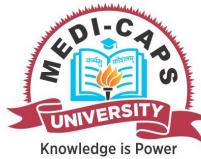


Enrollment No.....



Faculty of Engineering
End Sem Examination Dec 2024
EC3CO19 Antennas & Propagation
Programme: B.Tech. Branch/Specialisation: EC

Duration: 3 Hrs.**Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning. Draw necessary diagrams.

	Marks	BL	PO	CO	PSO
Q.1 i. An electric dipole is a system of two equal and opposite fixed charge carriers separated by a fix distance strength of dipole is measured by-	1	02	01		
(a) Current density (b) Current displacement (c) Dipole moment (d) Charge carrier count					
ii. In an antenna radiation pattern a null is defined as a zone in which _____ is minimum.	1	01	01		
(a) Directivity (b) Radiated power (c) Return loss (d) None of these					
iii. In end fire array, the direction of the maximum radiation is	1	01	01		
(a) Along the axis of array (b) Perpendicular to the axis of array (c) Opposite to the axis (d) Parallel to the axis of array					
iv. In case of uniform linear array, to increase the directivity, the array length has to be-	1	03	02		
(a) Increased (b) Decreased (c) No effect (d) None of these					
v. To increase the gain of the Yagi-Uda antenna, the number of directors is..... in the beam direction-	1	02	02		
(a) Decreased (b) Increased (c) Fixed (d) Both (a) and (c)					

[2]

- vi. In which of the following mode, the radiation is perpendicular to the axis of helical antenna?
 - (a) Axial
 - (b) Beam
 - (c) Normal
 - (d) End fire
- vii. Pyramidal horn antennas have :
 - (a) Lightweight and low directivity
 - (b) Lightweight and higher directivity
 - (c) Heavy weight and high directivity
 - (d) Heavy weight and low directivity
- viii. CST, HFSS are:
 - (a) Types of filters
 - (b) Radiation mechanism
 - (c) Elements of antenna
 - (d) Antenna design software
- ix. In radio transmission MUF is-
 - (a) Mean of utilised frequency
 - (b) Maximum usable frequency
 - (c) Mode of useful frequency
 - (d) Minimized usable frequency
- x. Optimum Working Frequency (OWF) is -
 - (a) Statistical prediction of the highest frequency
 - (b) Related to sky wave propagation
 - (c) Used at ionosphere level.
 - (d) All of these

	1	02	03
	1	02	03
	1	01	07
	1	01	07
	1	01	06

- Q.2 i. What is beamwidth?
 ii. Define: Gain, Directivity, Bandwidth.
 iii. Explain the different radiation patterns and their representation,

OR iv. Derive Radar Range Equation and give its significance

- Q.3 i. What is the concept of pattern multiplication?
 ii. Describe in detail the effects of uniform and non-uniform amplitude distributions.

OR iii. Write a note on operational details of scanning array and binomial array.

[3]

- Q.4 i. Write constructional details and characteristics of Yagi - Uda antenna.
 ii. State the design considerations for monomial helical antennas in axial mode and normal modes.
- OR iii. Explain F/D ratio, aperture blocking. give the geometry and details off-set feeds, cassegrain feeds for parabolic reflector.
- Q.5 i. Give the basic requirements of base station antenna and mobile station antenna.
 ii. Describe the features of FHSS and CST tools.
- OR iii. Write a short note on different types of horn antenna.
- Q.6 Attempt any two:
 i. What is super refraction? Explain the effect of earth's magnetic field on radio wave propagation.
 ii. Describe the structure of ionosphere mechanism of Ionospheric propagation.
 iii. Explain virtual height, skip distance, ionosphere abnormalities.

[2]

[3]

Marking Scheme
EC3CO19 (T) Antennas & Propagation (T)

			Marks		
Q.1	i	(c) dipole moment	1	OR	iii Explain F/D Ratio, Aperture Blocking. Give the geometry and details Off-set Feeds, Cassegrain Feeds for parabolic reflector . 2,2.5 ,2.5(geometry required)
	ii	(b)radiated power	1		
	iii	(a) along the axis of array	1		
	iv	(a) increased	1		
V		(b)increased	1		
vi		(c)normal	1		
vii		(b)lightweight and higher directivity	1		
viii		(d) antenna design software	1		
ix		(b)maximum usable frequency	1		
x		(d) all of the above	1		
Q.2	i	What is beamwidth ? Definition 2 marks	2	Q.5	i Give the basic requirements of base station antenna and mobile station antenna. <i>Base station 2 marks, mobile station 2 marks</i>
	ii	Define: Directivity, Bandwidth, Gain. <i>1 for each definition</i>	3		ii Describe the features of FHSS and CST tools
	iii	Explain the different radiation patterns and their representation . <i>All the types 2.5 ,radiation pattern plot for all 2.5</i>	5	OR	iii Write a short note on different types of horn antenna. 6 marks
OR	iv	Derive Radar Range Equation and give its significance <i>Equation derivation 4 marks ,Significance 1 mark</i>	5		
Q.3	i	What is the concept of pattern multiplication? <i>2 marks</i>	2	Q.6	i Attempt any two: What is super refraction ? Explain the effect of earth's magnetic field on radio wave propagation. <i>2+3</i>
	ii	Describe in detail the effects of Uniform and Non-uniform Amplitude Distributions <i>3 marks for each description and 2 marks for pattern of each .</i>	8		ii Describe the structure of ionosphere mechanism of Ionospheric propagation <i>Structure 3 marks ,details 2 marks</i>
OR	iii	Write a note on operational details of scanning array and binomial array. <i>2 marks for operational detail of each,(6 marks array factor, design ,HPBW ,Directivity etc)</i>	8		iii Explain :Virtual height, Skip distance, Ionosphere abnormalities. <i>Virtual height& Skip distance(3 marks), Ionosphere abnormalities.(2 marks)</i>
Q.4	i	Write constructional details and characteristics of Yagi - Uda antenna.	3		
	ii	State the design considerations for monomial helical antennas in Axial Mode and Normal Modes.	7		