



- c) Derive the formula for the magnetic moment of a nucleus. (06)
- Q-4      Attempt all questions      (14)**
- a) Explain the concept of mass parabola for odd nuclei taking the example of an isobaric family with  $A=91$ . (05)
- b) Explain the volume and surface energy term contributing to the semi empirical mass formula. (05)
- c) Mention at least four evidences that led to shell model (04)
- Q-5      Attempt all questions      (14)**
- a) Derive the Lorentz-Gauge condition. (07)
- b) Explain the concept of polarization. (07)
- Q-6      Attempt all questions      (14)**
- a) Prove that electromagnetic radiation has pressure and momentum. (10)
- b) Explain the concept of Retarded potentials and also specify the formulas for the same. (04)
- Q-7      Attempt all questions      (14)**
- a) Derive the formula for energy flux in a plane wave  $\langle N \rangle$ . (12)
- b) State Gauss's law. (02)
- Q-8      Attempt all questions      (14)**
- a) Derive the expressions for scalar ( $\phi$ ) and vector potentials ( $A$ ) in order to understand the concept of radiation from an oscillating dipole. (07)
- b) Explain the concept of a linear antenna. (07)

