

5. (a) Give the significance of the CMA diagram. 4
- (b) Derive Appleton-Hartree formula. 12

OR

- (p) Draw the dispersion curve of electromagnetic wave propagating parallel to static magnetic field B_0 and discuss about the cut-offs and resonance. 11
- (q) Draw dispersion curve and discuss about the cut-off for ordinary wave. 5



AQ - 963

Third Semester M. Sc. Part - II Physics (CBCS)
Examination

Paper - 3 PHY I

ELECTRODYNAMICS - II

(Radiations and Plasma Physics)

P. Pages : 4

Time : Three Hours]

[Max. Marks : 80

[Credit : 04

Note : All questions are compulsory and carry equal marks.

1. (a) What are synchrotron radiations ? Derive a relation for its radiated power and discuss about directional distribution. 9
- (b) Show that retarded scalar potential satisfies wave equation in free space. 7

OR

- (p) Derive wave equations for scalar and vector potentials. 7
- (q) Derive an expression for electric and magnetic fields of a moving point charge using Lienard-Wiechert potentials. 9

2. (a) What is adiabatic invariant ? 3
 (b) What is finite Larmor radius effect ? 3
 (c) What is micro instability ? 2
 (d) Prove invariance of Second adiabatic invariants (J) in Plasma Physics. 8

OR

- (p) Describe the motion of single charged particle in the presence of electric field nonuniform in time. 8
 (q) What is magnetic mirror ? 2
 (r) What is mirror ratio ? 3
 (s) What is loss cone ? 3

3. (a) What is pressure force ? 3
 (b) Discuss about behaviour of plasma fluid element perpendicular to the static magnetic field. 6
 (c) Discuss about magnetic properties of plasma in light of magnetic material. 4
 (d) Enlist the uses of plasma. 3

OR

- (p) Define plasma. 3
 (q) Describe relation between plasma Physics to ordinary electrodynamics. 4
 (r) What is Debye shielding ? 3
 (s) Derive the relation for Debye's length. 6

4. (a) Derive relation for ion-plasma frequency. 5
 (b) Derive dispersion relation for extraordinary waves in plasma. 7
 (c) What is plasma approximation ? 2
 (d) Explain the criteria for validity of plasma approximation. 2

OR

- (p) Derive dispersion relation for electrostatic ion waves perpendicular to magnetic field B . 6
 (q) Derive a relation for lower hybrid frequency. 2
 (r) What is electron plasma wave ? 2
 (s) Derive the dispersion relation for electron plasma wave. 6