

Total No. of Questions : 4]

SEAT No. :

**P5049**

**[6187] - 450**

[Total No. of Pages : 2

**T.E. (Electronics and Telecommunication) (Insem)**

**ELECTROMAGNETIC FIELD THEORY**

**(2019 Pattern) (Semester - I) (304182)**

*Time : 1 Hour]*

*[Max. Marks : 30*

*Instructions to the candidates:*

- 1) Answer Q1 or Q2, Q3 or Q4.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of electronic packet calculator and smith chart is allowed.
- 5) Assume suitable data, if necessary.

**Q1) a)** State and prove Divergence theorem applied for Gauss law. **[5]**

b) Three point charges in free space are located as follows: 50 nC at (0, 0, 0) m; 40nC at (3, 0, 0) m; -60nC at (0, 4, 0) m. Find the electric field intensity E at (3, 4, 0) m **[7]**

c) Explain different types of charge distribution. **[3]**

OR

**Q2) a)** Two point charges  $-4\mu\text{C}$  and  $5\mu\text{C}$  are located at (2, -1, 3) and (0, 4, -2) respectively. Find the potential at (1, 0, 1) assuming zero potential at infinity. **[6]**

b) The electric potential near the origin of a system of co-ordinates is  $V = 5x^2 + 8y^2 + 10z^2$ . Find the electric field at a point A(1, 2, 3). **[6]**

c) State and explain Coulomb's law in vector form. **[3]**

**P.T.O.**

- Q3)** a) Obtain an expression for the magnetic field intensity (H) due to straight infinite conductor carrying current I amperes along Z axis. [6]
- b) State and Prove Ampere's circuital law. [6]
- c) Define Biot-Savart's law. Enlist the applications employing the steady magnetic field. [3]

OR

- Q4)** a) State Maxwell's equation for static field in integral and point form. [6]
- b) i) Find H in rectangular components at P (2, 3, 4) if there is a current filament of infinite length on the z axis carrying 8 mA in the  $a_z$  direction.
- ii) Repeat if the filament is located at  $x = -1, y = 2$ . [6]
- c) Explain the physical significance of curl. [3]

