Reg. No.												

Question Paper Code	12613

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Sixth Semester

Electronics and Communication Engineering

20ECPC601 – TRANSMISSION LINES AND ANTENNAS

Regulations - 2020

Duration: 3 Hours Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Describe the need for inductance loading of telephone cable.	2	K1	CO1
2.	State the condition(s) for distortion less line.	2	K1	CO1
3.	Write any two applications of the quarter wave line.	2	K1	CO2
4.	List the applications of Smith Charts.	2	K1	CO2
5.	Given that the radiation resistance of an antenna is 75 ohms and loss resistance is 20 ohms. Calculate its efficiency.	2	K2	CO3
6.	Define gain of an antenna. Express the relationship between gain and aperture of an antenna.	2	K1	CO3
7.	State the conditions to obtain an end fire array antenna.	2	K1	CO4
8.	Summarize the advantages and disadvantages of binomial array.	2	K1	CO4
9.	List the various feeds used in reflectors.	2	K1	CO5
10.	Mention the advantages of horn Antenna.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	Obtain the true useful forms of equations for voltage and current at any point on a transmission line.	13	K2	CO1
		OR			
	b) i)	A line with zero dissipation has R=0.006 Ω/m L=2.5 μH, C=4.45 pF/m. If the line is operated at 10MHz. Find the line constants, velocity of propagation and wavelength?	7	K2	CO1
	ii)	Derive the open and short circuited conditions of dissipation less line with necessary representations.	6	K2	CO1
12.	a)	Using suitable equation derive the impedance of (i) one-eighth line (ii) quarter wave line (iii) half wave line. Discuss the expression obtained.	13	K2	CO2
		OR			

b) A 300 ohm line feeding an antenna having a standing wave ratio 4, the distance from the load of voltage minima is 28 cm with frequency 150MHz. Design a single stub matching network system. *13 K2 CO2*

13. a) Obtain the expression far field expression of half-wave dipole antenna. *13 K2 CO3*

OR

b) Explain the following terms: *13 K2 CO3*
(i) Radiation pattern
(ii) FNBW
(iii) Directivity
(iv) Aperture efficiency

14. a) Obtain the null directions and the direction of maximum radiation for arrays of n isotropic point sources of equal spacing and amplitude and in phase. *13 K2 CO4*

OR

b) Design a Yagi Uda antenna of six elements to provide a gain of 12 dB if the operating frequency is 200MHz. *13 K3 CO4*

15. a) Illustrate the principles of operation of Horn antenna and discuss the various forms of Horn Antenna. Obtain the design equations of Horn Antenna. *13 K2 CO5*

OR

b) Discuss the geometry of a parabolic reflector and the significance of f/d ratio. Explain its feed configurations. *13 K2 CO5*

PART - C (1× 15 = 15 Marks)

16. a) Describe the structure of the ionosphere and describe each layer in detail. *15 K2 CO6*

OR

b) A mobile link has to be established between two points spaced away 1300 km via ionosphere layer of density $3.5 \times 10^{6} cm^{-3}$ at a height 180 km. Calculate the maximum frequency which can be communicated, critical frequency and skip distance. *15 K2 CO6*