KNOWLEDGE PROBE 2: WIRING AND CABLING
Cables and Transmission Lines

Learning Objectives

- Identify and distinguish between the various types of wiring and cabling applications.
- Identify the different types of wire, sizes, insulation, and specifications.
- Select a wire type and size for a given application.
- Name the types of wire and cables used DC and AC power connections.
- Distinguish between a cable and a transmission line.

1. Which type of wire is used to make most AC power cords?
   a. Solid
   b. Stranded

2. Which type and size of cable is used for most AC power wiring in homes?
   a. Solid, #12
   b. Solid, #14
   c. Stranded, #12
   d. Stranded, #14

3. What is the trade name of AC power cable?
   a. Coax
   b. Zip cord
   c. Romex
   d. UTP

4. How many wires are there in a standard AC house wiring cable?
   a. 2
   b. 3
   c. 4
   d. 8

5. DC power wiring is mainly with
   a. Solid wires
   b. Stranded wires

6. Which of the following factors determines whether a cable is a transmission line?
   a. Frequency of the signals
   b. Length
   c. Both of the above
   d. None of the above

7. What is the wavelength of a 100 MHz FM radio signal?
   a. 0.75 meter
   b. 1.0 meter
   c. 1.5 meters
   d. 3 meters

8. Is a two wire connection with a length of 3 inches a transmission line at 2.4 GHz?
   a. Yes
   b. No

9. What is the minimum length a cable would have to be to be considered a transmission line at 54 MHz?
   a. 9.1 inches
   b. 1.82 feet
   c. 5.55 feet
   d. 18.2 feet

10. The equivalent circuit of a transmission line at the higher frequencies is a
    a. Capacitor
    b. High pass filter
    c. Low pass filter
    d. Resistor

11. The attenuation of transmission line increases with
    a. Both frequency and length
    b. Frequency only
    c. Length only
    d. Type of cable

12. What is the primary specification of any transmission line?
    a. Capacitance per foot
    b. Attenuation in dB
    c. Resistance
    d. Characteristic impedance

13. A 75 ohm generator is driving a 75 ohm cable with a 75 ohm load. To the generator, its load appears to be
    a. 37.5 ohms
    b. 75 ohms
    c. 150 ohms
    d. 225 ohms

14. If a transmission line is not terminated in its characteristic impedance, it will appear to the generator to be a/an
    a. Capacitor
    b. Complex impedance
    c. Open or short
    d. Resistor

15. Which of the following occurs when the load on a transmission line is matched to the cable impedance and generator impedance?
    a. Maximum current transfer to the load
    b. Maximum power transfer to the load
    c. Maximum voltage transfer to the load
    d. Standing waves occur

16. Which of the following occurs when a transmission line is not terminated in its characteristic impedance?
    a. Excessive noise
    b. Lower generator voltage
    c. Reduced voltage output
    d. Signal reflections

17. The most common transmission line for RF and video connections is
    a. Coax
    b. Twisted pair
    c. Romex
    d. Waveguide tubing

18. The most common impedances of coax cable are
    a. 50 and 75 ohms
    b. 50 and 150 ohms
    c. 75 and 100 ohms
    d. 75 and 150 ohms

19. What is the approximate impedance of twisted pair cable?
    a. 50 ohms
    b. 75 ohms
    c. 100 ohms
    d. 150 ohms

20. Which type of wire is used to make twisted pair cable?
    a. Solid
    b. Stranded

21. The most widespread use of CAT5/6 UTP is
    a. Computer LANs
    b. RF connections
    c. Speaker cable
    d. Video

22. What is the designation of the connector used with CAT5/6 UTP?
    a. BNC
    b. RJ-11
    c. RJ-45
    d. UHF

23. A coax cable has an attenuation of 3 dB per 100 feet. What is the attenuation of a cable 82 feet long?
    a. 1.23 dB
    b. 2.46 dB
    c. 3 dB
    d. 8.2 dB

24. A signal of 40 watts is applied to a cable 80 feet long. A power measurement at the load indicates a power of 36 watts. What is the cable attenuation in dB?
    a. -0.46 dB
    b. -0.9 dB
    c. -1.23 dB
    d. -2.7 dB

25. A transmitter applies 200 watts to a transmission line that is 300 feet long. The attenuation is 1.8 dB per 100 feet. What is the expected power at the load?
    a. 62.8 watts
    b. 57.68 watts
    c. 169.7 watts
    d. 200 watts

26. What is the speed of signals passing down a transmission line relation to the speed of light?
    a. Faster
    b. Same
    c. Slower
    d. No way to tell

27. What is the length of one quarter wavelength of coax cable at 220 MHz with a VF of 0.66?
    a. 2.3 inches
    b. 3.9 inches
    c. 7.4 inches
    d. 8.9 inches

28. By how much is a pulse applied to a 50 foot transmission line with C = 22 pF and L = 0.8 nH delayed?
    a. 0.76 nS
    b. 1.32 nS
    c. 6.6 nS
    d. 10.4 nS

29. What is the phase shift introduced to a 20 MHz sine wave by the transmission line in 50 foot transmission line with C = 22 pF and L = 0.8 nH delayed?
    a. 22.85 degrees
    b. 47.52 degrees
    c. 68.9 degrees
    d. 125 degrees

30. Crosstalk between wires or cables is caused by
    a. Capacitive coupling
    b. Inductive coupling
    c. Both of the above
    d. Resistive leakage