Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

Third Semester

Electrical and 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*	*BTL*	*CO*	*Marks*
1.	A point is represented in Cartesian coordinate as P (2, 6, 3), Evaluate the radial component in cylindrical coordinate system.	L3	1	2
2.	Point out the coulomb's law with mathematical expression.	L2	1	2
3.	Infer about the condition for a surface to be equipotential.	L2	2	2
4.	Interpret the mathematical expression for Poisson's and Laplace equations.	L2	2	2
5.	Relate magnetic field intensity and magnetic flux density.	L2	3	2
6.	Compare any two points between scalar and vector potential.	L2	3	2
7.	Illustrate faraday's law of electromagnetic induction principle.	L2	4	2
8.	Interpret about displacement current.	L2	4	2
9.	For a loss dielectric material having μr=1, r=48, =20s/m. Compute the Propagation constant at a frequency of 16 GHz.	L3	5	2
10.	Infer about the skin depth.	L2	5	2

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

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	$\overline{B} = 6\hat{a}_x + 42_y - 4\hat{a}_z$ Estimate the curl and divergence of vector A.	L3	1	6
		ii	Derive an expression for the electric field due to a straight and infinite Uniformly charged wire of length 'L' meters and with a charge density of + λ c/m at a point P which lies along the perpendicular bisector of wire.	L3	1	10
			Or			
	b		Make use of simple elemental model in cartesian coordinate system, derive the mathematical expression for divergence theorem.	L3	1	16
12.	a	i	Derive an expression for the capacitance of a parallel plate capacitor.	L2	2	8
		ii	Describe about the polarization and dielectric strength.	L2	2	8
			Or			
	b		Describe about the boundary conditions in two different dielectric medium Ξr1 and Ξr2.	L2	2	16

13.	a		Apply ampere's circuital law to obtain magnetic field intensity in a circular current loop.	L3	3	16
			Or			
	b	i	Derive an expression for force between two current carrying conductors.	L3	3	10
		ii	Calculate the inductance of a solenoid of 200 turns wound tightly on a cylindrical tube of 6cm diameter. The length of the tube is 60cm and the solenoid is air.	L3	3	6
14.	a		With necessary explanation, derive the Maxwell's equation in differential and integral forms.	L2	4	16
			Or			
	b	i	Distinguish between field theory and circuit theory in detail.	L2	4	8
		ii	Explain about the transformer and motional emf.	L2	4	8
15.	a		Deduce the expression for electromagnetic wave equation for conducting and perfect dielectric medium.	L4	5	16
			Or			
	b		Derive pointing theorem from Maxwells equation and explain.	L4	5	16