

Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Third Semester

Electrical and Electronics Engineering

UEETL24301 – Electromagnetic Fields

Regulations – 2024

Duration : 3 Hrs

Maximum : 100 Marks

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

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	Define Divergence and state Divergence theorem.	L1	1	2
2.	State the law for force between two charges.	L1	1	2
3.	State Gauss's law and its limitations.	L2	2	2
4.	How do the design parameters affect the capacitance of a Parallel Plate Capacitor?	L1	2	2
5.	Give Ampere's circuital Law.	L1	3	2
6.	Mention the significance of Self and Mutual Inductance in a magnetic circuit.	L2	3	2
7.	State Faraday's law of electromagnetic induction.	L1	4	2
8.	Compare the conduction current and displacement current.	L2	4	2
9.	List the significance of Sensors and actuators in industrial application.	L1	5	2
10.	What is meant by magneto therapy?	L1	5	2

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

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a i Describe various Sources and effects of electromagnetic fields with a neat diagram.	L2	1	10
	ii Derive Stoke's Theorem.	L2	1	6
Or				
	b Explain and derive the expression for Electric field intensity due to discrete and continuous charges.	L2	1	16

12.	a	Explain and derive the expression for Potential due to point charge, Line charge, surface and volume charge.	L2	2	16
		Or			
	b i	Derive the boundary conditions for Conductor-Dielectric mediums.	L2	2	8
	ii	Derive Poisson's and Laplace's equations.	L2	2	8
13.	a i	State and explain Biot-Savart's Law.	L2	3	8
	ii	Derive the expression for Magnetic field intensity due to current flowing in a circular loop.	L2	3	8
		Or			
	b i	Explain and derive the expression for force between two parallel current carrying conductors.	L2	3	8
	ii	Establish the expression for Inductance of a solenoid coil.	L2	3	8
14.	a	From the first principle, explain the Transformer emf and motional emf induced with necessary expressions.	L2	4	16
		Or			
	b	Obtain differential and integral form of Maxwell's equations from Faraday's law for a (i) static field (ii) time varying field.	L2	4	16
15.	a i	Write a detailed note on Domestic SMPS.	L2	5	8
	ii	Explain the significance of magnetic levitation in transportation application.	L2	5	8
		Or			
	b	Give the detailed explanatory note on Magnetic resonance imaging with necessary schematic diagram.	L2	5	16