

Yashwantrao Chavan College of Science, Karad

Question Bank

Course Name:- B.Sc. (CBCS) SEM -V B.Sc. Part- III

Subject Code:- 79714

Subject Name:- Electronics Paper X

DSE-E18: Antenna and Wave Propagation

Q1. Choose the correct alternative and rewrite the sentence with correct alternative.

1. The ratio of radiation intensity in a given direction from antenna to the radiation intensity over all directions is called as _____

- a) Array Factor c) Gain of antenna
b) Radiation power density d) Directivity

2. If directivity of antenna increases, then the coverage area _____

- a) decreases c) increases and then decreases
b) increases d) remains unchanged

3. The angular distance between two successive nulls of main lobe is called as _____

- a) Beam width c) FNBW
b) HPBW d) FBR

4. Expression for aperture efficiency in terms of physical aperture A_e and effective aperture A_{em} is _____

- a) A_e/A_{em} c) A_e+A_{em}/A_e-A_{em}
b) A_{em}/A_e d) A_e-A_{em}/A_e+A_{em}

5. The radiation lobe containing the direction of maximum radiation is called as _____

- a) Back lobe c) Side lobe
b) Minor lobe d) Major lobe

6. Units of radiation intensity is _____

- a) Watts/unit Solid angle c) Watts- m^2
b) Watts/ m^2 d) Watts

7. If the length of the dipole decreases, then the radiation resistance will _____
 a) increase c) decrease
 b) depends on current distribution d) not change
8. An ideal source in which the power is radiated equally in all directions is called as _____ radiator.
 a) Isotropic c) Directional
 b) Omni-directional d) Transducer
9. Relation between Quality factor, Bandwidth, and resonant frequency is _____
 a) $Q = BW/f_0$ c) $Q = BW \times f_0$
 b) $Q = f_0/BW$ d) $Q = (BW + f_0)/(BW - f_0)$
10. In the impedance v/s frequency graph of antenna, the antenna impedance at frequencies less than resonant frequency is _____
 a) inductive c) resistive
 b) capacitive d) both inductive and capacitive
11. What is the directive gain when the magnitude of radiation intensity equals to average radiation intensity?
 a) 4π c) 1
 b) ∞ d) 0
12. The ratio of power radiated in a particular direction to the total input power of antenna is called as _____
 a) Directive gain c) Directivity
 b) Power gain d) Partial directivity
13. Folded dipole antenna belongs to which type of antenna?
 a) Reflector c) Lens
 b) Aperture d) Wire
14. On which of the following factors does the overall impedance of the unequal conductor folded dipole depends? a) Only thickness of conductors
 b) Space between conductors
 c) Radiation resistance of the dipole
 d) Radii, radiation resistance and space between conductors.
15. The directivity of Yagi-Uda antenna is increased by adding _____

- a) reflectors c) directors
- b) driven element d) boom

16. Directors are used to increase _____ of the Yagi-Uda antenna.

- a) Directivity c) Back lobe
- b) Gain d) Reflection away from the radiation

17. In which of the following bands Yagi-Uda antenna operates?

- a) HF-UFH c) LF-HF
- b) VLF-MF d) UHF-EHF

18. Which of the following type does horn antenna belongs?

- a) Wire Antenna c) Aperture Antenna
- b) Array Antenna d) Lens Antenna

19. Which of the following antenna is mainly used for broadband signals?

- a) Marconi antenna c) Wire antenna
- b) Horn antenna d) Yagi-Uda antenna

20. In Horn antennas impedance matching is provided by _____

- a) flaring
- b) increasing Power
- c) decreasing axial length
- d) Balun

21. Which of the following is used as a secondary antenna in the reflector antenna?

- a) Horn c) Parabolic
- b) Feed antenna d) Dipole

22. Which of the following refers to the pattern of reflector in the reflector antenna?

- a) Primary pattern c) Reflector pattern
- b) Secondary pattern d) Feed pattern

23. A corner reflector is converted to plane reflector when the corner angle is

-
- a) 90° c) 45°
 - b) 180° d) 60°

24. In a corner reflector, included angle α refers to _____

- a) angle at which two plane reflectors are joined
- b) angle between vertex and the feed radiator
- c) angle between major axis to the main beam
- d) angle between vertex and the main beam axis

