Student Exam No: _____

GANPAT UNIVERSITY

B. TECH. SEMESTER VI (ELECTRONICS & COMMUNICATION ENGINEERING)
REGULAR EXAMINATION, MAY-JUNE 2013
2EC601 ANTENNA ENGINEERING

[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)	A parabolic dish provides a power gain of 60 dB at 10 GHz with 70% efficiency. Find out HPBW, BWFN and Diameter.	6
	(B)	Explain the design parameters of Horn antenna	5
	(C)	How the size of an antenna does vary with frequency?	1
		OR	
Que.-1	(A)	Design a rectangular micro strip Patch antenna using a substrate with a dielectric constant of 2.2, h=0.1588cm so as to resonate at 10 GHz.	6
	(B)	Explain: 1. Spill over effect 2. Back lobe radiation	5
	(C)	Give one difference between a Resonant and a non resonant antenna.	1
Que.-2	(A)	Define the antenna elements. What are the different types of antenna elements?	5
	(B)	List advantages and disadvantages of the micro strip antenna.	3
	(C)	Give the classification of lens antenna.	3
		OR	
Que.-2	(A)	Explain the log periodic antenna in detail.	5
	(B)	What are different design considerations for antennas those are used for satellite communication?	3
	(C)	Write various applications of the micro strip antennas. Explain any one in detail.	3
Que.-3	(A)	Write a short note about Yagi-Uda antenna.	4
	(B)	Explain in brief about antenna polarization.	4
	(C)	An antenna has a radiation resistance of 73 Ω and a loss resistance of 7Ω. If the power gain is 20, calculate the directivity and efficiency of the antenna.	4

SECTION-II

Que.-4	(A)	Define following terms related to antenna 1. Radiation resistance 2. Front to Back Ration 3. Beam Solid Angle 4. Power Radiation Pattern	4
	(B)	Define the term directivity and list out different formulas for its evaluation.	4

	(C)	Explain the Friis Transmission Formula for the antenna.	4
		OR	
Que.-4	(A)	An antenna is fed with a voltage source of (100+j80) V with impedance 50 Ω. Calculate radiation efficiency of antenna, real power delivered by source, real power input to antenna, power radiated by antenna if antenna impedance is (71+j25) Ω which includes loss resistance of 1 Ω	4
	(B)	Define antenna Beam width and Antenna Beam efficiency.	4
	(C)	Explain input impedance of Antenna.	4
Que.-5	(A)	Explain the Rhombic & Inverted V-Antenna in details.	5
	(B)	Design eight elements 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
		OR	
Que.-5	(A)	Explain the Half Wave Dipole & Helical Antenna.	4
	(B)	Derive maxima, minima and half power point directions with two point sources are fed with currents equal in magnitude and phase.	5
	(C)	Define following types of antenna array 1. Parasitic array 2. Collinear array	2
Que.-6	(A)	Derive expression for the radiation pattern of a broadside array of n elements	4
	(B)	Prove the equation: $A_{em} = 1.5\frac{\lambda^2}{4\pi}$	4
	(C)	Derive expression for directivity of end-fire array.	4

End of Paper