

ANURAG Engineering College

(An Autonomous Institution)

III B.Tech I Semester Regular Examinations, December – 2024

ANTENNAS AND WAVE PROPAGATION

(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours**Max. Marks: 60****Section – A (Short Answer type questions)****(10 Marks)****Answer All Questions**

	Course Outcome	B.T Level	Marks
1. Define antenna radiation pattern.	CO1	L1	1M
2. What is the significance of retarded potentials in antenna theory?	CO1	L1	1M
3. State the principle of pattern multiplication.	CO2	L1	1M
4. What are the common sources of error in antenna measurements?	CO2	L1	1M
5. What is a parasitic element in an antenna array?	CO3	L1	1M
6. What are the key factors influencing the design of a helical antenna?	CO3	L1	1M
7. List one key advantage of microstrip antennas.	CO4	L1	1M
8. Define a Paraboloidal reflector.	CO4	L1	1M
9. Name the three primary modes of wave propagation.	CO5	L1	1M
10. Define the critical frequency in sky wave propagation.	CO5	L1	1M

Section B (Essay Questions)**Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) Explain the concept of antenna radiation pattern and discuss how beam area, beam width, and beam efficiency are related.	CO1	L2	10M
OR			
B) Derive the expressions for radiation intensity and power radiated by a half-wave dipole antenna.	CO1	L3	10M
12. A) A uniform linear broadside array has five elements spaced $d=\lambda/4$ apart. Calculate the array factor and plot the radiation pattern for the main lobe and first side lobes.	CO2	L3	10M
OR			
B) Explain in detail the absolute gain measurement technique for antennas.	CO2	L2	10M
13. A) Explain the working principle of the Yagi-Uda antenna. Describe its structure and how the parasitic elements affect its directivity and gain.	CO3	L2	10M
OR			
B) Explain the process of optimizing a pyramidal horn for maximum directivity and gain. Include considerations for aperture size and flare angle.	CO3	L2	10M
14. A) Describe the structure and operating principle of microstrip antennas. Discuss their advantages and limitations in modern wireless applications.	CO4	L2	10M
OR			
B) Discuss the various feed methods used in Paraboloidal reflector antennas, such as prime focus, offset feed, and Cassegrain feed.	CO4	L2	10M

15. A) Explain the concept of M-curves and duct propagation in space wave propagation. How do these phenomena affect signal transmission? CO5 L2 10M

OR

B) Describe the concepts of virtual height and skip distance in sky wave propagation. Explain their importance in long-distance communication. CO5 L2 10M