

Exam.Code:0929
Sub. Code: 6595

2074

B.E. (Electronics and Communication Engineering)
Fifth Semester
EC-503: Antennas and Wave Propagation

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

Q.1a)	What are broadside and end fire arrays?	(2×5)
b)	Differentiate the antenna bandwidth and antenna beam-width.	
c)	What are super gain antennas?	
d)	What is the effect of earth imperfections and atmosphere on space wave propagation?	
e)	What is fading? List the major causes.	
Section A		
Q.2a)	Derive an expression for radiated power for infinitely small element carrying alternating current.	(5)
b)	Explain the terms Directivity, Gain, Aperture and Radiation resistance as applied to an antenna.	(5)
Q.3a)	What is the Dolph-Chebyshev distribution for linear broadside arrays. Show that it is the optimum distribution for obtaining beam width for given side lobe level and vice versa.	(5)
b)	A thin dipole antenna is $\lambda/15$ long. If its loss resistance is 1.5Ω , find radiation resistance and efficiency.	(5)
Q.4a)	Discuss various feeding methods of an array.	(5)
b)	Explain the principle of pattern multiplication and find the array factor of a two element array.	(5)
Section B		
Q.5a)	What do you understand by the term critical frequency? Calculate the critical frequencies for the F_1 , F_2 , and E layers for which the maximum ionic densities are 2.3×10^6 , 3.5×10^6 and 1.7×10^6 electrons per c.c. respectively.	(5)
b)	Define the terms 'Lowest Usable frequency' and 'Skip Distance'. Discuss tropospheric propagation in detail.	(5)
Q.6	What is the basic condition for frequency independent antennas? Is Log periodic antenna a frequency independent? Explain its principle of operation.	(10)
Q.7	Write short note on the following: (a) Duct Propagation (b) Rhombic Antenna (c) Super-refraction	(10)

x-x-x