

DEPARTMENT OF PHYSICS

Semester: II
Subject: Electrodynamics And Plasma Physics
Branch: Physics
Course Type: CORE
Time: 3 Hours
Max. Marks: 100

Date of Exam: 19.05.2018
Subject Code: PHH-510
Session: I
Course Nature: HARD
Program: M.Sc
Signature: HOD/Associate HOD:

Note: Attempt any two questions from each Part

PART-A (Each Question carries 10 marks)

- Q1. Write all four Maxwell's Equation in differential and integral form and derive continuity equation using these.
- Q2. Write third Maxwell's equation with modification. Explain displacement current. Calculate magnetic field from an infinite straight wire carrying current I in a steady state.
- Q3. Calculate electric field for a parallel plate capacitor C having charge density σ and hence energy stored in the capacitor.

PART-B (Each Question carries 20 marks)

- Q4. How will charge density and electric field change when observed from a moving frame:
- Parallel to motion
 - Perpendicular to motion
- Q5. a. Using Lorentz transformation write transformation equation in covariant formulation and hence write Alpha matrix elements.
- b. Using Maxwell's equations write the matrix for Field tensor.
- Q6. a. Using transformation equation write expression for charge and current densities.
- c. Write equation of continuity in covariant formulation.

PART-C (Each Question carries 20 marks)

- Q7. Charge is at rest in S' frame. Find magnetic field in S frame and hence show that it reduces to Biot Savart law for low velocity condition.
- Q8. Explain the concept of temperature in a plasma. Can there be two different temperature's in the same plasma? Explain. If temperature of electron is 10 keV calculate its temperature in Kelvin.
- Q9. What conditions should be fulfilled for the existence of a Plasma? Explain Debye Shielding.