Code No: P21EET02

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH ISEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 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)	Three equal positive charges of 4×10^{-9} coulomb each are located at three corners of a square, side 20cm. determine the electric field intensity at the vacant corner point of the square.	[7M]	1	
	b)	Obtain the expression for electric field intensity and potential due to an electric dipole.	[7M]	1	
		OR			
2.	a)	State and explain Maxwell's first law.	[7M]	1	
	b)	State and derive the expression for Equation of continuity.	[7M]	1	
		UNIT-II			
3.	a)	Derive the expression for the energy stored in the charged condenser.	[7M]	2	
	b)	The capacitance of a parallel plate condenser is 0.2μF. Potential difference between the plates is 2V. Calculate the energy stored by the charged condenser.	[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)	Obtain the expression for capacitance of a spherical capacitor.	[7M]	2	
		UNIT-III			
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]	3	
	b)	State Ampere's circuital law and prove the same.	[7M]	3	
		OR			
6.	a)	Define Magnetic flux, Magnetic flux line and Magnetic flux density and state the relation between Magnetic flux and Magnetic flux density.	[7M]	3	
	b)	Find the Magnetic Field Intensity due to a straight current carrying filament.	[7M]	3	
		UNIT-IV			
7.	a)	Derive the expressions for the self-inductances of a solenoid and a toroid.	[7M]	4	
	b)	Explain the concept self and mutual inductances.	[7M]	4	
		OR			
8.	a)	A toroid with cross section of radius 2cm has a silicon steel core of mean length 28cm and an air gap of length 1mm. Assume the air-gap area is 10% greater than the adjacent core and find the mmf required to establish an air-gap flux of 1.5 mwb.	[7M]	4	
	b)	Define and explain Scalar Magnetic potential and its limitations.	[7M]	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 equation for static fields. Explain how they are modified for time varying electric and magnetic fields.	[7M]	5	
	b)	State and explain Faraday's laws of electromagnetic induction with its integral and point forms.	[7M]	5	

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