P5049

SEAT No. :

[6187] - 450

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 $-4\mu C$ and $5\mu C$ 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]**

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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]**

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