Code No: RT22044 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, Dec/Jan-2015-16
EM WAVES AND TRANSMISSION LINES
(Com to ECE, EIE)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) Write the difference between convection current and conduction currents. (3M)
   b) Write the law of refraction for magnetic flux lines at a boundary with no surface current and write its significance. (3M)
   c) What is skin effect? Explain. (4M)
   d) What is total internal reflection? Explain. (4M)
   e) Sketch the T – type equivalent circuit of a transmission line. (4M)
   f) Define voltage reflection coefficient and current reflection coefficient. (4M)

PART -B

2. a) State and Explain coulomb's law. (8M)
   b) A square conducting loop of side '2a' lies in z = 0 plane and carries a current I in the counterclockwise direction. Find **H** at the center of the loop. (8M)

3. a) Explain the terms:
   (i) Transformer EMF (ii) Motional EMF (8M)
   b) Assume that dry soil has $\sigma = 10^{-4}$ S/m, $\varepsilon = 3\varepsilon_0$ and $\mu = \mu_0$. Determine the frequency at which the ratio of the conduction current density and the displacement current density is unity. (8M)

4. a) Derive the expression for attenuation constant and phase constant in a lossy dielectric medium. (8M)
   b) Show that in a good conductor, the skin depth δ is approximately given by $\delta = 2\pi/\lambda$. (8M)

5. a) Discuss about reflection and refraction of plane waves for normal incidence at the interface between two dielectrics. (8M)
   b) In a non magnetic medium has $\mathbf{E} = 4\sin(2\pi \times 10^7 t - 0.8x)\mathbf{a_z}$ V/m, Find (8M)
   (i) ε_r, η
   (ii) The time average power carried by the wave.

6. a) List out different types of transmission lines and write their applications. (8M)
   b) For lossless line, $Z_0 = 50\ \Omega$ and $u = 2.8 \times 10^8$ m/s. Determine L and C for the line. (8M)

7. a) Define input impedance of a transmission line and derive the expression for it. (8M)
   b) Write the applications of smith chart. (8M)
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