

[Time:3 Hrs]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:**
1. Question No.1 is compulsory
 2. Solve any three question from the remaining five
 3. Figures to the right indicate full marks
 4. Assume suitable data if necessary and mention the same in answer sheet

- Q.1 Attempt any 4 question 20
- a. Derive the continuity equation. What is use of this equation in electromagnetics
 - b. Describe corner reflector antenna. Give a typical application scenario for this antenna
 - c. Compare near field and far field radiation of antenna
 - d. Calculate directivity and gain of a given linear broadside uniform array of 5 isotropic elements with a separation of quarter wavelength between the elements.
 - e. Describe duct propagation.
- Q.2 10
- a. Write Maxwell's equation in point form and integral form. Give the word statement for each equation.
 - b. Derive the Helmholtz wave equation for free space in terms of electric and magnetic fields
- Q.3 10
- a. Derive the expression for vector magnetic potential in terms of current density
 - b. Derive the expression of total field for n isotropic point sources of equal amplitude and spacing
- Q.4 10
- a. Describe the construction and radiation pattern of Log Periodic antenna. Why is it called Log periodic?
 - b. Discuss feeding techniques for rectangular and circular patch antenna.
- Q.5 10
- a. With neat sketch explain Horn antenna, also describe how radiation pattern can be modified using physical dimensions of the same antenna.
 - b. Discuss radiation pattern of resonant dipole for following lengths
 - i) Half wavelength ($\lambda/2$)
 - ii) Full wavelength (λ)
 - iii) 1.5 wavelength (1.5λ)
 - iv) 3 wavelengths (3λ)
- Q.6 Short note on: (Attempt any two) 20
- a. Infinitesimal dipole
 - b. Application of Gauss law for surface charge
 - c. Friis transmission equation.
 - d. Array synthesis using Binomial array