T.E. sem V (CBGS) (ETRX) 18/11/15
EME

QP Code : 5564

(3 Hours) [Total Marks : 80

N.B. : (1) Question no 1 is **compulsory**
(2) Solve **any three** from Question no 2 to Question no 6
(3) Assume suitable data if required .
(4) Right **figures** indicate the **marks**

1. Attempt **any four** :
   (a) State and explain coulomb's law 5
   (b) derive poisson's and laplace equation. 5
   (c) What is intrinsic impedance of free space? 5
   (d) Define directive gain and directivity with respective antenna. An antenna has a directivity of 20 and a radiation efficiency of 90%.compute the gain in dBs. 5
   (e) Find out the divergence and curl of the following function 5

$$\overline{A} = 2xy\overline{ax} + (x^2z)\overline{ay} + z^3\overline{az}$$

2 (a) Given the potentials $V=2x^2y-5xz$ and a point P(-4,3,6) find V,E,D and e_v at point P 10
(b) Derive boundary conditions for electric fields at the boundary of two dielectric media 10

3. (a) Derive Maxwells integral and point form equations for time varying fields 10
   (b) Prove $\nabla . \overline{D} = e_v$ 10

4. (a) In a media characterized by $\sigma = 0, \mu = \mu_0$ and $\varepsilon = \varepsilon_0$ 10

$$\overline{E} = 20\sin(10^8 t - \beta z)\overline{ay}\ v/m. \text{find} \beta \text{and} \overline{H}.$$

   (b) Derive the expression for the reflection and transmission coefficients in case of reflection from perfect dielectric at oblique incidence. 10

5. (a) Explain in detail MOM method also state advantage and drawback of it. 10
   (b) State and derive the poynting theorem and describe the significance of each term 10

6. Attempt **any two** :
   (a) What is line of sight propagation? Obtain the expression for range of line of sight for space wave propagation in terms of antenna's transmitting and receiving heights. 10
   (b) Explain ground wave ,space wave propagations. 10
   (c) Derive an expression for radiation resistance of an small loop antenna. Explain Its significance 10