

Density Practice Problems

1. A sample of seawater masses 158 g and has a volume of 156 mL. What are the density of this seawater?

$$D = \frac{M}{V} = \frac{158}{156} = \boxed{1.019 \text{ g/mL}}$$

2. Mercury metal is poured into a graduated cylinder that holds exactly 22.5 mL. The mercury used to fill the cylinder masses 308.0 g. From this information, calculate the of mercury.

$$D = \frac{M}{V} = \frac{308.0}{22.5} = \boxed{13.7 \text{ g/mL}}$$

3. A beaker massing 144.85 grams is filled with a solution and remassed. The weight of the beaker plus solution is 153.77 grams. The volume of the solution is 4.55 L. What is the density of this solution?

$$\begin{array}{r} 153.77 \\ - 144.85 \\ \hline 8.92 \text{ g} \end{array} \quad \frac{8.92 \text{ g}}{4.55 \text{ L}} = \boxed{1.96 \text{ g/L}}$$

4. A block of lead has dimensions of 4.5 cm by 5.2 cm by 6.0 cm. The block masses 1587 g. From this information, calculate the density of lead.

$$V = 4.5 \times 5.2 \times 6.0 = 140.4 \text{ cm}^3$$

$$\frac{1587}{140.4} = \boxed{11.3 \text{ g/cm}^3}$$

5. Find the mass of 250.0 mL of benzene. The density of benzene 0.90 g/mL.

$$0.90 = \frac{m}{250} \quad m = 0.9(250) = \boxed{225 \text{ g}}$$

6. What volume of silver metal will have a mass of exactly 2500.0 g? The density of silver is 10.5 g/cm³.

$$10.5 = \frac{2500}{V} \quad V = \frac{m}{D} = \frac{2500}{10.5} = \boxed{238.1 \text{ cm}^3}$$

7. A rectangular block of copper metal masses 1896 g. The dimensions of the block are 8.4 cm by 4.6 cm by 5.5 cm. From these data, what is the density of copper?

$$V = 8.4 \times 4.6 \times 5.5 = 212.52 \text{ cm}^3$$

$$D = \frac{m}{V} = \frac{1896}{212.52} = \boxed{8.92 \text{ g/cm}^3}$$

The next three problems are Super Hard!!! - Give Them a Try if You Dare!!!

8. A piece of aluminum foil 12.8 cm long and 4.2 cm wide is found to have a mass of 0.319 grams. What is the thickness of the foil if the density of aluminum is 2.70 g/cm³?

$$V = \frac{m}{D} = \frac{0.319}{2.70} = 0.118 \text{ cm}^3$$

$$0.118 = 12.8 \times 4.2 \times H$$

$$H = \frac{0.118}{12.8 \times 4.2} = \boxed{0.0023 \text{ cm}}$$

9. A drop of oil massing 0.0025 g is dropped on the surface of a large pool of water. The drop spreads out until it forms a circle 18.2 m in diameter. How thick is the circle of oil? The density of this oil is 0.725 g/cm³

$$V = \pi r^2 h \quad D = \frac{m}{V} \quad V = \frac{m}{D} = \frac{0.0025}{0.725} = 0.0034 \quad 0.0034 = \pi (9.1)^2 h$$

$$h = \frac{0.0034}{\pi (9.1)^2} = \boxed{3.1 \times 10^{-4} \text{ m}}$$

10. What molecular mass (in grams) do you calculate for hydrogen fluoride if the density of this gas is 8.482 E-4 g/cm³ and you have 22.4 liters of the gas?

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

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$$m = DV$$

$$= 8.482 \times 10^{-4} (22100)$$

$$= \boxed{18.7 \text{ g}}$$