Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 80027

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. 2026
Fourth Semester
Electrical and Electronics Engineering
U23EE408 – ELECTROMAGNETIC FIELDS
(Regulation 2023)

Time : Three Hours Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define vector.	2	K1	CO1
2.	Write Divergence theorem.	2	K1	CO1
3.	State Gauss law for electric field.	2	K1	CO2
4.	Give the relationship between potential gradient and electric field.	2	K1	CO2
5.	State Biot –Savarts law.	2	K1	CO3
6.	What is the point form of ampere's circuit law?	2	K1	CO3
7.	Define self inductance.	2	K1	CO4
8.	State Faraday's law.	2	K1	CO4
9.	Define conduction current.	2	K1	CO5
10.	Write the Maxwell's equation for static electric field in time varying field.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Transform the given vector $A=3a_x-2a_y-3a_z$ at P(-2,-3,4)into spherical co-ordinate system.	13	K1	CO1
		ii.	Determine the curl of $A=yx\ a_x+4yz\ a_y+y\ a_z$			

(OR)

	b)	The vector A is given in the cylindrical co-ordinate system as $A= 3 \cos \phi\ a_r+4\ r\ a_\phi-5\ a_z$. Convert it into Cartesian co-ordinate system.	13	K1	CO1
12.	a)	i. Explain Coulomb's law and deduce the vector form of force equation between two point charges.	13	K2	CO2
		ii. The two charges 3 μc and 5 μc are separated by 6 cm. Find the force between them.			
		(OR)			
	b)	i. Consider a pair of point charges in free space: charge Q_1=-300μc is located at (-1, 3, 5) m and the charge Q_2=25 μc is located at (1, 1,2)m. What is the vector force on Q_2?	13	K1	CO2
		ii. A 250 μc point charge Q_1 is located in the rectangular system at (1,2,1)m and another point charge Q_2 of 150 μc is located at (-2,1,-2) m. Find the vector force on Q_2?			
13.	a)	Develop an expression for magnetic field intensity due to a linear conductor of infinite length carrying current I at a distance, point P. Assume R to be the distance between conductor and point P. Use Biot-Savart's Law.	13	K4	CO3
		(OR)			
	b)	i. Describe Ampere's circuital law.	13	K2	CO3
		ii. List the applications of Ampere's circuital law			
		iii. Interpret the point form of Ampere's circuital law.			
14.	a)	An air coaxial transmission line has a solid inner conductor of radius 'a' and a very thin outer conductor of inner radius 'b'. Determine the inductance per unit length of the line.	13	K3	CO4
		(OR)			
	b)	An inductor of 3 henries and resistance 4 ohms is connected to the terminals of a battery of emf, 20 volts and of negligible internal resistance. determine	13	K3	CO4
		i. The initial rate of increase of current in the circuit,			
		ii. The rate of increase of current at the instant when the current in the circuit is 1amp.			
15.	a)	State Poynting's theorem and relevant factors with proof and explain its physical significance.	13	K2	CO5
		(OR)			