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 $Q_1 = 33$µc located at P_1 (3, 8, -2)m **[4]**

<div align="center">OR</div>

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]**

<div align="center">OR</div>

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]

✿ ✿ ✿ ✿