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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations October-2020

ELECTROMAGNETIC FIELDS

(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

- 1 a** The three vertices of a triangle are located at A(-1,2,5), B(-4,-2,-3), and C(1,3,-2). **6M**
(i) Find the length of the perimeter of the triangle. (ii) Find 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.

- b** 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. **6M**

OR

- 2 a** 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 $y=7$. **6M**

- b** 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. **6M**

UNIT-II

- 3 a** State and explain Coulomb's law indicating clearly the units of quantities in the equation of force? **8M**

- b** State and prove Gauss's law and write limitations of Gauss's law? **4M**

OR

- 4 a** Derive Laplace and Poisson's equation. **7M**

- b** Find electric potential due to electric dipole? **5M**

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? **5M**

- 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? $\epsilon_0 = 8.854 \times 10^{-12}$. The capacitor is charged to potential difference of 500V? **7M**

UNIT-IV

- 7 a Write down Maxwell's third equation in point and integral form. **6M**
b State and explain Biot-savart's law. **6M**

OR

- 8 a State and explain ampere's circuital law? **6M**
b Derive an expression for the force between two current carrying wires? **6M**

UNIT-V

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

OR

- 10 a A coil of 500 turns is wound on a closed iron ring of mean radius 10cm and cross section of 3 cm^2 . Find the self inductance of the winding if the relative permeability of iron is 800? **6M**
b Derive the expression for inductance of a co-axial cable. **6M**

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