25. Which one of the following antennas is mostly used in TV Dish?

- a) Parabolic reflector c) Log periodic
- b) Lens antenna d) Rhombus antenna

26. Which of the following is a narrow band antenna?

- a) Rhombic antenna c) Log periodic antenna
b) Yagi-Uda antenna d) Horn antenna

27. Log periodic antenna uses which range of frequencies?

- a) VHF and UHF c) MF and VHF
b) VHF and SHF d) HF and VHF

28. Which of the following modes does the condition $\pi D \ll \lambda$ is satisfied in helical antenna?

- a) Axial mode c) Conical mode
b) Normal mode d) Axial, Normal and Conical

29. What is the pitch angle of the helical antenna to become a loop antenna?

- a) 90 c) 45
b) 0 d) 60

30. Which of the following type does helical antenna belongs to?

- a) Wire type c) Reflector
b) Aperture d) Array

31. Which of the following type does the slot antenna belongs?

- a) Aperture Type c) Lens Type
b) Wire Type d) Reflector Type

32. Which of the following antenna is obtained by removing a small area of metal from an infinite ground plane?

- a) Slot antenna c) Dipole
b) Plane reflector d) Yagi-Uda

33. What is the principle used in slot antennas?

- a) Babinet's principle c) Geo-Optics
b) Archimedes principle d) Image Theory

34 Which among the following is not a disadvantage of rhombic antenna? a.

- Requirement of large space
b. Reduced transmission efficiency
c. Maximum radiated power along main axis
d. Wastage of power in terminating resistor

35. In an electrically large loop, an overall length of the loop is equal to _____

- a. $\lambda/2$ c. $\lambda/10$
b. λ d. $\lambda/50$

36. The efficiency of Micro strip antenna is -----

- a) High c) infinite

b) Very high d) Low

37. One of the following consists of non-resonant antennas

- a. Rhombic antenna c. End-fire array
- b. Folded dipole d. Broadside array

38. An antenna that is circularly polarized is the

- a. helical
- b. small circular loop
- c. parabolic reflector
- d. Yagi – Uda

39. Mathematical prediction of radio waves was done by

- a. Einstein
- b. Hertz
- c. Faraday
- d. Maxwell

40: The electric field and magnetic field of a radio wave are

- a. Perpendicular to each other
- b. Perpendicular to the direction of propagation
- c. Both a and b
- d. None of the above

41: The speed of radio wave in free space is

- a. 3×10^6 metres/second
- b. 3×10^8 metres/second
- c. 3×10^6 miles/second
- d. 3×10^8 miles/second

42: Radio waves would strongly reflect off

- a. A flat insulating surface of the right size
- b. A flat metallic surface of the right size
- c. A flat dielectric surface of the right size
- d. A flat body of water

43: Radio waves sometimes bend around the corners due to

- a. Reflection
- b. Diffusion
- c. Refraction
- d. Diffraction

44: Which of the following is the phenomenon caused when Radio waves travel in two or more paths during propagation and produce slowly-changing phase differences between signals?

- a. Absorption
- b. Fading
- c. Baffling
- d. skip

45: High-frequency long-distance propagation mostly depends on

- a. Ionospheric reflection
- b. Tropospheric reflection
- c. Ground reflection
- d. Inverted reflection

46: What is the distance from the far end of the ground wave to the nearest point where the sky wave returns to earth called?

