TE- sem-V (CBS(rs) Electronics - Electromagnetic Engg
Electromagnetic Engineering   22/11/16

QP Code : 591102

(3 Hours)   [Total Marks : 80

N.B. : (1) Questions no. **1** is compulsory.
    (2) Solve **any three** from question no. 2 to question no. 6
    (3) **Right** figures **indicate** the marks.

1. Solve any **four**
    (a) Point charges Q_2 =300 μ C located at (2, -1, -3) m in experiences a   5
      force $\overline{F}_2 = 8a\overline{n} - 8a\overline{y} + 4a\overline{z}$ N due to point charge Q_1 at (3, -4,-2) m.
      Determine Q_1
    (b) The height of a monopole antenna is $\lambda/100$. what is radiation resistance   5
      of antenna.
    (c) State and explain Biot-Savart law.   5
    (d) Find out the divergence and curl of the following function   5
      $\overline{F} = 2x^2 y\overline{a}_x + (x^2 + z)\overline{a}_y + yz^3\overline{a}_z$
    (e) Explain what do you mean by skin depth for lossy media with respective   5
      to signal passing through lossy media.

2. (a) Derive maxwells integral and point form of equation for static fields.   10
   (b) Find electric field intensity $\overline{E}$ due to an infinite line charge.   10

3. (a) Define the polarization of wave. Explain different types of polarization.   10
   (b) Derive boundary condition for electric and magnetic fields at the boundary   10
     of two dielectric media.

4. (a) Explain in detail FDM method also state advantage and drawback of it.   10
   (b) State Poynting theorem and derive the average poynting vector.   10

5. (a) Derive the Expression for radiation power of Hertizen antenna.   10
   (b) Explain the principle modes of operation of helical antenna and draw its   10
     radiation pattern.

6. Solve any two :
    (a) Classify and explain different type of wave propagation   10
    (b) Explain the significance of the term "effective area of an antenna",   10
      Derive the relationship between effective area and directivity of any
      antenna.
    (c) Explain following terms: critical frequency, virtual height, maximum   10
      usable frequency.

240