(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2120   **Roll No.** [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

B. Tech.

(SEM. V) ODD SEMESTER THEORY EXAMINATION
2010-11

ANTENNA & WAVE PROPAGATION

Time : 2 Hours   *Total Marks : 50*

Note :   (1) Attempt **all** questions.

(2) Each question carries equal marks.

1.   Attempt any **four** of the following :   **(2½×4=10)**

   (a)   Define Radiation Intensity and Beam Efficiency. Relate Directivity D and Gain G.

   (b)   Explain the importance of retarded potentials.

   (c)   Calculate the average power available at 2 km distance if an element radiates in $\theta = 30°$ and carries a maximum current 2 Amp.

   (d)   Evaluate the radiation resistance of an element of length L = 1 m at an operating frequency of 10 MHz.

   (e)   Define Antenna Temperature and Antenna Impedance.

   (f)   Derive Friss transmission formula.

2.   Attempt any **four** of the following :   **(2½×4=10)**

   (a)   Find out and plot the relative field pattern of two isotropic point source of same amplitude and opposite phase separated by a distance $d = \lambda$.

(b) Explain with relevant example principle of pattern multiplication.

(c) Calculate and plot the field pattern of an array of two non isotropic dissimilar sources for which $E = \cos\phi + \sin\phi \angle\psi$

where $\psi = d\cos\phi + 8 = \dfrac{\pi}{2}(\cos\phi + 1)$.

(d) Derive the radiation resistance of short Electric dipole.

(e) Find out the far field of thin linear Antenna of length $l = \lambda/2$.

(f) What is the importance of folded Dipole Antennas ? Design 3 element Yagi Uda Antenna.

3. Attempt any two of the following : $(5\times2=10)$

(a) Find out the field component of small square loop Antenna of length d. What is the Directivity of small circular loop Antenna ?

(b) What is the importance of Slot Antenna ? Classify Horn Antenna. Design Monofilar Axial Mode Helical Antenna.

(c) Design Log periodic Antenna. What are the advantages of Microstrip Antennas ?

4. Attempt any two of the following : $(5\times2=10)$

(a) Explain the working and design of flat sheet Reflectors and corner Reflectors.

(b) Derive BWFN, HPBW, directing and gain of large circular Aperture with uniform illumination.

(c) What are Antenna Measurement ranges ? Explain the Gain measurement techniques.

5. Attempt any **two** of the following : **(5×2=10)**

   (a) Discuss the mechanism of Ground wave and Space wave propagators or propagations.

   (b) Describe the structure of Ionosphere. Define the terms critical frequency, maximum usable frequency.

   (c) Relate maximum usable frequency with skip distance in the skywave propagation. Derive the maximum range covered in tropospheric region between Transmitting and Receiving Antenna when curvature of Earth is considered flat.