Engg. - 29
T.E. (E & TC)
ELECTROMAGNETICS & TRANSMISSION LINES (In Sem.)
(2012 Pattern)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

1) *Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6.*

2) *Neat diagrams must be drawn wherever necessary.*

3) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

4) *Assume Suitable data, if necessary.*

Q1) a) What is an electric dipole? Derive an expression for potential due to dipole. **[6]**

b) A point charge of 6 μc is located at the origin. A uniform line charge with density 180 μc/m lies on entire *x* axis. An infinite sheet of charge having density 25 μc /m^2 placed at Z = 1 m. Find total electric flux leaving the surface of sphere having radius 4 m & centred at origin. **[4]**

OR

Q2) a) Derive relation between electric field intensity (E) and electric potential (V). **[5]**

b) State & prove Gauss law. **[5]**

Q3) a) Derive the boundary conditions for dielectric to dielectric interface. **[6]**

b) If $J = \dfrac{2}{r^3}\left(2\cos\theta\,\bar{a}r + \sin\theta\,\bar{a}\phi\right)$. Find current passing through hemisphere having radius 20 cm. **[4]**

OR

P.T.O.

Q4) a) Derive Laplace & Poisson's equation and state its physical significance. **[5]**

b) Write a note on polarization in dielectric & state relationship between polarization & electric field intensity. **[5]**

Q5) a) State & prove Ampere's Circuital law. **[5]**

b) An infinite long straight conductor carrying current 3 Amp. is placed on z - axis. Find magnetic field strength at (1, 2, 1). **[5]**

OR

Q6) a) Obtain the expression for H at the centre of a circular conductor carrying current I using Biot - Savart's law. **[5]**

b) Explain scalar & vector magnetic potential. **[5]**

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