T.E (Electronics) Sem V C-13-G-1

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 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 **5**
   (b) The height of a monopole antenna is λ/100. what is radiation resistance of antenna. **5**
   (c) State and explain Biot-Savart law. **5**
   (d) Find out the divergence and curl of the following function **5**
   $\overline{F} = 2x^2y\overline{a}_x + (x^2 + z)\overline{a}_y + yz^3\overline{a}_z$
   (e) Explain what do you mean by skin depth for lossy media with respective to signal passing through lossy media. **5**

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 of two dielectric media. **10**

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 radiation pattern. **10**

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", Derive the relationship between effective area and directivity of any antenna. **10**
   (c) Explain following terms; critical frequency, virtual height, maximum usable frequency. **10**