



R20 Regulation

Subject code: 3P6DB

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Regular/Supplementary Examinations, July 2024

## ANTENNAS AND WAVE PROPAGATION (ECE)

Maximum Marks: 70

Date:22.07.2024 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

### Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	Draw and mention the impedance of Half Wave Dipole.	CO1	L2
2	Define beam efficiency.	CO1	L1
3	Compare and contrast parasitic and driven elements in antenna arrays.	CO2	L2
4	Define the geometry of a helical antenna	CO2	L1
5	List the typical features of microstrip antennas.	CO3	L2
6	Define the following parameters for a rectangular patch antenna: radiation efficiency and bandwidth	CO3	L1
7	Draw the radiation pattern of EFA.	CO4	L2
8	Define a broadside array	CO4	L1
9	List the primary factors influencing the effectiveness of ground wave propagation?	CO5	L2
10	Define skip distance in ionospheric propagation.	CO5	L1

### Part-B

Answer All the following questions. (5X10M=50Marks)			
11	Define the following antenna parameters. a) Radiation pattern [2] b) Effective aperture [2] c) Directivity [2] d) Directive gain [2] e) Resolution [2]	CO1	L3
		CO1	L2
OR			
12	A. Calculate the received power for a transmitter with 1 W power, gain of 10 dBi, and a receiver with a gain of 5 dBi, separated by 1 km at a frequency of 2 GHz. [5] B. Describe the significance of aperture efficiency in large antenna systems. [5]	CO1	L3
		CO1	L2
13	Explain and derive the impedance of a folded dipole. [10]	CO2	L2

	OR		
14	A. Describe the design considerations for a normal mode helical antenna. [5] B. Calculate the beamwidth and directivity of a pyramidal horn antenna with an aperture size of 15 cm by 20 cm operating at 5 GHz. [5]	CO2 CO2	L2 L3
15	A. Explain the concept of impedance matching in the context of rectangular patch antennas. Why is it important? [5] B. Explain the principle of the operation of a flat sheet reflector. [5]	CO3 CO3	L2 L2
	OR		
16	Explain the operation of paraboloidal reflector antenna. [10]	CO3	L2
17	A. Derive the expression for directivity of an end-fire array. [5] B. Explain the purpose of antenna measurements, and why are they critical in antenna design and analysis? [5]	CO3 CO3	L4 L2
	OR		
18	A. List and describe common sources of errors in antenna measurements. [5] B. Explain Binomial array. [5]	CO4 CO4	L2 L2
19	Explain the sky wave propagation with neat diagrams. [10]	CO5	L3
	OR		
20	A. Compare the effectiveness and typical applications of ground wave, space wave, and sky wave propagation. [5] B. Define the following parameter: i) MUF [2] ii) Skip distance & skip zone [3]	CO5 CO5	L2 L2