GANPAT UNIVERSITY

B. Tech. Semester VI (EC) Electronics & Communication Engineering
Regular Examination, MAY-JUNE-2012
EC 601: Antenna and Wave Propagation

Max. Time: 3 Hrs.] **[Max. Marks: 70**

Instructions:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

Que:1	**(A)**	Design a Six element broad-side array of $\lambda/2$ spacing between elements. The pattern is to be optimum with a side lobe level 26 db down the main lobe maximum.	**6**
	(B)	Define the parasitic array and explain Log-Periodic antenna in detail.	**6**
		OR	
Que:1	**(A)**	Draw the helical antenna and explain it in detail.	**6**
	(B)	Prove that total far field pattern of linear array of N- isotropic point source of equal amplitude and spacing is given by $E_t=E_0(\sin N\psi/2) / (\sin \psi/2)$. Also prove that first side lobe ratio for uniform array is -13.5db	**6**
Que:2	**(A)**	Explain the gain measurement by reflection from ground.	**4**
	(B)	Design the Rhombic antenna to operate at 20MHZ when the elevation angle is 10.	**4**
	(C)	Explain the V antenna.	**3**
		OR	
Que:2	**(A)**	Explain the necessary design steps for Dolph-Tschebyscheff array	**4**
	(B)	Define polarization? Explain the elliptical and circular polarization.	**4**
	(C)	List features of Non-Resonant Antenna.	**3**
Que:3	**(A)**	Derive the equation for array of two point source with equal amplitude and equal phase. Also draw radiation pattern.	**5**
	(B)	Prove that radiation resistance of a half wave dipole $R_r=73.08\ \Omega$.	**7**

SECTION-II

Que:4	**(A)**	Derive the equation for relation between Directivity and antenna aperture.	**6**
	(B)	What is friis formula? Derive the equation for it.	**4**
	(C)	Define beam efficiency and Effective height of antenna.	**2**
		OR	
Que:4	**(A)**	Explain Ionospheric wave propagation.	**4**
	(B)	Explain Lens antenna, types of lens and Derive the equation of the shape of Lens.	**8**
Que:5	**(A)**	Explain Slot antenna and derive impedance of Slot antenna.	**6**
	(B)	Explain Parabolic Reflector in detail. List out application, advantages and disadvantages of it	**5**
		OR	
Que:5	**(A)**	Describe Horn antenna. List out application and features of Horn antenna.	**5**
	(B)	Describe Microstrip patch antenna	**3**
	(C)	Explain Babinet's Principle.	**3**
Que:6	**(A)**	Explain the measurement of antenna Beamwidth.	**4**
	(B)	Assuming the general expression for vector magnetic potential, derive expression for $\mathbf{E_r}$ field and $\mathbf{H_\Phi}$ field components due to alternating current element.	**8**

END OF PAPER