TE | ETRX | Sem-IV | 18/5/12
EME (REV)

AGJ 1st half (i) 54

Con. 3767-12. TE

Pending Framing

GN–6950

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Q. **2** to Q. **7**.
(3) **Vector notation** should be used wherever **necessary**.
(4) **Assumptions** made should be **clearly** stated.

1. (a) Derive wave equation for homogeneous unbounded source free medium starting from Maxwell's equation. **5**
   (b) Write a note on Smith Chart. **5**
   (c) What is intrinsic impedance of free space ? **5**
   (d) Explain the significance of the propagation constant and arrive at expressions for its real and imaginary parts for a uniform plane wave. **5**

2. (a) Obtain the transmission line equations for a two wire transmission line. Define characteristic impedance of the transmission line. Derive an expression for its characteristic impedance. **10**
   (b) Using Smith Chart find the input impedance and reflection coefficient at a point 0·64 λ from load $z_L = (75 - j\,25)\ \Omega$. Characteristic impedance is 50 Ω. **10**

3. (a) Explain various types of electromagnetic interferences. **10**
   (b) State boundary condition in scalar and vector form. **10**

4. (a) Derive Maxwell's equation in integral form. **10**
   (b) What is a uniform plane wave ? Stating from Maxwell equation, derive wave equation for free space. **10**

5. (a) State and explain Poynting vector using modified Ampere's law, derive the Poynting theorem and describe the significance of each of its terms. **10**
   (b) Explain potential functions for sinusoidal radiation oscillations. **10**

6. (a) Derive the expressions for the reflection and transmission coefficients in case of reflection from perfect dielectric at– **10**
      (i) Normal incidence
      (ii) Oblique incidence.
   (b) A lossless 50Ω transmission line is terminated in 25 + j50Ω. Find– **10**
      (i) voltage reflection coefficient
      (ii) current reflection coefficient
      (iii) VSWR
      (iv) impedance at 0·3λ distance from the load.

7. Write notes on :– **20**
   (a) Gauss's Law
   (b) Poisson's equation
   (c) Impedance Matching.