Code No: P18EET02

R18

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH/APRIL - 2023
ELECTRO MAGNETIC FIELDS
(EEE Branch)

Time: 3 hours Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1	a)	Define electro static field and mention any two sources.	[2M]	1	2
	b)	Explain electric dipole?	[2M]	2	2
	c)	State Gauss's law for magneto static fields.	[2M]	3	1
	d)	What is magnetic potential?	[2M]	4	2
	e)	Determine the e.m.f induced about the path r=0.5, z=0, t=0. If B=0.01sin377t.	[2M]	5	2

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.	a)	Derive the expression for the electric field intensity due to a surface charge	[5M]	1	3
	b)	Calculate the force on a unit positive charge at P(x=2m, y=0) due to the charges Q1 at origin and Q2 at (x=1m, y=0) where Q1 = 1000 pico coulombs Q2 = -2000 pico coulombs.	[5M]	1	4
		OR			
3.	a)	State and Prove the point form of Gauss's law.	[5M]	1	2
	b)	Two small similar conducting spheres have charge of 2.5nC and - 0.5nC respectively. When they are placed 5 cm apart what is the force between them. If they are brought into contact and then separated by 5 cms what is the force between them.	[5M]	1	4
		UNIT-II			
4.	a)	Differentiate the convection current density and conduction current density.	[5M]	2	2
	b)	Derive the expression for energy stored in static energy filed.	[5M]	2	3
		OR			
5.	a)	Find electric potential due to electric dipole.	[5M]	2	3
	b)	A charge of −0.3μC is located at A (25, -30, 15) cm and a second charge of 0.5 μC is located at B (-10, 8, 12) cm. Find the electric field strength, E at i) The origin and ii) Point P (15, 20, 50) cm	[5M]	2	4
		UNIT-III			
6.	a)	Derive an expression for the magnetic field strength at the center of a square loop of side 'a' m and N turns.	[5M]	3	3
	b)	Develop an expression for the magnetic field at any point on the line through the centre at a distance 'h' from the centre and perpendicular to the plane of a plane circular loop of radius 'a' and carrying current 'I' amperes.	[5M]	3	4
		OR			

7.		Derive Biot-Savart law and relate it to Amperes law. Show that the divergence magnetic induction is always zero.	[10M]	3	3
		UNIT-IV			
8.	a)	What is a magnetic dipole and explain how a magnetic dipole differs from an electric dipole.	[5M]	4	1
	b)	Derive the expression for Torque produced on a closed current carrying when placed in a magnetic field.	[5M]	4	3
		OR			
9.	a)	Derive an expression for force per meter length between two straight long parallel wires situated in space, separated by a distance‘d’ m carrying a steady current of I amp in the opposite direction.	[5M]	4	3
	b)	Derive the Lorentz force equation.	[5M]	4	3
		UNIT-V			
10.		Explain about Maxwell’s modified equations in (i) differential form (ii) integral form. Write the significance of each equation in detail?	[10M]	5	2
		OR			
11.	a)	Define pointing vector and derive the expression for pointing theorem.	[5M]	5	2
	b)	Derive the expressions for statically and dynamically induced emf’s	[5M]	5	2

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