c. zero resistance.
d. less than its color-coded value.

4. One precaution to observe when checking resistors with an ohmmeter is to
a. check high resistances on the lowest ohms range.
b. check low resistances on the highest ohms range.
c. disconnect all parallel paths.
d. make sure your fingers are touching each test lead.

5. A chip resistor is marked 394. Its resistance value is
a. 39.4 Ω.
b. 394 Ω.
c. 390,000 Ω.
d. 39,000 Ω.

6. A carbon-film resistor is color-coded with red, violet, black, and gold stripes. What are its resistance and tolerance?
a. 27 Ω ± 5%.
b. 270 Ω ± 5%.
c. 270 Ω ± 10%.
d. 27 Ω ± 10%.

7. A potentiometer is a
a. three-terminal device used to vary the voltage in a circuit.
b. two-terminal device used to vary the current in a circuit.
c. fixed resistor.
d. two-terminal device used to vary the voltage in a circuit.

8. A metal-film resistor is color-coded with brown, green, red, brown, and blue stripes. What are its resistance and tolerance?
a. 1500 Ω ± 1.25%.
b. 152 Ω ± 1%.
c. 1521 Ω ± 0.5%.
d. 1520 Ω ± 0.25%.

9. Which of the following resistors has the smallest physical size?
a. wire-wound resistors.
b. carbon-composition resistors.
c. surface-mount resistors.
d. potentiometers.

10. Which of the following statements is true?
a. Resistors always have axial leads.
b. Resistors are always made from carbon.
c. There is no correlation between the physical size of a resistor and its resistance value.
d. The shelf life of a resistor is about 1 year.

11. If a thermistor has a negative temperature coefficient (NTC), its resistance
a. increases with an increase in operating temperature.
b. decreases with a decrease in operating temperature.
c. decreases with an increase in operating temperature.
d. is unaffected by its operating temperature.

12. With the four-band resistor color code, gold in the third stripe corresponds to a
a. fractional multiplier of 0.01.
b. fractional multiplier of 0.1.
c. decimal multiplier of 10.
d. resistor tolerance of ±10%.

13. Which of the following axial-lead resistor types usually has a blue, light green, or red body?
a. wire-wound resistors.
b. carbon-composition resistors.
c. carbon-film resistors.
d. metal-film resistors.

14. A surface-mount resistor has a coded value of 4R7. This indicates a resistance of
a. 4.7 Ω.
b. 4.7 kΩ.
c. 4.7 MΩ.
d. none of the above.

15. Reading from left to right, the colored bands on a resistor are yellow, violet, brown and gold. If the resistor measures 513 Ω with an ohmmeter, it is
a. well within tolerance.
b. out of tolerance.
c. right on the money.
d. close enough to be considered within tolerance.

Essay Questions

1. List five different types of fixed resistors.
2. List the advantages of using a metal-film resistor versus a carbon-composition resistor.
3. Draw the schematic symbols for a (*a*) fixed resistor (*b*) potentiometer (*c*) rheostat (*d*) thermistor.
4. How can a technician identify a wire-wound resistor that is color-coded?
5. Explain an application using a decade resistance box.
6. List the differences between a potentiometer and a rheostat.
7. For resistors using the four-band code, what are the values for gold and silver as fractional decimal multipliers in the third band?
8. Briefly describe how you would check to see whether a 1-MΩ resistor is open or not. Give two precautions to make sure the test is not misleading.
9. Define the term "zero-power resistance" as it relates to thermistors.
10. Explain how the ambient temperature affects the power rating of a carbon resistor.

Problems

Answers to odd-numbered problems at back of book.

SECTION 2–2 RESISTOR COLOR CODING

2–1 Indicate the resistance and tolerance for each resistor shown in Fig. 2–22.

2–2 Indicate the resistance and tolerance for each resistor shown in Fig. 2–23.

2–3 Indicate the resistance for each chip resistor shown in Fig. 2–24.