

**Second Year B.Sc MRT Degree Regular/Supplementary Examinations
March 2026****Radiation Physics I****Time: 3 Hours****Total 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*

Essays: (3x10=30)

1. What are the factors that influence radiograph quality. Discuss the ways to improve the quality of a radiographic image.
2. Explain the variation of different photon interaction processes with photon energy using a graph.
3. Explain the X- ray generator circuit using a neat diagram.

Short notes: (8x5=40)

4. Explain attenuation of a photon beam passing through matter and derive the exponential attenuation law.
5. Calculate the wavelength of a photon having an energy of 1 MeV.
($h = 6.63 \times 10^{-34}$ Js, $c = 3 \times 10^8$ m/s, $1 \text{ eV} = 1.6 \times 10^{-19}$ J)
6. Explain Faraday's Laws of Electromagnetic Induction and its any application.
7. Explain various regions of response curve of the Gaseous radiation detectors with voltage.
8. Explain Exposure, Kerma and Dose with SI units.
9. Explain star and delta connection in X ray generator circuit.
10. Briefly explain tube rating charts and their advantage.
11. What do you understand by Bremsstrahlung X-ray. Differentiate it from characteristic X-rays.

Answer briefly: (10x3=30)

12. Optical density.
13. Thermionic emission.
14. Annihilation radiation.
15. Grid ratio.
16. Rare earth screens.
17. Intensification factor.
18. HVL and TVL.
19. Penumbra.
20. Quality of X ray photons.
21. Inherent filtration of X ray tubes.
