Q.P. Code: 16EE214 **R16**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester (R16) Regular Examinations May/June 2018

ELECTROMAGNETIC FIELDS

(ELECTRICAL & ELECTRONICS ENGINEERING)

Time: **3 hours** Max. Marks: **60**

(Answer all Five Units **5 X 12 = 60** Marks)

UNIT-I

1		A circle, centred at the origin with radius of 2 units, lies in the xy plane. Determine the unit vector in rectangular components that lies in the xy plane, is tangent to the circle at ($\sqrt{3}$, 1, 0), and is in the general direction of increasing values of y.	12M
		OR	
2		The surfaces ρ=3, ρ=5, Φ=100, Φ=130O, z=3, and z=4.5 define a closed surface. (a) Find enclosed volume. (b) Find the total area of enclosing surface. (c) Find the total length of the twelve edges of the surfaces. (d) Find the length of longest straight line that lies entirely within the volume.	12M

UNIT-II

3	a.	Derive the expression for electric field intensity at a point due to electric dipole.	6M
	b	Derive an expression for electric potential due to point charge.	6M
		OR	
4		Four point charges each of 10μC are placed in free space at the point (1, 0, 0), (-1, 0, 0), (0, 1,0) and (0, -1, 0) m respectively. Determine the force on a point charge of 30μC located at a point (0, 0, 1) m.	12M

UNIT-III

5		At the boundary between glass εr=4 and air, the lines of electric field make an angle of 400 with normal to the boundary. If electric flux density in the air is 0.25μC/m3. Determine the orientation and magnitude of electric flux density in the glass.	12M
		OR	
6	a.	Derive the expression for parallel plate capacitor.	6M
	b.	What is the energy stored in a capacitor made of two parallel metal plates each of 30 cm2 area separated by 5mm in air. ε_o= 8.854x10-12. The capacitor is charged to potential difference of 500v.	6M

UNIT-IV

7		Derive the expression for torque produced on a closed current carrying when placed in a magnetic field.	12M
		OR	
8	a.	Explain relationship between magnetic torque and moment.	6M
	b.	Derive an expression for the force between two current carrying wires.	6M

UNIT-V

9		Derive the equation of Continuity for time varying fields.	12M
		OR	
10		Derive an expression for motional and transformer induced emf.	12M

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