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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations Dec 2019

ELECTROMAGNETIC FIELDS

(ELECTRICAL & ELECTRONICS ENGINEERING)

Time: 3 hours Max. Marks: 60

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

UNIT-I

1 A field is given as $G=[25/(x^2+y^2)](xa_x + ya_y)$, Find: (a) a unit vector in the direction of G at P(3,4,-2); (b) the angle between G and a_x at P; (c) the value of double integral on the plane Y=7. **12M**

OR

2 The surfaces $\rho=3$, $\rho=5$,$\Phi=100^o$, $\Phi=130^O$, 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** State and explain Coulomb's law? **6M**

b Four concentrated charges Q_1= 0.3 μC, Q_2= 0.2 μC, Q_3= -0.3 μC, Q_4= 0.2 μC are located at the vertices of a plane rectangle. The length of rectangle is 5 cm and breadth of the rectangle is 2 cm. Find the magnitude and direction of resultant force on Q_1? **6M**

OR

4 **a** Derive Maxwell first equation. **6M**

b Derive the expression for torque on electric dipole in the presence of uniform electric field. **6M**

UNIT-III

5 **a** Derive the continuity equation. What is its physical significance? **6M**

b Derive the point form of ohms law. **6M**

OR

6 **a** Derive the expression for capacitance of a co-axial cable. **6M**

b A parallel plate capacitor has a plate area of 2 m^2 and a plate separation of 9 mm. There are two dielectrics in between the plates. The first dielectric has a thickness of 5 mm with a relative permittivity of 7 and the second has a thickness of 4 mm with a relative permittivity of 4. Find the capacitance? **6M**

UNIT-IV

7 **a** State and explain ampere's circuital law. **6M**

b Explain about Magnetic Dipole and Dipole Moment. **6M**

OR

8 Using Biot-savart law, Find $\vec{H}$ due to infinitely long straight conductor? **12M**

UNIT-V

9 **a** What is vector magnetic potential? Derive vector poison's equation. **6M**

b Derive the expression for inductance of a co-axial cable. **6M**

OR

10 **a** Explain physical significance of displacement current. **6M**

b State and Explain in Statically induced EMF and Dynamically induced EMF. **6M**

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