

IAT1

Microwaves and Antennas (17EC71/15EC71)

1. Microwaves are *

- DC signals with Longest wavelengths and shortest frequencies
- AC signals with Longest wavelengths and shortest frequencies
- DC signals with shortest wavelengths and highest frequencies
- AC signals with shortest wavelengths and highest frequencies

2. Microwaves range from

- 300MHz to 30GHz
- 30MHz to 300GHz
- 300GHz to 30THz
- 30GHz to 300THz

3. Following are the applications of microwaves

- Heating
- Communication
- Medical diagnostics
- All the above

4. Microwaves range in wavelengths from

- 1cm to 1m
- 10cm to 1m
- 1cm to 100m
- None of the above

5. Microwaves are used as ----- in communication systems

- Message signal
- Carrier signal
- Both
- None of the above

6. Following theory is used to analyse microwave circuits

- Lumped circuit theory
- Distributed circuit theory
- Both
- None of the above

7. Phases changes are negligible at microwave frequencies.

- True
- False
- Cannot be predicted
- Depends on the atmosphere

8. What is the principle of operation of reflex Klystron oscillator ?

- Amplitude modulation
- Frequency modulation
- Pulse modulation
- Velocity modulaton

9. Which of the following is the source of microwave ?

- Gunn oscillator
- Klystron oscillator
- Magnetron
- All the above

10. Transit time is

- Time taken by the electron to travel from cathode to repeller
- Time taken by the electron to travel from cathode to repeller and back to anode
- Time taken by the electron to travel from anode to repeller
- None of the above

11. Propagation constant is

- A function series impedance and shunt admittance
- A function of attenuation constant and phase constant
- Both

12. Following are examples of transmission lines

- Co-axial cable
- Waveguides
- Strip lines
- All the above

13. Following is the correct representation of primary line constants

- Series resistance, shunt inductance, shunt capacitance and series conductance
- Series resistance, series inductance, shunt capacitance and shunt conductance
- Shunt resistance, shunt inductance, shunt capacitance and series conductance
- Series resistance, shunt inductance, series capacitance and shunt conductance

14. Following are primary line constants

- R, G, L, f
- R, G, L and C
- $\gamma, \alpha, \beta, Z_0$
- V, I, Z_0

15. Following are secondary line constants

- γ, Z_0
- R and G
- L and C
- None of the above

16. Attenuation constant is measured in

- Nepers / km
- Radiations / km
- dB / km
- Both first and third options

17. What is reflection coefficient ?

- Ratio of reflected voltage to incident voltage
- Ratio of reflected current to incident current
- Both
- None of the above

18. Reflection coefficient ranges from

- 0 to 1
- 1 to infinity
- 1 to 100
- None of the above

19. SWR standing wave ratio has to be _____ for co axial connector.

- Low
- High
- Infinite
- Cannot be calculated

20. Incident energy will be reflected because of

- Losses in the line
- Impedance mismatches
- Interference
- None of the above

21. Transmission coefficient is

- Ratio of transmitted voltage to incident voltage
- Ratio of transmitted voltage to reflected voltage
- Ratio of transmitted voltage to incident current
- None of the above

22. Expression for α (attenuation constant) in terms of R , G, L and C of a transmission line is:

- $(R\sqrt{C/L}+G\sqrt{L/C})0.5$
- $(R\sqrt{C/L}+G\sqrt{L/C})$
- $(R\sqrt{L/C}+G\sqrt{C/L})$
- $(R\sqrt{L/C}+G\sqrt{C/L})0.5$

23. Expression for characteristic impedance Z_0 of a transmission line in terms of L and C the transmission line is:

- $\sqrt{C/L}$
- \sqrt{CL}
- $\sqrt{L/C}$
- $1/\sqrt{LC}$

24. If the inductance and capacitance of a loss line transmission line are 45 mH/m and 10 μ F/m, the characteristic impedance of the transmission line is:

- 50 Ω
- 67.08 Ω
- 100 Ω
- none of the mentioned

25. If $R = 1.5\Omega/m$, $G = 0.2$ mS/m, $L = 2.5$ nH/m, $C = 0.1$ pF/m for a low loss transmission line, then the attenuation constant of the transmission line is:

