Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2023

Subject Code:3161003 Date:02-12-2023

Subject Name:Antennas and Propagation

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define (1) FNBW (2) HPBW (3) Gain of antenna	**03**
	(b)	Describe briefly polarization and its types.	**04**
	(c)	Demonstrate the Radio communication link between transmitting and receiving antenna using Friss Transmission formula.	**07**
Q.2	**(a)**	Define antenna and list down various types of antennas.	**03**
	(b)	Show that directivity is inversely proportional to beam area.	**04**
	(c)	Derive the expression of E_θ and $H_\emptyset$ of a small current element.	**07**
		OR	
	(c)	Derive the expression of radiation resistance of a λ/2 dipole antenna	**07**
Q.3	**(a)**	Answer the following: (1) What is the value of directivity, if beam area is 2π/3? (2) Sketch the radiation pattern with necessary indications	**03**
	(b)	Explain the helical geometry of helical antenna with necessary diagram.	**04**
	(c)	Explain antenna field zones, antenna aperture and radiation resistance of an antenna.	**07**
		OR	
Q.3	**(a)**	Describe the constructional features of 3 - element Yagi - Uda antenna.	**03**
	(b)	Describe the principle of pattern multiplication in the working of Array antennas	**04**
	(c)	Explain Binomial Array in detail. Also give its advantages and disadvantages.	**07**
Q.4	**(a)**	Give the classification of lens antenna in brief.	**03**
	(b)	Explain Babinet's Principle for slot antenna.	**04**
	(c)	Explain in brief radiation mechanism for microstrip patch antenna. Give advantages, disadvantages and applications of microstrip patch antenna.	**07**
		OR	
Q.4	**(a)**	Define UWB. Explain it in brief	**03**
	(b)	Describe in brief the working principle of reflector antenna.	**04**
	(c)	Obtain the expression for the far field of circular loop antenna. And also show that directivity of loop antenna is same as dipole antenna	**07**
Q.5	**(a)**	Explain any one method of phase measurement.	**03**
	(b)	Describe in brief log periodic antenna.	**04**
	(c)	Which are the methods used to measure the gain of an antenna? Explain any one method.	**07**

OR

Q.5	**(a)**	Define MUF, virtual height and skip distance.	**03**
	(b)	Explain the structure of ionosphere with necessary diagram.	**04**
	(c)	Differentiate ground wave propagation, sky wave propagation and space wave propagation.	**07**

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