

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM
III B. Tech I Semester Regular/Supplementary Examinations, April/May -2025
ANTENNA AND WAVE PROPAGATION
 (ECE)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

UNIT-I			
1.	a)	Explain the concepts of Polarization and Bandwidth related to antennas. Describe different types of polarization.	[7M]
	b)	Derive the Friis transmission equation and explain its significance in wireless communication.	[7M]
(OR)			
2.	a)	Define and explain the terms: i) Directive Gain ii) Power Density iii) Radiation Pattern iv) Antenna Efficiency	[7M]
	b)	A radio link has a frequency of 1 GHz and a separation of 20 km. The transmitting antenna has a gain of 20 dB and the receiving antenna has a gain of 15 dB. Calculate the power received if the transmitted power is 10 W.	[7M]
UNIT-II			
3.	a)	Explain the radiation mechanism of a half-wave dipole antenna and derive its radiation resistance.	[7M]
	b)	Discuss the characteristics and applications of small loop antennas.	[7M]
(OR)			
4.	a)	State and explain the Reciprocity Theorem for antennas.	[7M]
	b)	Analyze the effects of antenna loading and discuss techniques for impedance matching.	[7M]
UNIT-III			
5.	a)	Explain the principle of array antennas and derive the expression for the array factor of a uniform linear array.	[7M]
	b)	Describe the design considerations for a Broadside array.	[7M]
(OR)			
6.	a)	Explain the working principle of a phased array antenna and discuss its beam steering capabilities.	[7M]
	b)	Write short notes on adaptive arrays and their applications.	[7M]
UNIT-IV			
7.	a)	Describe the construction and working of a Rhombic antenna.	[7M]
	b)	Explain the design considerations and applications of a Yagi-Uda antenna.	[7M]
(OR)			
8.	a)	Discuss the characteristics and applications of a log-periodic antenna.	[7M]
	b)	Explain the feeding methods used for microstrip patch antennas.	[7M]
UNIT-V			
9.	a)	Explain the working principle of a parabolic reflector antenna and discuss its different types of feeds.	[7M]
	b)	Discuss the applications of antennas in satellite communication	[7M]
(OR)			
10.	a)	Describe the construction and working of a Cassegrain antenna system.	[7M]
	b)	Write short notes on the applications of lens antennas in microwave communication.	[7M]
