

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VI EXAMINATION – WINTER 2025

Subject Code:3161003

Date:02-12-2025

Subject Name:Antennas and Propagation

Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	Marks
Q.1 (a) Derive the mathematical expression for the radiation intensity of an isotropic radiator.	03
(b) Enlist different types of antenna based on radiation pattern.	04
(c) Derive the mathematical expression between maximum effective aperture and directivity.	07
Q.2 (a) Define: 1. Antenna Radiation Efficiency. 2. Radiation Resistance of Antenna. 3. HPBW of Antenna.	03
(b) Show that the directivity of an infinitesimal dipole is 1.76dB.	04
(c) Derive the far field components of a half-wave dipole antenna.	07
OR	
(c) Derive the far field components of a monopole antenna.	07
Q.3 (a) Explain antenna field zones with necessary figures.	03
(b) Explain the concept of pattern multiplication.	04
(c) Sketch the helical geometry with its associated dimensions showing relationship between circumference, spacing, turn length and pitch angle of helix. Explain the axial mode of helical antenna.	07
OR	
Q.3 (a) Differentiate broadside array and endfire array.	03
(b) Explain 3-element Yagi-Uda antenna.	04
(c) Derive the field components of a small loop antenna.	07
Q.4 (a) Briefly explain folded dipole antenna.	03
(b) Explain Babinet's principle.	04

(c) Write short note on log periodic antenna with necessary figure. 07

OR

Q.4 (a) Explain any one antenna phase measurement method. 03

(b) Briefly explain UWB antenna. 04

(c) Enlist antenna gain methods and explain any two in detail. 07

Q.5 (a) Enlist different modes of propagation. 03

(b) Briefly explain different types of lens antenna. 04

(c) Write short note on microstrip patch antenna. 07

OR

Q.5 (a) In context of radio wave propagation define: 03
1. MUF.
2. Skip Distance.
3. Virtual Height.

(b) Explain multi-hop propagation. 04

(c) Write short note on parabolic reflector antenna. 07
