**Chapter 22 Practice Problems, Review, and Assessment**

*For all problems, assume the battery voltage and the lamp resistances are constant.*

16. A lamp draws a current of 0.50 A when it is connected to a 120-V source.

**a.** What is the resistance of the lamp?
**b.** What is the power consumption of the lamp?

*SOLUTION:*

**a.**

$$R = \frac{V}{I} = \frac{120\ \text{V}}{0.50\ \text{A}} = 2.4 \times 10^2\ \Omega$$

**b.** $P = IV = (0.50\ \text{A})(120\ \text{V}) = 6.0 \times 10^1\ \text{W}$

*ANSWER:*

**a.** $R = 2.4 \times 10^2\ \Omega$

**b.** $P = 6.0 \times 10^1\ \text{W}$

17. A 75-W lamp is connected to 125 V.

**a.** What is the current through the lamp?
**b.** What is the resistance of the lamp?

*SOLUTION:*

**a.**

$$I = \frac{P}{V} = \frac{75\ \text{W}}{125\ \text{V}} = 0.60\ \text{A}$$

**b.**

$$R = \frac{V}{I} = \frac{125\ \text{V}}{0.60\ \text{A}} = 2.1 \times 10^2\ \Omega$$

*ANSWER:*

**a.** $I = 0.60\ \text{A}$

**b.** $R = 2.1 \times 10^2\ \Omega$

## Chapter Assessment
## Section 1 Currents and Circuits: Mastering Problems

51. A motor is connected to a 12-V battery, as shown in **Figure 20.** (Level 1)

**a.** How much power is delivered to the motor?
**b.** How much energy is transformed if the motor runs for 15 min?

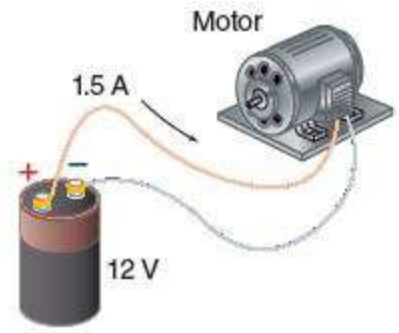


**Figure 20**

*SOLUTION:*

**a.** $P = VI = (12\text{ V})(1.5\text{ A}) = 18\text{ W}$

**b.** $E = Pt = (18\text{ W})(15\text{ min})(60\text{ s/min})$

$= 1.6\times10^{4}\text{ J}$

*ANSWER:*

**a.** $P = 18\text{ W}$

**b.** $E = 1.6\times10^{4}\text{ J}$

59. **Dryers** A 4200-W clothes dryer is connected to a 220-V circuit. How much current does the dryer draw? (Level 1)

*SOLUTION:*

$$P = IV$$

$$I = \frac{P}{V} = \frac{4200\text{ W}}{220\text{ V}} = 19\text{ A}$$

*ANSWER:*

$I = 19\text{ A}$

60. **Flashlights** A flashlight bulb is connected across a 3.0-V potential difference. The current through the bulb is 1.5 A. (Level 1)

**a.** What is the power rating of the bulb?
**b.** How much electrical energy does the bulb transform in 11 min?

*SOLUTION:*

**a.** $P = IV = (1.5\text{ A})(3.0\text{ V}) = 4.5\text{ W}$

**b. The definition of power is**

$$P = \frac{E}{t}, \text{ so}$$

$$E = Pt$$

$$= (4.5\text{ W})(11\text{ min})\left(\frac{60\text{ s}}{\text{min}}\right)$$

$$= 3.0 \times 10^3\text{ J}$$

*ANSWER:*

**a.** $P = 4.5\text{ W}$

**b.** $E = 3.0 \times 10^3\text{ J}$