TE Sem VI (Rev) - EXTC - May - June 2006

Antennaand wave Propagation

P4/RT-Ex-06-146

Con. 2850-06. (REVISED COURSE) TV-85

(3 Hours) [Total Marks : 1

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 :–
   (a) Radiation Resistance
   (b) Directivity
   (c) Beam efficiency
   (d) Critical frequency
   (e) Antenna arrays
   (f) Rhombic antenna
   (g) Isotropic antenna.

2. (a) Derive an expression for the near field and far field equation for a short electric dipole. 1
   (b) An antenna has a field pattern given by $E(\theta) = \cos\theta \cos 2\theta$ for $0 \le \theta \le 90°$. Find (i) HPBW and (ii) FNBW. 1

3. (a) 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. 1
   (b) Differentiate folded dipole and half wave dipole antennae.

4. (a) 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 atenna with a gian of 20 db ? The transmitting antenna is fed 150 W of power. 1
   (b) Explain parabolic reflector antenna. How is it illuminated ?

5. (a) Describe space wave propagation and derive the relation for the maximum distance between transmitting and receiving antennas. Earth is assumed to be flat. 1
   (b) With the help of a neat sketch, explain ducting effect. In which conditions, this effect takes place ?

6. (a) What is array factor ?
   (b) Explain pattern multiplication. Draw the radiation for an array of two parallel, half wave length spaced short dipoles using pattern multiplication. 1
   (c) Explain briefly about parasitic array.

7. Write notes on (any **four**) :– 2
   (a) Sky wave propagation
   (b) Effective Aperture
   (c) Biconical antenna
   (d) Microstrip antenna
   (e) Monopole antenna
   (f) Log periodic antenna.