Code No: P21EET02

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH ISEMESTER END REGULAR EXAMINATIONS, JAN - 2023
ELECTROMAGNETIC FIELDS
(EEE Branch)

Time: 3 hours Max. Marks: 70

Answer all the questions from each UNIT (5X14=70M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
1.	a)	Derive the Relationship between electric field and electric potential.	[7M]	1	
	b)	Obtain the expression for electric field intensity and potential due to an electric dipole.	[7M]	1	
		OR			
2.	a)	Using Gauss law, derive the expression for electric field intensity due to an infinite length of line charge.	[7M]	1	
	b)	Two 6nC point charges are located at (1,0,0)and (-1,0,0) in free space. i) Find V at P(0,0,z) ii) Find Vmax	[7M]	1	
		UNIT-II			
3.	a)	Derive the boundary conditions for a dielectric interface.	[7M]	2	
	b)	Derive the expressions for the capacitance of a parallel plate capacitor and the energy stored in it.	[7M]	2	
		OR			
4.	a)	A dielectric sphere of $\varepsilon r = 5.7$ and of radius 10 cm has a point charge 2 μC placed at its centre. Calculate the surface density of polarization charge on the surface of the sphere.	[7M]	2	
	b)	A parallel plate capacitor having a mica dielectric $\varepsilon r = 6$, plate area of 625 cm^2 and a separation of 2.5 cm, a potential of 100 VX is applied. Find the energy stored in the capacitor.	[7M]	2	
		UNIT-III			
5.	a)	Derive the magnetic field intensity due to an infinite length current carrying conductor by using Biot Savart's law.	[7M]	3	
	b)	Derive the expression for magnetic field intensity due to infinitely long coaxial transmission line. Use ampere circuital law.	[7M]	3	
		OR			
6.	a)	Find H at the centre of an equilateral triangle loop of side 4m carrying 5 A of current lying in x=0 plane and the centroid lies along z axis.	[7M]	3	
	b)	A current filament carrying 15 A in a_z direction lies along entire Z-axis. Find magnetic field intensity at: i) A(20 ,0,4) ii) B(-2,4,-4).	[7M]	3	
		UNIT-IV			
7.	a)	Derive the expressions for the self inductances of a solenoid and a toroid.	[7M]	4	
	b)	Two parallel current carrying conductors separated by a distance of 4m carries current of 10 A and 15 A in opposite directions. Find the force on each conductor. Find the field intensity at mid-point between the two conductors.	[7M]	4	
		OR			

8.		Derive an expression for the torque on a current loop placed in a uniform magnetic field and hence define magnetic dipole-moment from this derivation.	[14M]	4	
		UNIT-V			
9.	a)	Derive point form of Ampere circuital law and explain displacement current density from this derivation.	[7M]	5	
	b)	State and explain Faraday's laws of electromagnetic induction with some examples.	[7M]	5	
		OR			
10.	a)	Write Maxwell's equations for time varying fields and make their word statements	[7M]	5	
	b)	State and explain Faraday's laws of electromagnetic induction with its integral and point forms.	[7M]	5	

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