

- N.B. (1) Question No. 1 is compulsory.
(2) Attempt any four of remaining six. (solve in all five)
(3) Assume suitable data, if needed.
(4) Support your answers with suitable sketches.

1. Write briefly about :-

- Radiation Resistance
- Directivity
- Beam efficiency
- Critical frequency
- Antenna arrays
- Rhombic antenna
- Isotropic antenna.

- Derive an expression for the near field and for field equation for a short electric dipole.
 - An antenna has a field pattern given by $E(\theta) = \cos\theta \cdot \cos 2\theta$ for $0 \leq \theta \leq 90^\circ$. Find (i) HPBW and (ii) FNBW.
- Calculate Radiation of $\lambda/16$ wire dipole in free space. Also calculate antenna efficiency if loss resistance is 1.1 ohm. Discuss the factors influencing the antenna efficiency.
 - Differentiate folded dipole and half wave dipole antennae.
- Derive the relation for Friis formula. What is the maximum power received at a distance of 0.5 km over a free space 1 GHz circuit consisting of a transmitting antenna with a 25 db gain and a receiving antenna with a gain of 20 db ? The transmitting antenna is fed 150 W of power.
 - Explain parabolic reflector antenna. How is it illuminated ?
- Describe space wave propagation and derive the relation for the maximum distance between transmitting and receiving antenna. Earth is assumed to be flat.
 - With the help of a neat sketch, explain ducting effect. In which conditions, this effect takes place ?
- What is array factor ?
 - Explain pattern multiplication. Draw the radiation for an array of two parallel, half wave length spaced short dipoles using pattern multiplication.
 - Explain briefly about parasitic array.
- Write notes on (any four) :-
 - Sky wave propagation
 - Effective Aperture
 - Biconical antenna
 - Microstrip antenna
 - Monopole antenna
 - Log periodic antenna.