PQ 3b Resistance

Q and A

Q1

- A car interior lamp with a resistance of 33 Ohm's is placed across a 12-V battery. What is the current through the circuit?

$$I = \frac{V}{R} = \frac{12\ \text{V}}{33\ \Omega} = 0.36\ \text{A}$$

Q2

- A motor with an operating resistance of 32 Ohmn's is connected to a voltage source. The current in the circuit is 3.8 A. What is the voltage of the source?

$$V = IR = (3.8\ \text{A})(32\ \Omega) = 1.2\times10^{2}\ \text{V}$$

Q3

- A table 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?

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

- **b.** What is the power consumption of the table lamp?

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

Q4

- A 75-W table lamp is connected to 125 V.
- **a.** What is the current through the lamp?

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

- **b.** What is the resistance of the table lamp?

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

Q5

- A 15 Ohmn electric heater operates on a 120-V outlet.
- **a.** What is the current through the heater?

$$I = \frac{V}{R} = \frac{120\ \text{V}}{15\ \Omega} = 8.0\ \text{A}$$

Q6

- A 39 Ohmn resistor is connected across a 45-V battery.
- **a.** What is the current in the circuit?

$$I = \frac{V}{R} = \frac{45\ \text{V}}{39\ \Omega} = 1.2\ \text{A}$$

Q7

- The resistance of an electric oven element at operating temperature is 11 Ohmn’s
- **a.** If 220 V are applied across it, what is the current through the stove element?

$$I = \frac{V}{R} = \frac{220\ \text{V}}{11\ \Omega} = 2.0 \times 10^{1}\ \text{A}$$

Q8

- A digital clock has a resistance of 12,000 Ohmn’s and is plugged into a 115-V outlet.
- **a.** How much current does it draw?

$$I = \frac{V}{R} = \frac{115\ \text{V}}{12{,}000\ \Omega} = 9.6\times10^{-3}\ \text{A}$$