Reg. No.																

Question Paper Code	14196

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 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.	If Z_{oc}= 120Ω and Z_{sc} = 30Ω , the characteristic impedance is___. (a) 30 Ω (b) 60Ω (c) 120 Ω (d) 150 Ω	1	K2	CO1
2.	A finite line which is terminated in its characteristic impedance behaves as an_____. (a) distortionless line (b) distorted line (c) open line (d) infinite line	1	K1	CO1
3.	If K is the reflection coefficient and S is the Voltage standing wave ratio, then_____ (a) $k=\frac{VSWR-1}{VSWR+1}$ (b) $\|k\|=\frac{VSWR-1}{VSWR+1}$ (c) $k=\frac{VSWR+1}{VSWR-1}$ (d) $\|k\|=\frac{VSWR+1}{VSWR-1}$	1	K1	CO2
4.	If the length of a transmission line lies between λ/4<l<λ/2, then its equivalent circuit in shorted line is (a) resistor (b) conductor (c) capacitor (d) inductor	1	K2	CO2
5.	If a half-wave dipole operates at 300 MHz with λ = 0.5m & D_0 = 1.643, what will be its effective area? (a) 0.032 m^2 (b) 0.047 m^2 (c) 0.65 m^2 (d) 0.99 m^2	1	K2	CO3
6.	_____ is the most common reflector antenna. (a) Parabolic (b) Rectangular (c) Circular (d) Pyramidal	1	K1	CO3
7.	If the antenna elements are arranged in array _____ parameters decreases. (a) directivity (b) gain (c) beam width (d) bandwidth	1	K1	CO4
8.	Parasitic element that is typically about 5 percent longer than the half-wave dipole-driven element is called ____. (a) Array element (b) Director element (c) Reflector element (d) Driven element	1	K1	CO4
9.	The efficiency of a microstrip antenna is limited by _____. (a) dielectric losses (b) conductor losses (c) surface wave losses (d) all the mentioned	1	K1	CO5
10.	What happens to the F1 and F2 regions during the night? (a) They merge to form the D region (b) They merge to form the F region (c) They split into separate regions (d) They disappear completely	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Define Loading and list its types.	2	K1	CO1
12.	Determine the attenuation and phase constant of a wave propagating along the line whose propagation constant is $1.048 \times 10^{-4} \angle 88.8^{o}$.	2	K2	CO1
13.	Compare single stub and double stub impedance matching.	2	K2	CO2
14.	List the applications of Smith Chart.	2	K1	CO2
15.	Define an isotropic radiator. Draw its radiation pattern.	2	K1	CO3
16.	Draw a folded dipole and explain its significance.	2	K2	CO3
17.	Infer the Characteristic of broad side and End fire array.	2	K2	CO4
18.	List the features of "principle of pattern multiplication".	2	K1	CO4
19.	A parabolic reflector, with a mouth diameter of 32 m operates at frequency 7 GHz. It has illumination efficiency of 0.7. Find the power gain.	2	K2	CO5
20.	List the different feeding techniques used in a slot Antenna.	2	K1	CO5

21.		Find the range of LOS systems, when the receiving and transmitting antenna heights are 20 m and 200 m respectively. Take the effective earth's radius into consideration.	2	K2	CO6
22.		State the principles of frequency independent antenna.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the two types of waveform distortion on a transmission line and obtain the condition for distortion less line.	11	K2	CO1
		OR			
	b)	Outline the inductance loading of telephone cables and also the attenuation constant, phase constant and velocity of signal transmission for the uniformly loaded cable.	11	K2	CO1
24.	a)	Using suitable equations derive the impedance of (i) one-eighth line (ii) quarter wave line (iii) half wave line.	11	K2	CO2
		OR			
	b)	Explain in detail, the properties of the transmission line at UHF.	11	K2	CO2
25.	a)	Starting from the first principle, derive the expression for the field quantities (E and H) for a half wave dipole.	11	K2	CO3
		OR			
	b)	Derive the FRIIS transmission formula. Explain its significance.	11	K2	CO3
26.	a)	With a suitable diagram, illustrate the construction, operation and performance of a Yagi antenna.	11	K2	CO4
		OR			
	b)	Illustrate the principle of phased array antennas. Explain the types of phased array antennas.	11	K2	CO4
27.	a)	Illustrate the principles of operation of Horn antenna and outline the various forms of Horn Antenna. Obtain the design equations of Horn Antenna.	11	K2	CO5
		OR			
	b)	Explain in detail, the blockage due to aperture in a reflector antenna. Describe methods to overcome the aperture blockage.	11	K2	CO5
28.	a)	Explain in detail about Log Periodic antennas. What is the need for feeding from the end with shorter dipoles and the need for transposing the lines?	11	K2	CO6
		OR			
	b)	Draw the electron density profile chart of an ionosphere and explain. Also derive an expression for the effective relative dielectric constant of the ionosphere. Explain reflection and refraction of waves in the ionosphere.	11	K2	CO6