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

Question Paper Code: 95404

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2023

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. The beam width of the antenna pattern measured at half power points is called_____ CO1-U

   (a) Half power beam width (b) Full null beam width

   (c) Beam width (d) None of the above

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

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

3. The relation between slot and dipole impedances is CO1- U

   (a) $Z_S Z_d = Z_i^2/4$ (b) $Z_S Z_d = Z_i^2/2$ (c) $Z_S Z_d = Z_d^2/4$ (d) $Z_S Z_d = Z_d^2/2$

4. Which one is frequency independent antenna CO1- U

   (a) Helical antenna (b) Yagiuda antenna

   (c) Rhombic antenna (d) Log periodic antenna

5. During day which layer does not exist CO1- U

   (a) D layer (b) F1 layer (c) F2 layer (d) F layer

PART – B (5 x 3= 15 Marks)

6. Calculate the maximum effective aperture of an antenna which is operating at a wavelength of 2 meters and has directivity of 100. CO2 Ana

7. Calculate the bandwidth of a 50 cm long half wave dipole having a Q of 15. CO2 Ana

8. Differentiate flat reflector and corner reflector antenna CO1 U

9. Draw the structure of Yagi-Uda Antenna CO1 U

10. What are the factors that affect the propagation of radio waves? CO1 U

PART – C (5 x 16= 80 Marks)

11. (a) Prove that the current produced by antennas are same, if EMFs generated by the antenna is same when it is used either transmitting or receiving mode. CO1-U (16)

Or

(b) (i) Two spacecraft are separated by 100 Mm. Each has an antenna with D = 1000 operating at 2.5 GHz. If craft A's receiver requires 20 dB over 1 pW, what transmitter power is required on craft B to achieve this signal level? CO2-Ana (6)

(ii) What is the effective length of half wave dipole operating at 50MHZ and 200MHZ.given $A_e=.13\lambda^2$,Rr=73 ohm, Z=377 ohm. CO2-Ana (10)

12. (a) Design an antenna for a radio receiver operating at the frequency range of 3KHz to 300GHz CO5- C (16)

Or

(b) Design an end fire array antenna consisting of 2 point sources of equal amplitude and out of phase. Plot the field pattern. CO5- C (16)

13. (a) Explain the principle operation of horn antenna and describe the various forms of horn antenna. Obtain the design equation of horn antenna. CO1- U (16)

Or

(b) Explain the principle operation of parabolic reflector antenna with a neat diagram and various types of feed used. CO1- U (16)

14. (a) Calculate the dimensions of a Yagi-Uda array that has a directivity of 12dBat 145MHz. Also calculate the same for 245MHz.Infer the results. CO4- Ana (16)

Or

	(b)	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)
15.	(a)	Discuss the structure of atmosphere with various layers. Specify the factors affecting the radio wave propagation.	CO1- U	(16)
		Or		
	(b)	Explain the principle of ionospheric propagation with a neat diagram.	CO1- U	(16)

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