

[Time: Three Hours]

[Marks:80]

N.B: 1. Question number one is compulsory
2. Attempt any three out of remaining

- Q.1 Attempt any FOUR: (20)**
- Derive wave equation for electric fields.
 - Define the terms near field and far field for antenna
 - Derive continuity equation for electric fields
 - Explain ground wave propagation
 - Why Maxwells equations need to be modified for time varying fields
- Q.2 (10)**
- Define loop antenna. Mention the disadvantages of loop antenna
 - Design rectangular micro strip antenna for 2.4 GHZ frequency using FR-4 Substrate of dielectric value 4.4 & thickness 1.6mm. (10)
- Q.3 (10)**
- Compare broadside and end fire array. (10)
 - Derive FRIIS Transmission Equation & Explain its Significance (10)
- Q.4 (10)**
- With neat sketch explain parabolic Reflector antenna. List feed mechanism used (10)
 - Derive wave equations for magnetic fields and explain what is TEM wave (10)
- Q.5 (10)**
- Explain H-plane sectoral horn a antenna and describe various configuration of horn antenna (10)
 - What are the advantages of array antenna? Describe principle of pattern multiplication and sketch radiation pattern of a 3-element array separated at $\lambda/2$ (10)
- Q.6 (20)**
- Write short notes on (any four questions, each carry five marks)
- Sky wave propagation
 - Power in EM wave
 - Retarded potential
 - Equivalent noise temperature of antenna
 - Radiation pattern
