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K22P 1426

Reg. No. :

Name :

III Semester M.Sc. Degree (CBSS – Reg./Sup./Imp.) Examination, October 2022
(2019 Admission Onwards)

PHYSICS

PHY3E02 : Radiation Physics

Time : 3 Hours

Max. Marks : 60

SECTION – A

Answer both questions (either a or b). (2×12=24)

1. a) Explain the effects of radiation on chromosomes. What are genetic effects ?

OR

- b) Explain the principle and working of nuclear reactor. Mention its uses.

2. a) What are different electron sources ? Explain how they are produced.

OR

- b) Explain how Gamma rays interact with matter.

SECTION – B

Answer any four questions (1 mark for Part a, 3 marks for Part b, 5 marks for Part c).
(4×9=36)

3. a) What is the wavelength of an X-ray of energy 100 keV ?

- b) What is absorbed dose ?

- c) Explain about different personal monitoring instruments in radiation science field.

4. a) What is pair production ?

- b) List various artificial ionizing radiation sources.

- c) Differentiate between Bremsstrahlung and Characteristic X-rays.

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K22P 1426



5. a) Write down the Bethe formula for specific energy loss.

- b) What is primary and secondary radiations in an X-ray room ?

- c) How the radiation level at different locations in the vicinity of radiation installation is assessed ? Explain.

6. a) What is ALARA in Radiation Science ?

- b) Write a note on radioactive waste disposal from nuclear medicine department.

- c) What are deterministic and stochastic effects of radiation ?

7. a) Define Curie and Becquerel.

- b) What is KERMA ?

- c) Explain the concept of Relative Biological Effectiveness.

8. a) Give the expression for Compton shift in wavelength.

- b) If a radiographer stands 1 meter away from an X-ray tube and is subject to an exposure rate dose of 2mGy per hour, what will it be if the same radiographer moves to a position located 4 meter from the X-ray tube ?

- c) Explain effective radiation protection for personal exposure reduction.