PVP 14

Code: EC5T4

III B.Tech - I Semester – Regular/Supplementary Examinations
October 2019

ANTENNA AND WAVE PROPAGATION
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1. a) Define aperture efficiency.
   b) Bring out the relationship between antenna gain and antenna aperture.
   c) Draw the structure of Biconical antenna.
   d) List the features of duct propagation.
   e) Sketch shapes of various horn antennas.
   f) What is pattern multiplication?
   g) Draw the structure of 3 – element Yagi-Uda antenna. Mention lengths and spacing.
   h) What is meant by fading? Name the two primary sources of fading.
   i) List out the advantages of Binomial arrays.
   j) Explain the term spillover loss in parabolic reflector antenna.
   k) What are the factors that affect the propagation of radio waves.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Compute the directivity in dB of an antenna with a power pattern by considering the spherical coordinates given below. 10 M

$$U(\theta,\phi) = \begin{cases} \sin\theta \sin\phi & 0 \le \theta \le \pi, 0 \le \phi \le \pi \\ 0 & 0 \le \theta \le \pi, \pi \le \phi \le 2\pi \end{cases}$$

b) List all apertures of antennas. Explain them. 6 M

3. a) List the properties of N- element broad side array. 8 M

b) Design a linear broad side array consists of 5 elements (point sources) for a total length of λ. Determine Directivity, HPBW and BWFN. 8 M

4. a) Sketch the radiation pattern of dipole antenna for the lengths of 0.25λ, 0.5λ and λ . Clearly indicate necessary field equations. 8 M

b) Describe the construction and basic principles of operation of a helical antenna under normal mode and axial mode. 8 M

5. a) Explain about the radiation mechanism and various feed systems of parabolic reflector antennas. 8 M

b) Explain the measurement procedure for the measurement of gain and VSWR. 8 M

6. a) Discuss in detail about structure of atmosphere and give brief description of different modes of propagation. 8 M

b) What is the radio harizon of a television antenna placed at a height of 166 meters? If the signal is to be received at a distance of 66 KM, what should be the height of receiving antenna? 8 M