C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 95404

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

Fifth Semester

Electronics and Communication Engineering

19UEC504 - Antenna and Wave Propagation

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Power radiated from an antenna per unit solid angle is called_____ CO1-U

   (a) Vector effective length (b) Effective Aperture

   (c) Radiation Intensity (d) Directivity

2. Linear array is a system of _____spaced elements CO1- U

   (a) Un equally (b) Equally (c) Both a and b (d) None

3. _____ antenna have gain less than reflector antennas but have more lenient tolerance on surfaces. CO1- U

   (a) Helical antennas (b) Lens antennas (c) Array antennas (d) Slot antennas

4. Which of the following are the applications of microstrip antenna? CO1- U

   (a) Air-craft (b) Space-craft (c) Cars (d) All the above

5. What is the frequency at which tropospheric scatter occurs? CO1- U

   (a) Above 30MHz (b) Below 30 MHz (c) < 3MHz (d) > 3 MHz and < 30MHz

PART – B (5 x 3= 15 Marks)

6. Calculate the effective area of a half wave dipole operating at 1 GHz? CO2 App

7. Draw the geometry for E-plane type of metal-plate lens antenna. CO1 U

8. Write the difference between corner and parabolic reflector antenna CO1 U

9. What are the applications of Micro strip antenna? CO1 U

10. List out the layers available in ionosphere layer during day and night time CO1 U

PART – C (5 x 16= 80 Marks)

11.	(a)	State and prove the reciprocity principle with an antenna.	CO1-U	(16)
		Or		
	(b)	(i) Derive the relationship between Directivity, Gain and Beam solid angle.	CO1-U	(8)
		(ii) Explain in detail about Effective Aperture of an antenna	CO1-U	(8)
12.	(a)	Analyze the fields radiated from a $\lambda/2$ dipole and mono pole antenna using Maxwell's equation.	CO4- Ana	(16)
		Or		
	(b)	Analyze the fields radiated from a half wave dipole and quarter wave dipole antenna using Maxwell's equation.	CO4- Ana	(16)
13.	(a)	Explain working principle of slot antenna and drive the expression for the impedances of the slot antenna.	CO1- U	(16)
		Or		
	(b)	Describe the geometry of a common curved reflector antenna and the significance of F/D ratio. Explain its feed configuration.	CO1- U	(16)
14.	(a)	Calculate the Length and width of the Rectangular patch antenna for RT/duroid 5880 substrate with dielectric constant of 2.2 and h=1.58mm for the resonating frequency 10 Ghz .What will be its length and width if FR4 substrate (dielectric constant of 3.4 and h=1.58mm) is used for the same resonating frequency. Infer the results.	CO4- Ana	(16)
		Or		
	(b)	Calculate the dimensions of a Yagi–Uda array that has a directivity of 12 dB at 145 MHz. Also calculate the same for 245MHz.Infer the results.	CO4- Ana	(16)
15.	(a)	Explain the mechanism of ionospheric propagation with neat diagram	CO1- U	(16)
		Or		
	(b)	Explain about (i) Critical Frequency (ii) Maximum Usable frequency (iii) Virtual Height	CO1- U	(16)