

Code: ECMC1T1

I M.Tech - I Semester - Regular Examinations – February 2016

**TIME HARMONIC ELECTROMAGNETIC FIELDS
(MICROWAVE & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Answer any FIVE questions. All questions carry equal marks

1. a) Explain the AC behavior of circuit elements. 7 M
b) Derive the circuit law of capacitors and circuit law of inductors using Maxwell Equation. 7 M
2. a) Briefly discuss about reflection of waves. 7 M
b) Explain the properties of Uniform plane wave in perfect dielectric. 7 M
3. a) Explain Resonator Concept by considering the rectangular Cavity. 7 M
b) Derive the various parameters in Rectangular waveguide for TE_{on} for $a < b$. 7 M
4. a) Explain in detail about Uniqueness Theorem. 7 M

- b) State and explain the Lorentz reciprocity Theorem with an example. 7 M
5. a) Explain the Reaction Theorem. 7 M
- b) Evaluate the Γ_{ij} for the free space Tensor Green's function defined by $H=[\Gamma]I1$. 7 M
6. a) Explain the various Green's functions wave guide. 7 M
- b) Explain the fields of rectangular Cavity as TE mode in x, y, z Coordinates. 7 M
7. a) Derive the wave function in Radial waveguide. 7 M
- b) Explain the Concept of sources of Cylindrical Waves. 7 M
8. a) Explain in detail about the wave transformations in spherical coordinates. 7 M
- b) Consider an air filled Spherical resonator of radius 10Cm bounded by copper walls. Determine the first five resonant frequencies and the Q of the dominant mode. 7 M