PAPER ID-310570

Roll No:

B. TECH
(SEM-V) THEORY EXAMINATION 2020-21
ANTENNA AND WAVE PROPAGATION

Time: 3 Hours   *Total Marks: 70*

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

SECTION A

1. **Attempt *all* questions in brief.**   **2 x 7 = 14**

a.	Discuss different parts of a radiation pattern.
b.	Explain Broadside arrays.
c.	A parabolic dish provides a gain of 75 dB at a frequency of 15GHz. Determine the 3dB bandwidth and FNBW.
d.	Design a Horn antenna.
e.	Examine the major advantage of folded dipole antenna.
f.	Define critical frequency and virtual height.
g.	Illustrate surface wave propagation.

SECTION B

2. **Attempt any *three* of the following:**   **7 x 3 = 21**

a.	Discuss radio communication link and derive the Friss transmission formula mathematically.
b.	Calculate the Array Factor (AF) of the uniform linear array of n isotropic point sources separated by λ/4 distance.
c.	Analyze the optical equivalent of Yagi Uda antenna with its construction, properties and applications.
d.	Calculate in dB the directivity of a helix antenna with 25 turns, having α=10 degree and circumference equal to one wavelength.
e.	Summarize the different parts of Ionosphere.

SECTION C

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

(a)	Describe field from an oscillating dipole.
(b)	Describe directivity of an antenna and find the relationship between directivity and gain of antenna.

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

(a)	Describe the radiation pattern of an array of 8 isotropic point sources separated by λ/2 distance and in phase with the help of pattern multiplication.
(b)	Differentiate between the radiation pattern of two-point isotropic array with phase difference of π and π/2.

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

(a)	Discuss the fields of a short dipole.
(b)	Explain long wire antennas with proper diagrams.

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

(a)	Analyze how a loop antenna is utilized to determine the direction of an incoming radio signal. Also determine the emf equation of Loop antenna.
(b)	Outline the structure, characteristics and applications of microstrip antenna.

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

(a)	Demonstrate the skip distance for region between transmitter and receiver using sky wave propagation, when curvature of earth is taken into consideration.
(b)	Calculate the expression for refractive index of ionosphere.