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Paper Id: | 131208 |

Sub Code: EEC 029

Roll No. | | | | | | | | | | |

B.TECH
(VI-SEM) THEORY EXAMINATION 2018-19
ANTENNA AND WAVE PROPAGATION

Time: 3 Hours   *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. **Attempt *all* questions in brief.**   **2 x 10 = 20**

   a) Differentiate radian and steradian**.**
   b) What is meant by duct propagation?
   c) State pattern multiplication.
   d) What do you understand by fading?
   e) Define skip distance.
   f) Write a short note on MUF critical frequency.
   g) State RUMSEY's Principle.
   h) Distinguish between linear polarization and circular polarization.
   i) Draw the structure of 3-elements yagi uda antenna and give the dimensions and spacing between the elements in terms of wavelength.
   j) The diameter of a parabolic reflector is 2 m. for operation at 6GHz; find the beam width between first nulls and the gain.

SECTION B

2. **Attempt any *three* of the following:**   **10 x 3 = 30**

   a) With a neat block diagram, explain the radiation pattern and gain of an antenna can be measured.
   b) Explain in detail the binomial array and derive an expression for the array factor also obtains the excitation coefficients of a seven element binomial array.
   c) Discuss in detail about the structure of atmosphere and the different modes of propagation.
   d) Explain the principles of operation of horn antenna and discuss the various forms of horn antenna.
   e) What is dipole antenna? Explain the directional properties of dipole antenna.

SECTION C

3. **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) Obtain the expression for power radiated and the radiated resistance of a half wave dipole.
   b) Write a short note on: antenna gain, antenna temperature.

4. **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) Derive the expression for the array factor of a linear array of four isotropic element spaced lamda/2 apart feed with signals of equals amplitude and phase. Obtain the direction of maxima and minima.
   b) Obtain an expression for the refractive index of an ionosphere layer.

5. **Attempt any *one* part of the following:** **10 x 1 = 10**

   a) Derive and plot the radiation from a broadside array of 4 point sources.

   b) Derive the expression for the maximum usable frequency for the flat earth, in terms of the critical frequency, distance between transmitter and receiver and height of the ionospheric layer.

6. **Attempt any *one* part of the following:** **10 x 1 = 10**

   a) Explain the principle of parabolic reflector antenna and discuss on different types of feed used with neat diagram.

   b) Explain the operation and design of a turnstile antenna.

7. **Attempt any *one* part of the following:** **10 x 1 = 10**

   a) Describe the difference between frequency independent planar log spiral antenna and conical spiral antenna.

   b) Explain the operation of rhombic antenna and also describe the leg length of rhombic antenna.