

Problems

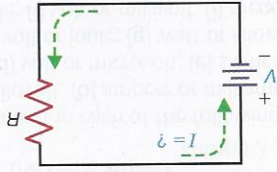
5. State two safety precautions to follow when working on electric circuits.
6. Referring back to the resistor shown in Fig. 1-10 in Chap. 1, suppose that it is not marked. How could you determine its resistance by Ohm's law? Show your calculations that result in the V/I ratio of 10 k Ω . However, do not exceed the power rating of 10 W.
7. Give three formulas for electric power.
8. What is the difference between work and power? Give two units for each.
9. Prove that 1 kWh is equal to 3.6×10^6 J.
10. Give the metric prefixes for 10^{-6} , 10^{-3} , 10^3 , and 10^6 .
11. Which two units in Table 3-2 are reciprocals of each other?
12. A circuit has a constant R of 5000 Ω , and V is varied from 0 to 50 V in 10-V steps. Make a table listing the values of I for each value of V . Then draw a graph plotting these values of milliamperes vs. volts. (This graph should be like Fig. 3-5c.)

SECTION 3-1 THE CURRENT $I = V/R$

In Probs. 3-1 to 3-5, solve for the current, I , when V and R are known. As a visual aid, it may be helpful to insert the values of V and R into Fig. 3-11 when solving for I .

- 3-1 **Multisim** a. $V = 10$ V, $R = 5$ Ω , $I = ?$
b. $V = 9$ V, $R = 3$ Ω , $I = ?$
c. $V = 24$ V, $R = 3$ Ω , $I = ?$
d. $V = 36$ V, $R = 9$ Ω , $I = ?$
- 3-2 **Multisim** a. $V = 18$ V, $R = 3$ Ω , $I = ?$
b. $V = 16$ V, $R = 16$ Ω , $I = ?$
c. $V = 90$ V, $R = 450$ Ω , $I = ?$
d. $V = 12$ V, $R = 30$ Ω , $I = ?$
- 3-3 **Multisim** a. $V = 15$ V, $R = 3,000$ Ω , $I = ?$
b. $V = 120$ V, $R = 6,000$ Ω , $I = ?$
c. $V = 27$ V, $R = 9,000$ Ω , $I = ?$
d. $V = 150$ V, $R = 10,000$ Ω , $I = ?$

Figure 3-11 Figure for Probs. 3-1 to 3-5.

SECTION 3-2 THE VOLTAGE $V = IR$

In Probs. 3-6 to 3-10, solve for the voltage, V , when I and R are known. As a visual aid, it may be helpful to insert the values of I and R into Fig. 3-12 when solving for V .

- 3-4 If a 100- Ω resistor is connected across the terminals of a 12-V battery, how much is the current, I ?
- 3-5 If one branch of a 120-V power line is protected by a 20-A fuse, will the fuse carry an 8- Ω load?
- 3-6 **Multisim** a. $I = 2$ A, $R = 5$ Ω , $V = ?$
b. $I = 6$ A, $R = 8$ Ω , $V = ?$
c. $I = 9$ A, $R = 20$ Ω , $V = ?$
d. $I = 4$ A, $R = 15$ Ω , $V = ?$
- 3-7 **Multisim** a. $I = 5$ A, $R = 10$ Ω , $V = ?$
b. $I = 10$ A, $R = 3$ Ω , $V = ?$
c. $I = 4$ A, $R = 2.5$ Ω , $V = ?$
d. $I = 1.5$ A, $R = 5$ Ω , $V = ?$

Figure 3-12 Figure for Probs. 3-6 to 3-10.

