

Total No. of Questions : 6]

SEAT No. :

[Total No. of Pages : 2

P3715

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 $6 \mu\text{C}$ is located at the origin. A uniform line charge with density $180 \mu\text{C/m}$ lies on entire x axis. An infinite sheet of charge having density $25 \mu\text{C/m}^2$ 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 $\mathbf{J} = \frac{2}{r^3} (2\cos\theta \bar{a}_r + \sin\theta \bar{a}_\phi)$. 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]**

