Course Code:1930204 Roll No: MLRS- R19

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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II B.Tech I Sem Supplementary Examination, February-2022

Electromagnetic Fields

(EEE)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Answer any FIVEquestions.
2. Each question carries 14 marks and may have a, b as sub questions.

1	a)	State Coulomb's law. Four like charges of 30μC each are located at the corners of a square, the diagonal measures 8m. Find the force on a 100μC located 3m above the center of the square.	7M	CO1	U
	b)	Derive the Relationship between electric field and electric potential.	7M	CO1	U
2		What is meant by electric dipole? Derive the expression for electric field intensity due to electric dipole. Two dipoles with dipole moments -5 a_znC/m and 9 a_znC/m are located at points (0, 0, -2) and (0, 0, 3) respectively. Find the potential at the origin.	14M	CO1	Ap
3	a)	State and derive the expression for Equation of continuity.	7M	CO2	U
	b)	Derive Laplace and Poisson equation.	7M	CO2	U
4		Derive the expressions for the capacitance of a parallel plate capacitor and the energy stored in it. A parallel plate capacitor having a mica dielectric ε_r = 6, plate area of 625cm^{2}and a separation of 2.5cm, a potential of 100V$_x$is applied. Obtain the energy stored in the capacitor.	14M	CO2	Ap
5	a)	Apply Biot-Savart's law to derive the expression for Magnetic Field Intensity due to circular loop placed on xy plane with radius 'r'	7M	CO3	Ap
	b)	State Ampere's circuital law and explain any two applications of Ampere's Circuital law.	7M	CO3	U
6		Define Magnetic flux, Magnetic flux line and Magnetic flux density and state the relation between Magnetic flux and Magnetic flux density. If magnetic vector potential is$\bar{A} = 2.5r^{2.5}a_z$ Wb/m in free space, Analyze Magnetic field intensity$\bar{H}$.	14M	CO3	An
7	a)	State and explain Faraday's laws of electromagnetic induction with its integral and point forms.	7M	CO4	U
	b)	Derive the Maxwell's four equations for time varying fields.	7M	CO4	U

8	Derive the relation between E and H in uniform plane wave propagation. State the Poynting Theorem and derive the necessary expressions.	14M	CO5	U

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