THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

Re-accredited (2nd Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

Backlog Arrear Examination, March 2021

PGP 4425 – ELECTRODYNAMICS AND PLASMA PHYSICS/

PGP 561 – Electromagnetic theory

Time: 3 Hours   **Max.: 75 marks**

Part - A

Answer Any FIVE questions   **(5 x 15 = 75)**

1. Derive the electrostatic field at an external point of a uniform spherical charge distribution using Coulomb's law.

2. Derive the vector potential inside and outside a spinning spherical shell of radius R, carrying a uniform surface current.

3. Derive the scalar and vector potential and hence the electric field due to a perfect oscillating electric dipole.

4. Derive the Maxwell's equations of magnetic field from the relativistic Maxwell's equations.

5. What is Debye shielding? Obtain an expression for Debye length.

6. Obtain Maxwells electrodynamic equations in both differential and integral forms and give their meaning.

7. Derive the expression for phase velocity, energy density and Poynting vector for a plane EM wave propagating through a non – conductor.

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