Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025

Third Semester

Electrical Electronics Engineering

EE3301 - Electromagnetic Fields

Regulations - 2021

Duration : 3 Hrs ***Maximum : 100 Marks***

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	State Stoke's theorem and its application.	L1	1	2
2.	Given points P(-4,5,3) .Find P in cylindrical and spherical coordinates.	L3	1	2
3.	State Poisson's equations & Laplace equations.	L1	2	2
4.	Write the boundary conditions at the interface between two perfect dielectric, Conductor-dielectric.	L1	2	2
5.	State Biot Savart's law and its application.	L1	3	2
6.	Find the energy stored in the solenoid having 40cm long and 5cm in diameter and is wound with 2000 turns of wire, carrying a current of 10A.	L3	3	2
7.	Write four Maxwell's Equations in Integral & Point form.	L1	4	2
8.	State Faradays Law & Write Continuity equation.	L1	4	2
9.	State pointing theorem and write its significance.	L1	5	2
10.	Define Brewster angle and Critical angle.	L1	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Point charges Q_1= 6 nC and Q_2= - 4 nC are placed at (4, 2, 1) and (-4, 0, 5), respectively. Determine the force on Q_1.	L4	1	8
		ii	Find the electric field intensity at point P located at (0,0,h)m due to charge of surface charge density σ C/m2 uniformly distributed over the circular disc r<=a, Z=0m .	L4	1	8
			Or			
	b	i	Calculate electric field intensity due to infinite line charge with charge density ρ.	L4	1	8
		ii	Explain Stoke's theorem in detail**.**	L2	1	8
12.	a	i	Derive the boundary conditions for electric fields between dielectric-dielectric.	L4	2	8
		ii	$V = 2X^2 + 20Z - \frac{3}{X^2+Y^2}$ Volts. Evaluate E and D at point (6,-2, 3).	L4	2	8

Or

	b	i	Derive electric potential due to charged disc.	L2	2	8
		ii	Derive the capacitance of coaxial cable & spherical capacitor**.**	L2	2	8
13.	a	i	Explain boundary conditions between two different magnetic materials.	L4	3	8
		ii	Derive the inductance of coaxial cable with solid conductor.	L2	3	8
			Or			
	b	i	State Biot Savart's law. Deduce the expression for the magnetic field at a point on the axis of a current carrying circular loop of radius is 'R' distance 'X' from the center.	L4	3	8
		ii	Derive the inductance of Solinoid and Toriod**.**	L4	3	8
14.	a		Develop Maxwell's Equations in Integral and differential forms in time varying field.	L4	4	16
			Or			
	b	i	Examine whether the following fields satisfy Maxwell's equation or not. $E=[E_m \sin x \sin t\, a_y]$and $H=[(E_m/ \mu_0)\text{Cos } x \text{ Cos } t\, a_z]$.	L4	4	8
		ii	Draw and explain an EMF induced by Faraday's Disc Generator.	L2	4	8
15.	a		Define Poynting theorem. Illustrate and derive poynting vector in integral and differential form.	L4	5	16
			Or			
	b		Develop the wave equations from Maxwell's equations for lossy dielectric materials.	L4	5	16