

Code: ECMC1T1

**I M.Tech - I Semester - Regular Examinations – March 2014**

**TIME HARMONIC ELECTRO MAGNETIC FIELDS  
(MICROWAVE & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) State and explain Constitutive relationships? 8 M  
b) Starting from Maxwell's equations, derive the circuit law for capacitors,  $I=C dv/dt$ , and the circuit law for inductors  $V=Ldi/dt$ ? 6 M
2. a) Discuss the behavior of waves in lossy matter. 7 M  
b) Explain about Intrinsic wave concepts? 7 M
3. a) Write short notes in waveguide constants ? 7 M  
b) Show that a source in unbounded space is characterized by a radiation of energy? 7 M
4. a) Discuss the fields in half space ? 7 M

- b) Elaborate the equivalence principles (Volume Equivalence and surface Equivalence) ? 7 M
5. a) Explain reaction theorem ? 7 M
- b) Derive integral equations in terms of vector potentials A and F ? 7 M
6. a) Explain modal expansion of fields? 7 M
- b) Discuss the concepts of partially filled waveguide? 7 M
7. a) Briefly explain the Apertures in cylinders ? 7 M
- b) Write short notes on cylindrical wave guide and radial wave guide? 7 M
8. a) Explain in detail about the sources of spherical waves? 7 M
- b) Explain Orthogonality relationships in Spherical wave functions? 7 M