Roll No.

Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (Physics) (Sem.-3) RADIATION PHYSICS Subject Code : MSPH-535-18 M.Code : 76754 Date of Examination : 04-01-2023

Time: 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains SEVEN questions carrying FIVE marks each and students have to attempt any SIX questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) Find the wavelength of the photon scattered through 60° in Compton scattering.
- b) What is the minimum energy of a photon to create pair production?
- c) What is the difference between elastic and inelastic collision?
- d) Explain the term '*straggling*'.
- e) Mention two basic characteristics of nuclear detectors.
- f) Mention various applications of nuclear detectors.
- g) Write a short note on internal conversion.
- h) Explain the term "nuclear quadrupole moment".
- i) Discuss the working principle of PIXE.
- j) Write a short note on nuclear medicine.

SECTION-B

- 2. Write down the law of absorption of gamma rays in matter and discuss the broad beam geometry for measurement of absorption coefficient.
- 3. Discuss the interaction of heavy charged particles with matter and their energy loss mechanism.
- 4. Explain the principle and working of ionization chamber.
- 5. Write a short note on Ge(Li) detector.
- 6. Discuss the concept and importance of angular correlation in context of nuclear spectroscopy.
- 7. Discuss theory and applications of electron spin resonance spectroscopy (ESR).
- 8. Discuss the principle of Mossbauer effect and the instrumentation required for its measurement.

SECTION-C

- 9. Describe the three main processes of interaction of photons with matter by which radiation lose energy on passage through matter.
- 10. Describe the construction and operation of scintillation detector. Draw a block diagram to show the main components. In what way, a scintillation detector is superiors to gas filled detector?
- 11. Discuss the principle of X-Ray Fluorescence (XRF). Discuss the instrumentation needed with neat diagram and the spectrum analysis of XRF.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.