

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

III - B. Tech I-Semester Supplementary Examinations (BR23), Mar/Apr - 2026

ANTENNAS AND WAVE PROPAGATION (ECE)

Time: 3 hours

Max. Marks: 70

*Question Paper consists of Part-A and Part-B
Answer ALL the question in Part-A and Part-B*

PART-A (10X2 = 20M)

	Marks	CO	BL
1. a) Define HPBW, FNBW and relation between them?	(2M)	CO1	L1
b) Write short notes on effective height.	(2M)	CO1	L2
c) Explain how can estimate the power radiated by the antenna?	(2M)	CO2	L3
d) Derive the Retarded potential equations from the current element?	(2M)	CO2	L4
e) Define Uniform and non-uniform distribution array antenna?	(2M)	CO3	L1
f) Critically evaluate the operational principles of the end fire array antenna.	(2M)	CO3	L4
g) Evaluate the limitations of microstrip antennas in practical applications	(2M)	CO4	L5
h) Classify and draw the horn antenna structure?	(2M)	CO4	L3
i) Define and explain MUF?	(2M)	CO5	L2
j) Explain Ionospheric Layers.	(2M)	CO5	L2

PART-B (5X10 = 50M)

2a. Discuss about directivity and resolution of an antenna.	5(M)	CO1	L2
b. Explain about current distribution on a thin wire antenna.	5(M)		L2
(OR)			
3a. Write notes on polarization, Antenna Aperture (A_{eff}) and directivity (D)? What is the relation between A_{eff} and D?	5(M)	CO1	L2
b. Calculate the radiation efficiency of a short dipole which is $\lambda/15$ m long and it has $R_{loss}=1.5\Omega$.	5(M)		L3
(OR)			
4a. Explain how the power is radiated by a current element	5(M)	CO2	L2
b. Derive the radiated fields by small loop antenna	5(M)		L4
(OR)			
5a. State Reciprocity theorem and explain its use in antennas.	5(M)	CO2	L2
b. How can estimate E and M fields at far-field distance radiated by an antenna? Explain.	5(M)		L3
(OR)			
6a. Discuss and design a 5-element Yagi-Uda antenna at 30MHz	5(M)	CO3	L6
b. What is broadside array and derive the expression for angles of nulls, maxima and half power points?	5(M)		L4
(OR)			
7a. Estimate and draw the radiation pattern of 3-element Binomial array? Discuss the advantages with this technique?	5(M) 5(M)	CO3	L3

b.	Evaluate the salient features of the Yagi-Uda antenna array, discussing how each feature influences its performance in practical applications.			L5
8a.	Analyse how the design of a parabolic antenna affects its performance?	5(M)	CO4	L4
b.	Explain the working principle of a Pyramidal horn antenna?	5(M)		L2
	(OR)			
9a.	Explain the working and designing of a Cassegrain feed antenna? How it is different from Parabolic Antenna?	5(M)	CO4	L2
		5(M)		
b.	List types of lens antennas with brief characteristics			L4
10a	Explain the fundamentals of ground wave propagation.	5(M)	CO5	L2
b.	Evaluate the impact of wave tilt on the propagation and attenuation of ground waves in radio communication.	5(M)		L5
	(OR)			
11a	Write short notes on Ground wave Propagation?	5(M)	CO5	L2
b.	Derive the LOS range in space wave Propagation?	5(M)		L3
