Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–V EXAMINATION – WINTER 2015

Subject Code:X51101 **Date:10/12/2015**

Subject Name: Antenna & Wave Propagation

Time: 10:30pm to 1:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define and explain the following terms for an antenna	**08**
	(i)	Radiation Patterns	
	(ii)	Horizontal and Vertical Polarization	
	(iii)	Beam width and Bandwidth	
	(iv)	Antenna Apertures	
	(b)	Answer the following	**06**
	(i)	Consider the lossless horn antenna with directivity of 20dB. At a frequency of 20 GHz and incident power density is 5×10^{-3} w/m^2 calculate the maximum effective aperture and maximum power received.	
	(ii)	Explain the friss transmission formula.	
Q.2	**(a)**	Derive the maxima, minima and half power point directions if two point sources are fed with currents equal in magnitude and in phase.	**07**
	(b)	Derive the expression for magnetic and electric field at a large distance from small square loop with uniform in phase current.	**07**
		OR	
	(b)	Explain in details Broad-side Array and End-fire Array.	**07**
Q.3	**(a)**	What are the advantages of Dolph-Tchebysheff amplitude distribution of feeding current of linear array? Compare uniform, binomial and edge amplitude distribution of feeding current for linear array with optimum distribution.	**07**
	(b)	Prove the equality of directivity and radiation pattern of transmitting and receiving mode.	**07**
		OR	
Q.3	**(a)**	Design a four element broad side optimum array of isotropic sources of $\lambda/2$ spacing between the elements. The pattern is to be optimum with a side lobe 20 dB down the main lob maximum.	**07**
	(b)	What is the importance of parabolic structure as a reflector in antenna? Explain the cassegrain feed mechanism of parabolic reflector antenna.	**07**
Q.4	**(a)**	What is log periodic antenna? Explain with neat sketch log periodic dipole array.	**07**
	(b)	What is parasitic element? Explain Yagi-Uda array and list out its	**07**

applications.

OR

Q.4	**(a)**	Explain Experimental Setups for the Measurement of Gain of the antenna.	**07**
	(b)	Write short note on: Helical Antenna	**07**
Q.5	**(a)**	Define and explain the following terms for radio wave propagation. (i) Ground wave propagation (ii) Sky wave propagation.	**07**
	(b)	Explain the experimental setup for polarization measurements.	**07**

OR

Q.5	**(a)**	Define and explain the following terms for radio wave propagation. (i) Multi Hope Propagation (ii) Space Wave Propagation	**07**
	(b)	Write Short note on : (i) Antenna for terrestrial mobile communication. (ii) Plasma Antenna	**07**

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