Q.P. Code: 18EE0203 **R18**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations Feb-2021

ELECTROMAGNETIC FIELDS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	a	Define curl of a vector.	2M
	b	State vector form of coulombs law.	2M
	c	Define Dielectric Strength.	2M
	d	Define mutual inductance.	2M
	e	State Faraday's law of electromagnetic induction.	2M

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2	a	The vector from the origin to point A is given as (6,-2,-4), and the unit vector directed from the origin toward point B is (2, -2,1)/3. If points A and B are ten units apart, find the Coordinates of point B.	5M
	b	A vector field is specified as $G= 24xya_x + 12(x^2+2)a_y + 18z^2a_z$. Given two points P(1,2,-1) and Q (2, 1,3), find: (i) G at P; (ii) a unit vector in the direction of G at Q; (iii) a unit vector directed from Q towards P; (iv) the equation of surface on which G=60.	5M

OR

3		The three vertices of a triangle are located at A(-1,2,5), B(-4,-2,-3), and C(1,3,-2). Find (i) The length of the perimeter of the triangle. (ii) A unit vector that is directed from the midpoint of the side AB to the midpoint of the side BC. (iii) Show that this unit vector multiplied by a scalar is equal to the vector from A to C and that the unit vector is therefore parallel to AC.	10M

UNIT-II

4	a	Derive Laplace and Poisson's equation.	5M
	b	Derive Maxwell first equation.	5M

OR

5		Four positive point charges 10^{-12} coulomb each are situated in X-Y plane at points (0,0), (0, 1) (1, 1) and (1, 0) m.Find the electric field and potential at (3/4, 3/4) & (1, 1)	10M

UNIT-III

6	a	Derive the continuity equation. What is its physical significance?	5M
	b	Derive the point form of ohms law.	5M

OR

7	a	Derive the expression for parallel plate capacitor.	4M
	b	What is the energy stored in a capacitor made of two parallel metal plates each of $30cm^2$ area separated by 5mm in air. $\varepsilon_o= 8.854x10^{-12}$. The capacitor is charged to potential difference of 500v.	6M

UNIT-IV

8 Derive the expression for torque produced on a closed current carrying when placed in a magnetic field. **10M**

OR

9 **a** What is vector magnetic potential? Derive vector poison's equation. **5M**

b A toroid has air core and has a cross sectional area of $10mm^2$ it has 1000 turns and its mean radius is 10mm. find its inductance? **5M**

UNIT-V

10 Write Maxwell's equation in good conductors for time varying fields and static fields both in differential and integral form. **5M**

OR

11 **a** A copper wire carries current of 1A. Determine displacement current in the wire at 1MHz for copper $\varepsilon=\varepsilon o$ and $\sigma=5.8x10^7$. **5M**

b Explain pointing vector and its significance. **5M**

END