

COURSE CODE(CREDITS): 25B11EC512(4)

MAX. MARKS: 15

COURSE NAME: Electromagnetic Field Theory

COURSE INSTRUCTORS: SRU

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory. (b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems. (c) Scientific Calculator is allowed.

Q.No	Question	CO	Marks
Q.1	Let $\mathbf{D} = 4xy\mathbf{a}_x + 2(x^2 + z^2)\mathbf{a}_y + 4yz\mathbf{a}_z$ nC/m ² and evaluate surface integrals to find the total charge enclosed in the rectangular parallelepiped $0 < x < 2$, $0 < y < 3$, $0 < z < 5$ m. Draw the geometry for the given limits.	CO-1	3
Q.2	What do you mean by dipole? Derive an expression for the electric field intensity of the dipole. Plot the electric field intensity of a dipole.	CO-1	3
Q.3	Let Region 1 ($z \leq 0$) be composed of a uniform dielectric material for which $\epsilon_r = 3.2$, while Region 2 ($z \geq 0$) is characterized by $\epsilon_r = 2$. Let $\mathbf{D}_1 = -30\mathbf{a}_x + 50\mathbf{a}_y + 70\mathbf{a}_z$ nC/m ² and find: (a) $\mathbf{D}_{n1}$; (b) $\mathbf{D}_{t1}$; (c) $\mathbf{E}_{t2}$; (d) $\mathbf{E}_2$;	CO-2	3
Q.4	Write all the Maxwell's equations in integral form along with their significance .	CO-2	3
Q.5	Briefly Explain the following 1. Perfect electrical conductor and Perfect Dielectric material 2. Faraday's Law applications 3. Equation of continuity	CO-1	3