- a. Angle of radiation
- b. maximum usable frequency
- c. Skip distance
- d. Skip zone

47: Which of the following are electromagnetic

- a. Radio waves
- b. Light
- c. Gamma waves
- d. All the above

48: The radio waves were demonstrated experimentally by

- a. Hertz
- b. Maxwell
- c. Marconi

d. Armstrong

49. The electric and magnetic fields of a radio wave are:

- a. perpendicular to each other
- b. perpendicular to the direction of travel
- c. both a and b
- d. none of the above

50. In free space, radio waves travel at a speed of:

- a. 3×10^6 meters per second
- b. 300×10^6 meters per second
- c. 3×10^6 miles per second
- d. 300×10^6 miles per second

51. Ground waves are most effective:

- a. below about 2 MHz
- b. above about 20 MHz
- c. at microwave frequencies
- d. when using horizontally polarized waves

52. Radio waves sometimes “bend” around a corner because of:

- a. reflection
- b. diffusion
- c. refraction
- d. diffraction

53. Space waves are:

- a. line-of-sight
- b. reflected off the ionosphere
- c. same as sky waves
- d. radio waves used for satellite communications

54 The troposphere is the:

- a. highest layer of the atmosphere
- b. middle layer of the atmosphere
- c. lowest layer of the atmosphere
- d. the most ionized layer of the atmosphere

55. The radiation pattern of this half-wave dipole is ----- in the H-plane.

- a) both directions
- b) omni-directional
- c) T- direction
- d) Z direction

56 The major part of the radiated field, which covers a larger area, is the -----.

- a) Minor lobe
- b) major lobe
- c) back lobe
- c) side lobe

57. The angular span between the first pattern nulls adjacent to the main lobe, is called as the ----- Null Beam Width

- a) first
- b) second
- c) third
- d) fourth

58. The unit of FNBW is -----

- a) decibals
- b) radians
- c) ppm
- d) degree / cm

59. The maximum energy radiated by the beam, with minimum losses can be termed as -----

- a) beam width
- b) beam efficiency
- c) directivity
- c) gain

60. A ----- antenna is defined as a type of RF (Radio Frequency) antenna, consisting of two conductive elements such as rods or wires.

- a) monopole
- b) rhombic
- c) helical
- d) Dipole

Q2 Long Answer Questions [8 marks Questions]

1. Explain the different radiation patterns along with advantages and disadvantages

2. Explain rhombic antenna in brief along with radiation pattern and state its advantages
3. Explain Yagi- Uda Antenna along with its radiation pattern in terms of vertical and horizontal radiation pattern.
4. Write brief note on Helical antenna
5. Explain Log periodic antenna with its radiation pattern.
6. Explain corner reflection antenna with its radiation pattern and state its advantages.
7. Explain folded Dipole antenna along with advantages and disadvantages also state the different types of folded Dipole antennas.
8. Explain Monopole and dipole antenna in brief with their radiation pattern
9. Explain the Ground wave propagation.
10. Explain the sky wave propagation along with its advantage over the other types of wave propagation
11. Explain the formation of ionospheric layers and their characteristics . Also explain the variation of layers formation in day and night time.
12. Explain the different types of wave propagation in brief.
13. Write brief note on sky wave propagation
14. Derive the expression for the critical and maximum usable frequency.
15. Explain the dipole antenna and its radiation pattern with advantage and disadvantages.

Q3 Short Answer Questions [4 Marks each question]

1. Explain the different lobe formations in antenna.
2. Define the following terms.
 - a) Beam width
 - b) beam area
 - c) directivity
 - d) antenna gain
3. Explain the half power beamwidth of antenna.
4. Explain the basic radiation pattern of basic antenna.
5. Explain the basic concept of travelling wave radiators.
6. Explain long wire antenna.
7. Write note on parabolic reflectors of microwave antenna.

8. Explain microstrip antenna and state its advantages.
9. Write note on horn antenna
10. What are the advantages and disadvantages of lens antenna.
11. Explain the monopole antenna with its advantages.
12. Explain dipole antenna in short with its radiation pattern.
13. Explain the loop antenna with its radiation pattern.
14. Explain the biconical antenna.
15. Define the following terms
 - a) Tropospheric scattering
 - b) Duct Propagation
 - c) Diffraction
 - d) Critical frequency
16. Explain the formation of different layers above the surface of the earth.
17. Derive the expression for critical frequency
18. Explain the fading concept.
19. Explain the space wave propagation.
20. Derive the expression for maximum usable frequency
21. Explain the characteristics of line of sight wave propagation. 22. Define the following terms
 - a) wave tilt
 - b) Virtual height
 - c) Maximum usable frequency
 - d) Skip distance



