

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS

III–B.TECH–II–Semester End Examinations (Regular) - June- 2025

ANTENNAS AND WAVE PROPAGATION

(ECE)

[Time: 3 Hours]

[Max. Marks: 60]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 10 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(10 Marks)

1. a) What is meant by front to back ratio? [1M]
- b) Define beam efficiency. [1M]
- c) Differentiate broadside array and end fire array. [1M]
- d) Define an isotropic antenna. [1M]
- e) What are the disadvantages of loop antenna? [1M]
- f) List out the applications of helical antenna. [1M]
- g) Give the advantages of microstrip antennas. [1M]
- h) Describe the corner reflector antenna. [1M]
- i) What are the factors that affect the propagation of radio waves? [1M]
- j) What is duct Propagation? [1M]

PART-B

(50 Marks)

- 2.a) Describe beam area and radiation intensity. [5M]
- b) Write a short note on effective height of antenna and antenna temperature. [5M]

OR

3. Derive the expression for the radiated field from a short dipole. [10M]
- 4.a) Explain near & far fields with respect to antenna measurements. [5M]
- b) Define directivity. Give the procedure for the measurement of directivity. [5M]

OR

5. Derive the expression for electric field of a end fire of n sources and also find the maximum direction minimum direction and half power point direction? [10M]

6. A 16 turn Helical Antenna has a Circumference of ' λ ' and turn spacing of ' $\lambda/4$ '. Determine HPBW and Axial Ratio and also Calculate the Directivity in dB having $\alpha=12$. [10M]

OR

7. Explain the design considerations of pyramidal horn antennas. Derive the expressions for beamwidth, directivity and gain. [10M]

8. Explain the radiation characteristics of flat sheet and corner reflector antennas. [10M]

OR

9. Describe the geometry and parameters of a rectangular microstrip patch antenna. Include the expression for resonant frequency. [10M]

10. Discuss the effect of Earth's curvature and wave tilt in ground wave propagation. How do these affect the signal strength at the receiver? [10M]

OR

11. Explain critical frequency, MUF, LUF, and skip distance in sky wave propagation. Derive the relation between MUF and skip distance. [10M]
