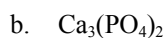


1. Determine the molar mass of the following compounds:



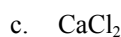
SOLUTION 1: $(23.0\text{g/mol}) + (12.0\text{g/mol}) + (16.0\text{g/mol}) = 51.0\text{g/mol}$

SOLUTION 2: $2(23.0\text{g/mol}) + (12.0\text{g/mol}) + 3(16.0\text{g/mol}) = 106.0\text{g/mol}$



SOLUTION 1: $3(40.1\text{g/mol}) + 2(31.0\text{g/mol}) + 8(16.0\text{g/mol}) = 310.3\text{g/mol}$

SOLUTION 2: $3(40.1\text{g/mol}) + (31.0\text{g/mol}) + 8(16.0\text{g/mol}) = 279.3\text{g/mol}$



SOLUTION 1: $2(40.1\text{g/mol}) + 2(35.5\text{g/mol}) = 151.2\text{g/mol}$

SOLUTION 2: $(40.1\text{g/mol}) + 2(35.5\text{g/mol}) = 111.1\text{g/mol}$



SOLUTION 1: $4(14.0\text{g/mol}) + 4(1.0\text{g/mol}) + 3(14.0\text{g/mol}) + 3(16.0\text{g/mol}) = 150.0\text{g/mol}$

SOLUTION 2: $(14.0\text{g/mol}) + 4(1.0\text{g/mol}) + (14.0\text{g/mol}) + 3(16.0\text{g/mol}) = 80.0\text{g/mol}$

2. A pop can contains around 3.34×10^{23} aluminum atoms. How many moles of aluminum are contained in a pop can?

SOLUTION 1:

$$3.34 \times 10^{23} \text{ atoms} \times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} = 5.55 \times 10^{-1} \text{ mol of Al}$$

SOLUTION 2:

$$3.34 \times 10^{23} \text{ atoms} \times \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} = 0.555 \text{ mol of Al}$$

3. The average glass of water contains 235.8 g of water molecules. How many moles of water molecules are in the average glass of water?

SOLUTION 1:

$$235.8 \text{ g} \quad \times \quad \frac{1 \text{ mol}}{18.0 \text{ g}} \quad = \quad 13.08 \text{ mol H}_2\text{O}$$

SOLUTION 1:

$$18.0 \text{ g} \quad \times \quad \frac{1 \text{ mol}}{235.8 \text{ g}} \quad = \quad 0.07634 \text{ mol H}_2\text{O}$$

4. Iron (Fe) is a common building material. A standard 2-inch finishing nail contains about 8.55×10^{21} iron atoms. What is the mass of a finishing nail?

SOLUTION 1:

$$8.55 \times 10^{21} \text{ atoms} \quad \times \quad \frac{1 \text{ mol}}{55.8 \text{ g}} \quad \times \quad \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol}} \quad = \quad 9.22 \times 10^{43} \text{ g Fe}$$

SOLUTION 1:

$$8.55 \times 10^{21} \text{ atoms} \quad \times \quad \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atom}} \quad \times \quad \frac{55.8 \text{ g}}{1 \text{ mol}} \quad = \quad 0.793 \text{ g Fe}$$

5. An underground cavern is completely filled with 8198 g of methane gas (CH_4). What is the volume (in L) of the underground cavern? (Assume the gas is at STP conditions)

SOLUTION 1:

$$8198 \text{ g} \quad \times \quad \frac{1 \text{ mol}}{16 \text{ g}} \quad \times \quad \frac{22.4 \text{ L}}{1 \text{ mol}} \quad = \quad 1.148 \times 10^4 \text{ L}$$

SOLUTION 1:

$$8198 \text{ g} \quad \times \quad \frac{1 \text{ mol}}{22.4 \text{ L}} \quad \times \quad \frac{16 \text{ g}}{1 \text{ mol}} \quad = \quad 5.856 \times 10^3 \text{ L}$$