Assignment -2

B.Sc. SEM-V Paper CC-303

Unit- 2 (Antenna)

1: Explain concept of retarded potentials and show that both ϕ and A satisfies inhomogeneous equations.

2: Prove that Charge oscillating between two sphere is equivalent to an oscillating dipole moment.

3: Dipole wire lies along Z axis. (i) Find the retarded potentials A and ϕ at given point p. (ii) Obtain components of E and B with Hertz relation.

4: Prove that for dipole radiated power proportional to the ratio P^2/λ^4 .

5: From the value of power dissipated in case of dipole obtain radiation resistence.

6: Discuss the radiation from an electron in arbitrary motion and obtain Lienard- Wiechert potentials

7.Short Question

(i) What is antenna?

(ii) Define retarded potentials.

(iii) What is unit of dipolemoment?

Unit- 4 (Nuclear Physics)

- **Introduction to γ -emission**

Q-1. Write a note on Multi polarity in γ transitions.

Q-2. Write a note on Internal Conversion of γ rays.

Q-3. Write a note on 'Nuclear Isomerism'.

- **Liquid Drop Model**

Q-1. Draw binding energy curve and state the conclusions drawn from this binding energy curve.

Q-2. Discuss in detail different energy terms appearing in Semi Empirical Mass formula.

Q-3. (A). For Isobaric family draw mass parabola. What predictions are made from this?

What is meant by "Isobaric family"? Using the mass formula obtain parabolic equation for the isobaric family A=91. Draw the mass parabola curve and obtain the following expressions for odd-A nuclei :

(i) Nuclear charge (Z_0) of the most stable nucleus

(ii) Parabolic mass relationship

(iii) Energy release for β^- and β^+ decay.

(B). Discuss mass parabola for isobaric family with even mass no. A.

Q-4. Estimate Nucleon Separation Energy.

EX-1 For the family of isobars with A=91, estimate

(i) nuclear charge of the most stable isobar Z_0

(ii) the energy release Q_{β^-} and Q_{β^+} for transitions leading to Z_0.(Take a_a = 19 MeV, a_c = 0.60 MeV, m_n-m_p = 0.8 MeV)

EX-2 (i). For 'mirror nuclei' which have N and Z differing by one unit, determine the mass difference. Consider A to be odd.

(ii). The masses of $_7N^{15}$ and $_8O^{15}$ are 15.000108 u and 15.003070 u respectively. Using this data, determine the Coulomb energy coefficient a_c in the Semi empirical mass formula.