Code No.: EC602PC	R20	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
III–B.TECH–II–Semester End Examinations (Supply) - December- 2025
ANTENNAS AND WAVE PROPAGATION
(ECE)

[Time: 3 Hours] **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 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 **(20 Marks)**

1. a)	Define front to back ratio	[2M]
b)	Compare half wave dipole & quarter wave monopole antenna.	[2M]
c)	What is tapering of arrays?	[2M]
d)	What would be the directivity of a linear broadside array in dB consisting 5 isotropic elements with element spacing λ/4	[2M]
e)	What is the principle used in horn antenna?	[2M]
f)	Define Folded dipole	[2M]
g)	List out the characteristics of parabolic reflector antenna	[2M]
h)	What are the feeding methods of microchip antenna?	[2M]
i)	List the characteristics of Space wave propagation	[2M]
j)	Define Multi Hop propagation	[2M]

PART-B **(50 Marks)**

2.	Explain the following antenna parameters (i) Directivity (ii) Gain (iii) Effective Aperture (iv) Beam Solid Angle and (v) Radiation Resistance	[10M]
	OR	
3.	An Antenna has radiation Intensity $U=A\sin^2\Theta$: $0<\Theta<\pi$; $0<\phi<2\pi$. Find its Directivity.	[10M]
4.a)	Prove that maximum of the first minor lobe is 13.46 dB down from the maximum at the major lobe of an N-element linear array.	[5M]
b)	What is broadside array and derive the expression for angles of nulls and side lobe maxima?	[5M]
	OR	
5.	Explain the Gain Measurement in i) 2 antenna method ii)3 antenna method	[10M]
6.a)	Explain the design considerations for Helical antennas in different modes.	[6M]
b)	Discuss the basic properties of Helical antenna.	[4M]
	OR	
7.a)	Discuss the construction and design of a Yagi Uda antenna.	[6M]
b)	Show that the impedance of a Folded dipole is 300Ω.	[4M]
8.a)	Briefly explain about Flat Sheet Reflectors.	[6M]
b)	A paraboloid reflector of circular cross-sectional area 8000 sq.cm is uniformly excited at 5GHz. Calculate the HPBW and the gain.	[4M]
	OR	
9.	Explain rectangular micro strip patch antenna and explain its design steps.	[10M]

10.a) Explain in detail about Ground wave propagation. [6M]

b) Explain Wave Tilt effect in ground wave propagation? [4M]

OR

11. Explain about space wave propagation and Derive expression for LOS distance for space wave propagation assuming effective radius of earth, [10M]

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