

# Density and Pressure Review

## Answer Key

- The density of air is lower than the density of water.
  - The density of the solid oil is greater than the liquid oil.
  - Rivers and lakes would freeze from the bottom to the top in winter, becoming solid blocks of ice. This would kill most organisms in the winter.

$$2. \quad D = \frac{m}{V}$$

$$D \cdot V = \frac{m}{V} \cdot V$$

$$m = DV$$

$$m = \left( 0.785 \frac{\text{g}}{\text{mL}} \right) (1.50 \times 10^3 \text{ mL})$$

$$m = 1.18 \times 10^3 \text{ g or } 1.18 \text{ kg}$$

$$3. \quad D = \frac{m}{V}$$

$$D = \frac{700 \text{ g}}{3.1 \times 10^3 \text{ L}}$$

$$D = 0.23 \frac{\text{g}}{\text{L}}$$

$$4. \quad D = \frac{m}{V}$$

$$D \cdot V = \frac{m}{V} \cdot V$$

$$\frac{DV}{D} = \frac{m}{D}$$

$$V = \frac{m}{D}$$

$$V = \frac{4.2 \times 10^3 \text{ g}}{13.6 \frac{\text{g}}{\text{mL}}}$$

$$V = 3.1 \times 10^2 \text{ mL}$$

# Density and Pressure Review

## Answer Key (continued)

5. (a) Since  $1 \text{ Pa} = 1 \frac{\text{N}}{\text{m}^2}$ ,  $102.5 \text{ kPa} = 1.025 \times 10^5 \frac{\text{N}}{\text{m}^2}$ .

$$P = \frac{F}{A}$$

$$P \cdot A = \frac{F}{A} \cdot A$$

$$F = PA$$

$$F = \left( 1.025 \times 10^5 \frac{\text{N}}{\text{m}^2} \right) (2.14 \times 10^4 \text{ m}^2)$$

$$F = 2.19 \times 10^9 \text{ N}$$

(b)  $1 \text{ kg} = 9.81 \text{ N}$

$$m = (2.19 \times 10^9 \text{ N}) \left( \frac{\text{kg}}{9.81 \text{ N}} \right)$$

$$m = 2.23 \times 10^8 \text{ kg}$$

6. (a)  $P = \frac{F}{A}$

$$P = \frac{820 \text{ N}}{0.045 \text{ m}^2}$$

$$P = 1.8 \times 10^4 \frac{\text{N}}{\text{m}^2} \text{ or } 1.8 \times 10^4 \text{ Pa}$$

(b)  $P = \frac{F}{A}$

$$P \cdot A = \frac{F}{A} \cdot A$$

$$F = PA$$

$$F = \left( 1.8 \times 10^4 \frac{\text{N}}{\text{m}^2} \right) (0.035 \text{ m}^2)$$

$$F = 6.3 \times 10^2 \text{ N}$$