Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– II(New course) • EXAMINATION (Remedial) – WINTER- 2015

Subject Code: 2720503 **Date: 10/12/2015**

Subject Name: Antenna Engineering Design

Time:2:30 pm to 5:00 pm **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)**	Explain the concept of Reciprocity theorem? How can be implemented on Antenna?	**07**
	(b)	Define following (1) Isotropic Antenna (2) Omni directional Antenna (3) Polarization (4) FNBW (5) Side lobe and Back lobe (6) HPBW (7) Gain	**07**
Q.2	**(a)**	Derive the relation between Effective Aperture and Directivity. Also derive the relation between Effective Aperture and Gain.	**07**
	(b)	The radiation intensity of the major lobe of antenna is represented by U_1=sinð sinū , U_2=sinð $\sin^2$ū , U_3=sinð $\sin^3$ū . Find the HPBW and Directivity for 0 Òð , ū ÒÜ.	**07**
		OR	
	(b)	An antenna with a impedance of Z_A = 50 + j50q is connected to a generator with open circuit voltage of 10 V and internal impedance of 50q via a ø/4-long transmission line with characteristic impedance of 100 ohms. (i)Draw the equivalent circuit (ii)Determine the power supplied by the generator (iii)Determine the power radiated by the antenna	**07**
Q.3	**(a)**	Discuss the Directivity of Linear Array with n sources in case of Ordinary Endfire array and Woodyard Endfire array.	**07**
	(b)	Obtain the expression for the resultant field and show the effect on Ç for two element array consisting identical radiators carrying equal currents in phase and assume one source is used as a reference.	**07**
		OR	
Q.3	**(a)**	Discuss Dolph-Tchebysheff distribution for linear arrays.	**07**
	(b)	For uniform linear array of óníô isotropic sources of equal amplitude and spacing, obtain the expression for relative electric field and AF at a far point. Also discuss the nulls, maxima and HPBW for general case.	**07**
Q.4	**(a)**	Write a short note on Antenna Beam-forming. Discuss the Adaptive Digital Beam forming.	**07**
	(b)	Explain Microstrip arrays and Feed Networks.	**07**
		OR	
Q.4	**(a)**	Write a short note on Finite Difference Time Domain Method (FDTD).	**07**
	(b)	What is the concept of Smart Antenna? Discuss the need of Smart Antenna in Cellular system.	**07**
Q.5	**(a)**	Explain the Rectangular Horn Antenna and derive the equation of Directivity.	**07**
	(b)	Describe the working principle, design and applications of a Microstrip patch antenna.	**07**
		OR	
Q.5	**(a)**	Discuss the Microstrip antenna Feeding technique in details.	**07**
	(b)	Discuss carious antenna optimization techniques in brief.	**07**

***