

[Time:3 Hrs]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:**
1. Questions number one is compulsory.
 2. Attempt any three out of remaining five questions
 3. Assume suitable data
 4. Figures to the right indicate the maximum marks

- Q.1** a) Explain Laplace's and Poisson's equations **20**
 b) What is the significance of Gauss's law for magnetic field
 c) Explain Pattern Multiplication w.r.t to linear arrays
 d) Explain Faraday's Law, and its relevance in EM wave Theory
 e) Differentiate Between Antenna Efficiency and aperture efficiency
- Q.2** a) Derive the expression for array factor. Compare End Fire Array and Broadside Array **10**
 b) Derive the expression for MUF, Critical Frequency and skip Distance for flat earth surface **10**
- Q.3** a) Derive the radiation field for Dipole Antenna **10**
 b) A point charge of 20nC is located at (4,-1,-3) and uniform line charge of $-25nC/m$ lies along the intersection of plane $x=-4$ & $z=6$ Calculate Electric Flux Density D (3, 1,0). In free space **10**
- Q.4** a) Compare EM wave propagation through lossy, perfect dielectric and conducting medium with suitable expressions. **10**
 b) Calculate number (N), spacing d and lengths L of the elements of a log periodic dipole array antenna for given values Scaling Factor $T= 0.822$ and Relative Spacing $a= 0.149$ for given frequency of 54 to 216 MHz **10**
- Q.5** a) Derive the expression for Electric Field for two linear isotropic point sources excited with source of equal amplitude and same phase. **10**
 b) What is a patch Antenna? List and explain the various feeding techniques used in microstrip antenna **10**
- Q.6** Write a Short Note on any two **10**
 a) Power in EM wave and significance of Poynting Vector **10**
 b) FRIL's transmission formula
 c) Horn Antenna
 d) Loop Antenna
