

Code: R7 211003

R7

B.Tech II Year I Semester (R07) Supplementary Examinations, May 2012

ELECTRO MAGNETIC WAVES AND TRANSMISSION LINES

(Electronics and Instrumentation Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions

All questions carry equal marks

- 1 (a) A circular ring charge of radius 'R' is situated in x-y plane with its center at the origin. If the linear charge density is ' ρ ' C/m find the electric field at any point on z-axis.
(b) Find the electric field due to electric potential $V = \frac{\sin\theta \cos\phi}{r^2}$.
- 2 (a) What is uniqueness theorem? Prove it with respect to static fields.
(b) Determine the energy stored in order to distribute charge on concentric spherical shell.
- 3 (a) Find the magnetic field due to a circular loop carrying current 'I' at a distant point from the loop?
(b) Find the flux density at a point due to a long filamentary conductor carrying a current of 20 Amps in z- direction?
- 4 (a) Is time varying field electric and magnetic fields dependent. Explain.
(b) In free space electric flux density $D = D_0 \sin(\omega t + \beta z) i_x$ find the magnetic flux density using Maxwell's equations.
- 5 (a) Derive wave equations for conducting medium.
(b) Derive the relationship between E and H in a uniform plane wave.
- 6 (a) State and prove pointing theorem.
(b) In free space $E = 50 \cos(\omega t - \beta z) a_z$ V/m, find the average power crossing a circular area of radius 3m in z=0 plane.
- 7 (a) Derive an expression for input impedance of a transmission line in terms of reflection co-efficient.
(b) A loss less transmission line of characteristic impedance 150Ω is connected through a loss less section of length 'd' and characteristic impedance of Z_1 to a load of $250 + j 100 \Omega$ find 'd' in wave lengths and Z_1 which match the load to 150Ω line.
- 8 Explain the following:
 - (a) Types of transmission lines.
 - (b) Reflection coefficient and VSWR.
 - (c) Smith chart and its applications.
 - (d) Minimum attenuation condition.