- 0.0158
- 0.0523
- 0.0216
- 0.0745

26. When a load is matched to a transmission line, the condition that is satisfied when matched is:

- $Z_L = Z_0$
- $Z_L = 2Z_0$
- $Z_L = Z_{in}$
- $Z_L = 2Z_{in}$

27. When a load Z_L is matched to a line, the value of standing wave ratio is:

- 1
- 0
- infinity
- insufficient data to calculate SWR

28. The value of reflection coefficient when a transmission line is matched to the load is:

- 1
- 0
- 0.707
- cannot be determined

29. The value of transmission coefficient when a transmission line is matched to a load is:

- 1
- 0
- 0.707
- 0.5

30. If $Z_L < Z_0$, then the reflection coefficient at that junction is:

- $\Gamma < 0$
- $\Gamma > 0$
- $\Gamma > 1$
- None of the mentioned

31. Which of the following bands that comes under Microwave Band

- C
- D
- E
- All the above

32. Reflex klystron is a _____

- Amplifier
- Oscillator
- Attenuator
- Filter

33. At Microwave frequencies , the size of the antenna becomes

- Very large
- Large
- Small
- Very Small

34. The key difference between circuit theory and transmission line theory is:

- circuit elements
- voltage
- current
- electrical size

35. Transmission line is a _____ parameter network.

- lumped
- distributed
- active
- none of the mentioned

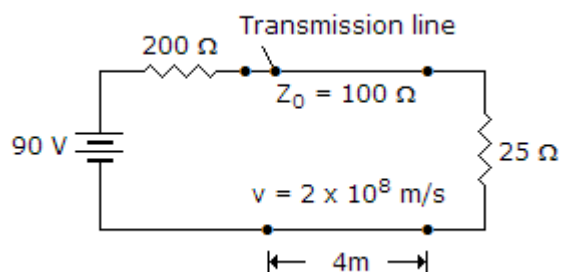
36. For transverse electromagnetic wave propagation, we need a minimum of:

- 1 conductor
- 2 conductors
- 3 conductors
- bunch of conductors

37. The reflection coefficient on a line is $0.2 \angle 45^\circ$. The SWR is

- 0.8
- 1.1
- 1.2
- 1.5

38. In the given figure reflection coefficient at load is



- 0.6
- 0.6
- 0.4
- 0.4

39. Assertion (A): The impedance of a matched load is equal to characteristic impedance of line. Reason (R): A matched termination absorbs all the power incident on it.

- Both A and R are correct and R is correct explanation of A
- Both A and R are correct but R is not correct explanation of A
- A is correct but R is wrong
- A is wrong but R is correct

40. Which of the following parameters is negligible in transmission lines?

- R
- L
- C
- G

41. A line has $Z_0 = 300 \angle 0^\circ \Omega$. If $Z_L = 150 \angle 0^\circ \Omega$, reflection coefficient is

- 0.5
- 0.3333
- 0.3333
- 0.5

42. A line has a phase constant of 29.8 rad/m. At 1000 MHz the wavelength is

- 29.8 m
- 2.98 m
- 2.1 m
- 0.21 m

43. A line is excited by a 100 V dc source. If reflection coefficients at both ends are 1 each then

- there will be no oscillations on line
- there will be only 1 or 2 oscillations on line
- there will be a finite number of oscillations on line
- the oscillations will continue indefinitely

44. Reflex klystron oscillator is essentially a low power device

- True
- False

45. A 10 km long line has a characteristic impedance of 400 ohms. If line length is 100 km, the characteristic impedance is

- 4000 Ω
- 400 Ω
- 40 Ω
- 4 Ω

46. A resistive microwave load with $Z_L = 150 \Omega$ is connected to 50Ω coaxial line. SWR is

- more than 3
- less than 3
- equal to 3
- either (a) or (c)

47. In Reflex Klystron oscillator the focussing electrode is at a high potential

- True
- False

48. If a line having $Z_0 = 300 \angle 0^\circ \Omega$ is open circuited at far end, VSWR is

- 0
- 1
- ∞
- 2

49. A transmission line has $Z_0 = 300 \Omega$ and $Z_L = (300 - j300) \text{ ohm}$. The transmission coefficient is

- 1.265 $\angle -18.43^\circ$
- 1.01 $\angle -10^\circ$
- 1.14 $\angle 66.68^\circ$
- 1.09 $\angle 66.68^\circ$

50. In a reflex klystron oscillator, repeller electrode is at

- low positive potential
- high positive potential
- negative potential
- zero potential

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