

PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)
III B.Tech I Semester Supplementary Examinations, May - 2024

ANTENNA AND WAVE PROPAGATION
(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70 M

Answer ONE Question from each Unit
 All Questions Carry Equal Marks

Q. No.	Questions	BTL	CO	Marks
UNIT – I				
1.	a) As related to Radiation Pattern of Antennas Define the following (a) Isotropic pattern (b) Directional pattern (c) Omni directional pattern (d) Beam widths (e) Major lobe (f) Minor lobe	K2	CO1	7 M
	b) What is antenna temperature and explain the effect of equivalent noise temperature of antenna.	K2	CO1	7 M
OR				
2.	a) Write short notes on I. antenna field zones. II. Polarization III. Types of Antenna Apertures IV Antenna Efficiency	K1	CO1	7 M
	b) Calculate the gain of an antenna with circular aperture of diameter 3 meters at 5GHz frequency assuming zero losses.	K3	CO1	7 M
UNIT – II				
3.	a) Evaluate the power component of half-wave dipole antenna from basic Maxwell's equations.	K2	CO2	7 M
	b) Calculate the maximum effective apertures of short dipole and $\lambda/2$ dipoles.	K3	CO2	7 M
OR				
4.	Derive the electric and magnetic field components of half wave dipole.	K2	CO2	14 M
UNIT – III				
5.	a) Design a 6-element yagi-uda antenna with folded dipoles operating with a frequency of 250 MHz	K3	CO3	7 M
	b) Write short notes on: i) Collinear arrays ii) Binomial arrays and iii) Scanning arrays	K2	CO3	7 M
OR				
6.	a) Write about the construction and working of Helical antenna.	K2	CO3	7 M
	b) Calculate the directivity of a 20 turn helical antenna having $\alpha=12^\circ$, circumference equal to one wavelength	K3	CO3	7 M
UNIT – IV				
7.	a) Classify the lens Antenna? Explain the function of lens antennas.	K2	CO4	7 M

	b)	Explain the construction of Cassegrain and Offset feed systems in parabolic reflector.	K2	CO4	7 M
OR					
8.	a)	Explain the salient features of Microstrip Antennas.	K2	CO4	7 M
	b)	Explain the concept of adaptive beam forming.	K2	CO4	7 M
UNIT – V					
9.	a)	Derive the expression for fundamental equation free space propagation.	K2	CO5	7 M
	b)	Write short notes on i) Duct propagation ii) Ionospheric absorption iii) M-Curves	K3	CO5	7 M
OR					
10.	a)	Show that the radius of curvature of the ray path is given by $-2/[d\epsilon_r/dh]$ for tropospheric waves?	K3	CO5	7 M
	b)	Calculate the free space loss in a satellite communication where the satellite is at a height of 36,000 km above the earth. Given $G_T = 15\text{dB}$, $G_R = 45\text{dB}$, $f = 4\text{GHz}$. What is the power received, if the power radiated is 200 watts.	K3	CO5	7 M