Total No. of Questions :6]

SEAT No. : _____

P5635

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TE/INSEM./OCT.-23

T.E. (E & TC)

ELECTROMAGNETICS & TRANSMISSION LINES

(2012 Pattern) (Semester - I)

Time : 1 Hour] ***[Max. Marks :30***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Assume suitable data, if necessary.***
3) ***Use of log table, electronic pocket calculator is allowed.***
4) ***Neat diagram must be drawn wherever necessary.***

Q1) a) Derive an expression for electric field intensity due to electric dipole. **[6]**

b) Charge Q_2 of 10µc is located at P_2 (-3, 1, 4)m. Find the force on Q_2 due to Q_1 = 33µc located at P_1 (3, 8, -2)m **[4]**

OR

Q2) a) Derive an expression for electric field intensity due to uniformly charged infinite sheet using Gauss Law. **[5]**

b) An infinite line charge having density 25nc/m is placed on y axis. Find electric field intensity at P (-1, -2, -3). **[5]**

Q3) a) Derive boundary condition between conductor & free space. **[5]**

b) Define conduction current density and derive current continuity equation. **[5]**

OR

Q4) a) Derive expression for capacitance of cylindrical plate capacitance. **[5]**

b) Determine whether or not following potential fields satisfy Laplace's equation.

i) $V = x^2 - y^2 + z^2$

ii) $V = r \cos \phi + z$ **[5]**

P.T.O.

Q5) a) State and explain Biot & Savart Law **[4]**

b) Explain scalar & vector magnetic potentials. **[6]**

OR

Q6) a) Derive the expression for magnetic field intensity due to infinite long current carrying conductor using Ampere's Law. **[5]**

b) Plane z = 0 & z = 4 carry current K = –10 $\bar{a}_x$ A/m and K = 10 $\bar{a}_x$ A/m respectively Determine $\overline{H}$ at point

i) P (1, 1, 1)

ii) Q (0, -3, 10) **[5]**