

Total No. of Questions : 8]

SEAT No. :

P1730

[5058]-363

[Total No. of Pages : 3

T.E. (Electronics & Telecommunication)
ELECTROMAGNETICS AND TRANSMISSION LINES
(2012 Course) (Semester-I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.*
- 2) *Figure to right indicate full marks.*
- 3) *Neat diagram must be drawn wherever required.*
- 4) *Use electronic pocket calculator and smith chart is allowed.*
- 5) *Assume suitable data, if necessary.*

- Q1)** a) Derive expression for flux density for an infinite line charge using Gauss law. [6]
- b) Derive relation between \bar{E} and V. Also state significance of potential gradient. [8]
- c) State & explain stokes theorem. [6]

OR

- Q2)** a) A point charge of 2nC is located at (4, -1, -3) & a uniform line charge of -25nC/m lies along the intersection of planes X = -4 & Z = 6 calculate \bar{D} and \bar{E} at (3, 1, 0). [8]
- b) Derive boundary condition for perfect dielectric media. [8]
- c) In the region $0 < r < 0.5\text{m}$ in cylindrical coordinates, the current density is $\bar{J} = 4.5e^{-2r} a_z \left(\frac{\text{A}}{\text{m}^2} \right)$ and $J = 0$ elsewhere. Use Ampere's law to find \bar{H} . [4]

P.T.O.

Q7) a) Derive expression for characteristic impedance, propagation constant and velocity of propagation for distortion less line. [8]

b) A transmission line with characteristics impedance of $692\angle -12^\circ \Omega$ is terminated in 200Ω resistor. Determine reflection coefficient & SWR. [10]

OR

Q8) a) What do you mean by single stub matching on a line and derive the equation of single stub along the line. [8]

b) In lossless 100Ω transmission line is terminated in an impedance $50 + j60 \Omega$. Calculate VSWR, reflection coefficient, impedance of 0.35λ from the load using smith chart. [10]

