Student Exam No: _____

GANPAT UNIVERSITY

B. TECH. SEMESTER VI (ELECTRONICS & COMMUNICATION ENGINEERING)
REGULAR EXAMINATION, April - June 2015
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)	Define following terms related to antenna 1. Radiation resistance 2. Front to Back Ratio 3. Beam Solid Angle 4. Power Radiation Pattern	4
	(B)	Define antenna beamwidth and directivity & obtain relation between them.	4
	(C)	A lossless half wave dipole antenna of (73+ j42.5) Ω having directional gain 1.15dB is driven from 10 V, 50 Ω generator. Determine electric field intensity at a distance 10 km in a plane perpendicular to the antenna.	4
		OR	
Que.-1	(A)	Explain the antenna polarization in detail.	4
	(B)	Explain the Friis Transmission Formula for the antenna.	4
	(C)	Define following terms: 1. Radian 2. Steradian 3. Effective area 4. Field Radiation Pattern	4
Que.-2	(A)	Explain various forms of antenna arrays with neat diagrams.	5
	(B)	Derive maxima, minima and half power point directions with two point sources are fed with currents equal in magnitude and phase.	2
	(C)	Write a note on binomial array.	
		OR	
Que.-2	(A)	What is broadside array? Derive expression for the radiation pattern of a broadside array of n elements.	6
	(B)	Derive expression for directivity of broadside array.	5
Que.-3	(A)	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
	(B)	Give different definitions of antenna and list important function.	6

SECTION-II

Que.-4 (A) Prove the equation: $A_{em} = 1.5\frac{\lambda^2}{4\pi}$ 4

(B) For two elements array consisting identical radiators carrying equal currents in phase, obtain positions of maxima and minima of the radiation pattern if the distance of separation d=λ. 4

(C) Explain the harmonic antenna with all necessary equations. 4

OR

Que.-4 (A) 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

(B) With the help of suitable diagram explain the measurement of radiation pattern of an antenna. 4

(C) Explain the log periodic antenna in detail. 4

Que.-5 (A) Define the antenna elements. What are the different types of antenna elements? 5

(B) Explain the Microstrip antenna with all necessary equations. 4

(C) Explain the V antenna in detail. 2

OR

Que.-5 (A) Explain how impedance transformation is possible using folded tripoles antenna 4

(B) Derive expression for directivity of End fire array. 5

(C) Explain the Rhombic antenna in detail. 2

Que.-6 (A) For a source with radiation intensity $U=6\cos\theta$, find the directivity and HPBW, when its pattern is unidirectional. 4

(B) 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

(C) Explain the Half Wave Dipole. Derive the equation of impedance of half wave dipole. 4

End of Paper