

1. What is the lumped parameter equivalent of a transmission line?

- a) RLC circuit
- b) RC circuit
- c) RL circuit
- d) LC circuit

Answer: a) RLC circuit

Explanation: A transmission line can be represented by a lumped parameter equivalent circuit consisting of resistors (R), inductors (L), and capacitors (C) per unit length.

2. What do characteristic impedance and propagation constant define in a transmission line?

- a) Attenuation
- b) Voltage
- c) Impedance matching
- d) Wave propagation

Answer: c) Impedance matching

Explanation: Characteristic impedance and propagation constant define the impedance characteristics and signal propagation along the transmission line, crucial for impedance matching and signal integrity.

3. What does a distortion-less line imply?

- a) No signal loss

- b) No waveform distortion
- c) No impedance mismatch
- d) No signal reflection

Answer: b) No waveform distortion

Explanation: A distortion-less line implies that the transmitted waveform remains intact without distortion along the transmission line.

4. What does the reflection coefficient measure in a transmission line?

- a) Attenuation
- b) Phase shift
- c) Signal loss
- d) Signal reflection

Answer: d) Signal reflection

Explanation: The reflection coefficient quantifies the ratio of the reflected wave amplitude to the incident wave amplitude in a transmission line.

5. What is the purpose of a phase equalizer in a transmission line?

- a) Reduce attenuation
- b) Eliminate impedance mismatch
- c) Compensate for phase distortion
- d) Minimize signal reflection

Answer: c) Compensate for phase distortion

Explanation: A phase equalizer is used to correct phase distortion along the transmission line, ensuring the fidelity of the transmitted signal.

6. What parameter defines the location of a line fault in a transmission line?

- a) Reflection coefficient
- b) Attenuation
- c) Impedance mismatch
- d) Time delay

Answer: a) Reflection coefficient

Explanation: The reflection coefficient provides information about the impedance mismatch and can help locate faults in a transmission line based on variations in reflection.

7. Which circuit model is commonly used as an equivalent of a transmission line for analysis?

- a) T-equivalent
- b)  $\pi$ -equivalent
- c) RLC circuit
- d) RL circuit

Answer: b)  $\pi$ -equivalent

Explanation: The  $\pi$ -equivalent circuit model is often employed for transmission line analysis due to its simplicity and effectiveness.

8. What does the insertion loss measure in a transmission line?

- a) Signal attenuation
- b) Signal reflection
- c) Phase distortion
- d) Impedance mismatch

Answer: a) Signal attenuation

Explanation: Insertion loss quantifies the reduction in signal power as it passes through a transmission line due to attenuation.

9. In a coaxial cable, what component provides the primary mechanism for confining the electromagnetic fields?

- a) Inner conductor
- b) Dielectric material
- c) Outer conductor
- d) Insulating sheath

Answer: c) Outer conductor

Explanation: The outer conductor of a coaxial cable primarily serves to confine the electromagnetic fields within the cable, providing shielding and minimizing signal interference.

10. What factor determines the characteristic impedance of a transmission line?

- a) Length of the line
- b) Material composition
- c) Frequency of operation
- d) Cross-sectional area

Answer: b) Material composition

Explanation: The characteristic impedance of a transmission line is determined by factors such as the material composition, geometry, and arrangement of conductors.

11. What phenomenon does a short-circuited transmission line exhibit at the input end?

- a) Maximum voltage
- b) Maximum current
- c) Minimum voltage
- d) Minimum current

Answer: b) Maximum current

Explanation: A short-circuited transmission line at the input end results in maximum current due to the absence of impedance matching and signal reflection.

12. How does a transmission line with a high reflection coefficient affect signal transmission?

- a) Increases signal fidelity
- b) Reduces signal attenuation
- c) Enhances impedance matching
- d) Causes signal distortion

Answer: d) Causes signal distortion

Explanation: A high reflection coefficient indicates significant signal reflection, leading to signal distortion and degradation in the transmitted waveform.

13. What is the primary function of a transmission line equalizer?

- a) Reduce signal attenuation
- b) Minimize phase distortion
- c) Compensate for impedance mismatch
- d) Eliminate signal reflection

Answer: b) Minimize phase distortion

Explanation: A transmission line equalizer is primarily used to minimize phase distortion, ensuring the integrity of the transmitted signal waveform.

14. How does the length of a transmission line affect the propagation delay?

- a) Longer lines have shorter delays
- b) Shorter lines have longer delays
- c) Longer lines have longer delays
- d) Delay is independent of line length

Answer: c) Longer lines have longer delays

Explanation: Longer transmission lines introduce greater propagation delays due to the time taken for signals to travel along the extended length of the line.

15. What is the primary function of a coaxial cable's dielectric material?

- a) Confining electromagnetic fields
- b) Providing mechanical support
- c) Shielding against external interference
- d) Preventing signal attenuation

Answer: b) Providing mechanical support

Explanation: The dielectric material in a coaxial cable primarily serves to provide mechanical support and insulation between the inner and outer conductors.

16. How does a mismatched characteristic impedance affect signal transmission in a transmission line?

- a) Enhances signal fidelity
- b) Reduces signal distortion
- c) Increases signal attenuation
- d) Minimizes signal reflection

Answer: c) Increases signal attenuation

Explanation: A mismatched characteristic impedance leads to signal reflection and increased signal attenuation along the transmission line.

17. What parameter characterizes the rate of signal decay along a transmission line?

- a) Propagation constant

- b) Reflection coefficient
- c) Characteristic impedance
- d) Attenuation coefficient

Answer: d) Attenuation coefficient

Explanation: The attenuation coefficient quantifies the rate at which the signal power decreases along the transmission line due to factors such as resistance and dielectric losses.

18. How does the cross-sectional area of a transmission line affect its characteristic impedance?

- a) Larger area, lower impedance
- b) Larger area, higher impedance
- c) Smaller area, lower impedance
- d) Smaller area, higher impedance

Answer: b) Larger area, higher impedance

Explanation: A larger cross-sectional area in a transmission line generally results in a higher characteristic impedance due to changes in the geometry and distribution of currents.

19. What parameter determines the velocity of signal propagation in a transmission line?

- a) Frequency
- b) Length
- c) Material composition
- d) Temperature



Answer: c) Material composition

Explanation: The velocity of signal propagation in a transmission line is primarily determined by the material composition, particularly the properties of the dielectric material separating the conductors.

20. How does the attenuation of high-frequency signals compare to low-frequency signals in a transmission line?

- a) High-frequency signals experience higher attenuation
- b) High-frequency signals experience lower attenuation
- c) Attenuation is independent of frequency
- d) Low-frequency signals experience higher attenuation

Answer: a) High-frequency signals experience higher attenuation

Explanation: High-frequency signals typically experience higher attenuation in a transmission line compared to low-frequency signals due to increased dielectric and conductor losses at higher frequencies.