

Reg. No.																				
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code	13062
---------------------	-------

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Sixth Semester

Electronics and Communication Engineering

20ECPC601 – TRANSMISSION LINES AND ANTENNAS

Regulation - 2020

(Smith Chart need to be provided)

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K - Level</i>	<i>CO</i>
1. The networks in which the R, L, C parameters are individually concentrated or lumped at discrete points in the circuit are called (a) Lumped (b) Distributed (c) Parallel (d) Paired	1	K1	CO1
2. For a transmission line, open circuit and short circuit impedances are 20Ω and 5Ω . The characteristic impedance of the line is (a) 100Ω (b) 50Ω (c) 25Ω (d) 10Ω	1	K1	CO1
3. If $Z_{oc} = 120\Omega$ and $Z_{sc} = 30\Omega$, the characteristic impedance is (a) 30Ω (b) 60Ω (c) 120Ω (d) 150Ω	1	K1	CO1
4. Major advantage of a quarter wave transformer is (a) It gives proper matching (b) It gives high gain (c) Broader bandwidth (d) None of the mentioned	1	K1	CO2
5. The reflection coefficient of a line is -1 . The line is (a) Open circuited (b) Short circuited (c) Terminated in Z_0 (d) Of infinite length	1	K1	CO2
6. The major advantage of single stub tuning over other impedance matching techniques is (a) Lumped elements are avoided (b) It can be fabricated as a part of transmission line media (c) It involves two adjustable parameters (d) All of the mentioned	1	K1	CO2
7. Under which conditions of charge does the radiation occur through wire antenna (a) For a charge with no motion (b) For a charge moving with uniform velocity with straight & infinite wire (c) For a charge oscillating in time motion (d) All of the above	1	K1	CO3
8. What is the nature of current distribution over the small dipoles? (a) Spherical (b) Rectangular (c) Triangular (d) Square	1	K1	CO3
9. Dipole antenna is symmetrical in nature where the two ends are at equal potentials with respect to point (a) Initial (b) Eventual (c) Mid (d) None of the above	1	K1	CO3
10. In a broadside array, the direction of maximum radiations indicated by (a) 0 and 180 degrees (b) 90 and 270 degrees (c) 90 and 180 degrees (d) None of the above	1	K1	CO4
11. The collinear array is also called as (a) Broadcast array (b) Broad fire array (c) Omni directional array (d) All of the above	1	K1	CO4

12. The relation between directivity and the array factor length is given by 1 K1 CO4
 (a) $D = 2(L/\lambda)$ (b) $D = 3(L/\lambda)$ (c) $D = 4(L/\lambda)$ (d) None of the above
13. The efficiency of Micro strip antenna 1 K1 CO5
 (a) High (b) Very high (c) infinite (d) Low
14. The pattern of the reflector in a reflector antenna is called 1 K1 CO5
 (a) primary pattern (b) secondary pattern
 (c) reflector pattern (d) none of the mentioned
15. At which of the following frequencies aperture antennas are operated? 1 K1 CO5
 (a) UHF and EHF (b) MF and HF (c) HF and UHF (d) LF and MF
16. The widely used shape for patch antennas is 1 K1 CO5
 (a) Rectangular (b) Circular (c) Elliptical (d) Parabolic
17. Which mode of propagation is adopted in HF antennas? 1 K1 CO6
 (a) Ionospheric (b) Ground wave (c) Tropospheric (d) All of the above
18. The maximum possible frequency for which the wave is reflected back for a given distance of propagation in the ionosphere layer is called as 1 K1 CO6
 (a) Maximum usable frequency (b) Critical frequency
 (c) Resonance frequency (d) Dominating frequency
19. After which phenomenon/phenomena do the waves arrive at the receiving antenna in ionospheric propagation? 1 K1 CO6
 (a) Reflection or Scattering (b) Refraction (c) Defraction (d) All of the above
20. For which band/s is the space wave propagation suitable over 30 MHz? 1 K1 CO6
 (a) VHF (b) SHF (c) UHF (d) All of the above

PART - B (10 × 2 = 20 Marks)

Answer ALL Questions

21. Discuss frequency and phase distortion in a transmission line. 2 K1 CO1
22. Express the secondary constants in terms of primary constants of a transmission line. 2 K1 CO1
23. Write any two applications of the quarter wave line. 2 K2 CO2
24. List the applications of Smith Charts. 2 K2 CO2
25. Differentiate Beam width and Band width. 2 K1 CO3
26. Define gain of an antenna. Express the relationship between gain and aperture of an antenna. 2 K1 CO3
27. List the types of antenna array. 2 K1 CO4
28. Summarize the advantages and disadvantages of binomial array. 2 K2 CO4
29. Draw the various types of feeds used in reflectors. 2 K1 CO5
30. Define virtual height. 2 K1 CO6

PART - C (6 × 10 = 60 Marks)

Answer ALL Questions

31. a) Obtain the true useful forms of equations for voltage and current at any point on a transmission line. 10 K2 CO1
- OR**
- b) Discuss the two types of waveform distortion on a transmission line and obtain the condition for distortion less line. 10 K2 CO1
32. a) Evaluate the impedance equation for half wave and eighth wave line of transmission line. 10 K2 CO2

OR

- b) A lossless line of characteristic impedance 300 ohm is terminated by an unknown impedance, the first voltage minimum is located at 15 cm from the load. The standing wave ratio is 3.3. Calculate the frequency and the terminating impedance. 10 K2 CO2
33. a) Derive the expression for the field quantities radiated from a $\lambda/2$ dipole and prove that its radiation resistance is 73Ω . 10 K2 CO3
- OR**
- b) Define the following radiation parameters of the antenna performance 10 K2 CO3
 (i) Radiation pattern (ii) Input Impedance (iii) radiation intensity
 (iv) Bandwidth (v) Effective area
34. a) Derive the expression for field pattern of uniform broadside array of two point Sources of equal amplitude and spacing. 10 K2 CO4
- OR**
- b) Describe the operation and performance of a Yagi antenna. 10 K2 CO4
35. a) Illustrate the principles of operation of horn antenna and discuss the various forms of horn antenna. Obtain the design equations of Horn antenna. 10 K2 CO5
- OR**
- b) Discuss in detail the construction, working principle and the performance of a parabolic reflector. 10 K2 CO5
36. a) Explain the operation and design of microstrip patch antenna. 10 K2 CO6
- OR**
- b) Discuss the effects of earth's magnetic field on ionosphere radio wave propagation. 10 K2 CO6