Reg. No.															

Question Paper Code	13628

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Electronics and Communication Engineering

20ECPC601 - TRANSMISSION LINES AND ANTENNAS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Find propagation constant of a 1m long transmission line, if the input impedance of short and open circuited transmission lines are 25Ω and 9 Ω respectively. (a) 0.693-j1.57Ω (b) 12.34+j36.78Ω (c) 16.42+j3.42Ω (d)39.635+j60.52Ω	1	K2	CO1
2.	The receiving end impedance is infinite for _____ transmission line. (a) short circuited (b) open circuited (c) both open and short circuited (d) neither open nor short circuited	1	K1	CO1
3.	Find the value of reflection coefficient, if SWR is 4. (a) 0.9 (b) 0.5 (c) 0.6 (d) 0.4	1	K2	CO2
4.	In an impedance Smith chart, a clockwise movement along a constant resistance circle gives rise to _____. (a) a decrease in the value of reactance (b) an increase in the value of reactance (c) no change in the reactance value (d) no change in the impedance value	1	K1	CO2
5.	_____ antennas are utilized in high frequencies. (a) Wire antennas (b) Aperture antennas (c) Microstrip antennas (d) Array antennas	1	K1	CO3
6.	At which angles does the front to back ratio specify an antenna gain? (a) 0° & 180° (b) 90° & 180° (c) 180° & 270° (b) 90° & 360°	1	K1	CO3
7.	The Broadside array is defined as an array having maximum radiation _____ the axis array. (a) Perpendicular to (b) Along (c) Parallel (d) None of the above	1	K1	CO4
8.	The amplitudes will be _____ in the resultant pattern using the principle of multiplication of patterns. (a) Out of phase (b) Linear (c) Added (d) Multiply	1	K1	CO4
9.	The quality factor of microstrip antennas is _____. (a) high (b) very high (c) very low (d) unity	1	K1	CO5
10.	Which of the following antenna parameters is not adjustable for reconfigurable antennas? (a) Frequency of operation (b) Radiation pattern (c) Polarization (d) Impedance	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Illustrate the need for inductance loading of telephone cable.	2	K2	CO1
12.	Define frequency and phase distortion in a transmission line.	2	K1	CO1
13.	State the expressions for capacitance and inductance of coaxial cable.	2	K1	CO2
14.	Define standing waves, SWR, nodes and antinodes.	2	K1	CO2
15.	The radiation resistance of an antenna is 70 Ω and loss resistance is 10 Ω. Calculate the directivity in dB, if the power gain is 25.	2	K2	CO3
16.	Compare Radian and Steradian.	2	K2	CO3
17.	Infer why we need an antenna array.	2	K2	CO4
18.	Find the directivity of broadside forms of arrays when a uniform linear array contains 50 isotropic radiation with an inter element spacing of λ/2.	2	K2	CO4

19.	Find the impedance of a slot antenna, for L=0.10 λ and L/W ratio very high.		*2*	*K2*	*CO5*
20.	List the different types of feeds used in microstrip patch antenna.		*2*	*K1*	*CO5*
21.	The critical frequency for an ionized layer is 6 MHz. Determine the electron density of the layer.		*2*	*K2*	*CO6*
22.	Define LPDA. Why is it called so?		*2*	*K1*	*CO6*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Obtain the true useful forms of equations for voltage and current at any point on a transmission line.	*11*	*K2*	*CO1*
		OR			
	b)	Explain in detail, the primary constants and secondary constants of a transmission line. Derive the expression to show the relation between them.	*11*	*K2*	*CO1*
24.	a)	Derive the voltage and current equations of dissipation less line.	*11*	*K2*	*CO2*
		OR			
	b)	Summarize the properties and applications of a Smith Chart.	*11*	*K2*	*CO2*
25.	a)	Derive the power radiated from the field equations and hence obtain the radiation resistance of half wave dipole.	*11*	*K2*	*CO3*
		OR			
	b)	Define the following parameters and explain their dependence on an antenna performance (i) Radiation Power Density (ii) Bandwidth (iii) Aperture area.	*11*	*K2*	*CO3*
26.	a)	Determine the excitation coefficients and directivity, of a seven element binomial array separated by λ/2.	*11*	*K3*	*CO4*
		OR			
	b)	Derive the expression for the field pattern and draw the radiation pattern of an end fire array with 4 isotropic sources of equal amplitude and equal spacing.	*11*	*K3*	*CO4*
27.	a)	Explain in detail, the construction, working principle and the performance of a parabolic reflector.	*11*	*K2*	*CO5*
		OR			
	b)	With a neat diagram, explain the working principle of microstrip patch antenna.	*11*	*K2*	*CO5*
28.	a)	With necessary equations, illustrate the design concepts of a helical antenna. Explain the effect of each parameter on the performance of the antenna.	*11*	*K2*	*CO6*
		OR			
	b)	Explain how electromagnetic waves are propagated in the troposphere layer and outline the principle of troposcatter propagation.	*11*	*K2*	*CO6*