

**SHOW YOUR WORK**

1. Calculate the number of moles there would be in each of the following:

a) 30.0 g of  $\text{CaCO}_3$  (limestone)

b) 125 grams of  $\text{CH}_3\text{COOH}$  (vinegar)

2. Calculate the mass of each of the following:

a) 4.5 moles of  $\text{NH}_3$  (cleaning agent)

b) 2.56 moles of  $\text{C}_6\text{H}_{12}\text{O}_6$  (honey)

3. Calculate the number of atoms in 48 grams of magnesium.

4. Calculate the mass of  $9.03 \times 10^{23}$  molecules of  $\text{NaOH}$  (Draino).

5. Calculate the number of atoms of H and O in 54 grams of water.

6. Calculate the number of molecules of  $\text{CO}_2$  in a fire extinguisher that contains 1000. grams of  $\text{CO}_2$ .

### SHOW YOUR WORK

1. Calculate the number of moles there would be in each of the following:

a) 30.0 g of  $\text{CaCO}_3$  (limestone)

$$\frac{30.0 \text{ g}}{100.1 \text{ g}} = \frac{x}{1 \text{ mole}} \quad \boxed{x = .30 \text{ moles}}$$

b) 125 grams of  $\text{CH}_3\text{COOH}$  (vinegar)

$$\frac{125 \text{ g } \text{CH}_3\text{COOH}}{60 \text{ g}} = \frac{x}{1 \text{ mole}} \quad \boxed{x = 2.08 \text{ moles}}$$

2. Calculate the mass of each of the following:

a) 4.5 moles of  $\text{NH}_3$  (cleaning agent)

$$\frac{1 \text{ mole } \text{NH}_3}{17 \text{ g}} = \frac{x}{4.5 \text{ mole}} \quad \boxed{x = 76.5 \text{ g}}$$

b) 2.56 moles of  $\text{C}_6\text{H}_{12}\text{O}_6$  (honey)

$$\frac{1 \text{ mole}}{180.16 \text{ g}} = \frac{x}{2.56 \text{ mole}} \quad \boxed{x = 461.2 \text{ g}}$$

3. Calculate the number of atoms in 48 grams of magnesium.

$$\frac{48 \text{ g}}{24.3 \text{ g}} = \frac{x \text{ atoms}}{6.02 \times 10^{23} \text{ atoms}} \quad \boxed{x = 1.2 \times 10^{24} \text{ atoms}}$$

4. Calculate the mass of  $9.03 \times 10^{23}$  molecules of  $\text{NaOH}$  (Draino).

$$\frac{9.03 \times 10^{23} \text{ molecules}}{6.02 \times 10^{23} \text{ molecules}} = \frac{x \text{ g}}{40 \text{ g}} \quad \boxed{x = 60.0 \text{ g}}$$

5. Calculate the number of atoms of H and O in 54 grams of water.

$$\frac{54 \text{ g } \text{H}_2\text{O}}{18 \text{ g}} = \frac{6.02 \times 10^{23} \text{ molecules}}{x} \quad x = 1.8 \times 10^{24} \text{ molecules} \times 2 \text{ atoms H} = \boxed{3.6 \times 10^{24} \text{ atoms H}}$$

6. Calculate the number of molecules of  $\text{CO}_2$  in a fire extinguisher that contains 1000. grams of  $\text{CO}_2$ .

$$\frac{1000 \text{ g } \text{CO}_2}{44 \text{ g}} = \frac{x \text{ molecules}}{6.02 \times 10^{23} \text{ molecules}} \quad x = 1.3 \times 10^{25} \text{ molecules}$$