Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 161003 **Date: 27/04/2017**

Subject Name: Antenna & Wave Propogation

Time: 10:30 AM to 01:00 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)**	What do you mean by an antenna? Derive the FRIIS formula relating to power received and radiated power.	**07**
	(b)	Define following terms: 1) HPBW 2) Antenna radiation efficiency 3) Radiation density 4) Beam solid angle 5) Directivity 6) Far field 7) Effective length of an antenna	**07**
Q.2	**(a)**	Solve the followings: 1) Find the radiation resistance of a Hertzian dipole of length $\lambda/40$ ans $\lambda/60$. 2) An antenna whose radiation resistance is 300 Ω operates at a frequency of 1 GHz and with a current of 3 A. Find the radiated power. 3) Find the effective area of a Hertizian dipole operating at 100 MHz.	 **02** **02** **03**
	(b)	Derive necessary equations for **E** and **H** field of Half wave dipole antenna.	**07**
		OR	
	(b)	Explain Broadside array and End fire array, considering linear array of four isotropic sources.	**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)	Find the basic and actual transmission losses between two antennas separated by 30 m operating at 10 MHz when the gain of each antenna is 1.65 dB.	**07**
		OR	
Q.3	**(a)**	Define binomial arrays. Also write a brief note on Principle of Pattern Multiplication.	**07**
	(b)	Derive the far field components and the radiation resistance of a small circular loop with radius 'a' and with a uniform phase current.	**07**
Q.4	**(a)**	What is the importance of parabolic structure as a reflector in antenna? Explain the cassegrain feed mechanism of parabolic reflector antenna.	**07**
	(b)	State Babinet's principle and illustrate its application to slot antennas and complementary antennas.	**07**
		OR	
Q.4	**(a)**	What is log periodic antenna? Explain with neat sketch log periodic dipole array.	**07**
	(b)	Draw and explain the Helical Geometry with neat diagram. Also explain transmission and radiation mode.	**07**
Q.5	**(a)**	Write a short note on sky wave and space wave propagations.	**07**
	(b)	Explain Gain measurement and impedance measurement of antenna along with the experimental set-up.	**07**

OR

Q.5 **(a)** Define the following terms for radio wave propagation. **07**

1) Virtual height
2) MUF
3) Critical frequency
4) Skip distance
5) Fading
6) Multi hope propagation
7) OWF

(b) Write short notes on followings: **07**

1) Lens antenna
2) Embedded antenna.

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