MSPHY03O01/MSPHN03O02 : Radiation Physics

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **any 5**. **Each** one carries **3** marks.

1. Compare and contrast exposure and absorbed dose.
2. State the energy threshold for pair production and explain its physical basis.
3. Define attenuation and list the factors affecting it.
4. What is the role of ionization in gas-filled detectors ?
5. Explain any two biological effects of ionizing radiation.
6. How are radiation hazards monitored and controlled ? **(5×3=15)**

SECTION – B

Answer **any 3**. **Each** one carries **6** marks.

7. List any four units used in radiation measurement and their interconversion.
8. a) Explain energy fluence and mention its unit.
   b) Calculate the energy fluence if a beam delivers 2 J of energy over an area of 0.5 m^2.

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9. Explain the significances of Compton scattering in diagnostic radiology.

10. A dosimeter records a dose of 0.5 mSv over 10 hours. Calculate the average dose rate in μSv/hour.

11. Explain the role of personnel monitoring systems in radiation protection. **(3×6=18)**

SECTION – C

Answer **any 3**. **Each** one carries **9** marks.

12. Discuss the significances of equivalent dose and effective dose in assessing radiation risk. (Include relevant formulas and examples).

13. Describe the process of photoelectric absorption and its role in image contrast.

14. Explain the construction, working principle and applications and solid-state detectors.

15. Explain the significances of area monitoring and survey meters in ensuring radiation safety.

16. Describe the sources of radiation and their classification. Explain how they contribute to occupational exposure. **(3×9=27)**

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