

## Concentration Practice #1

### 1. Define

- a. Solute: the minor component of a solution
- b. Solvent: the major component of a solution.
- c. Solution Solute dissolved in a solvent.

### 2. Identify which solution has the highest concentration

- a. 5g in 250mL or 4g in 100mL

$$C = \frac{m}{V} = \frac{5g}{250mL} = 0,02g/mL \quad C = \frac{m}{V} = \frac{4g}{100mL} = 0,04$$

- b. 10g in 200mL or 12g in 120mL

$$C = \frac{m}{V} = \frac{10g}{200mL} = 0,05g/mL \quad C = \frac{m}{V} = \frac{12g}{120mL} = 0,1g/mL$$

- c. 30g in 400mL or 35g in 500mL

$$C = \frac{m}{V} = \frac{30g}{400mL} = 0,075g/mL \quad C = \frac{m}{V} = \frac{35g}{500mL} = 0,07g/mL$$

### 3. Calculate the mass of solute needed to prepare 300mL of a 40 g/L aqueous solution.

$$C = 40g/L$$

$$m = Xg$$

$$V = 300mL \rightarrow 0,3L$$

$$m = C \cdot V$$

$$m = 40g/L \cdot 0,3L$$

$$m = 12g$$

### 4. Calculate the mass of solute needed to prepare 500mL of a 30g/L aqueous solution.

$$C = 30g/L$$

$$m = Xg$$

$$V = 500mL \rightarrow 0,5L$$

$$m = C \cdot V$$

$$m = 30g/L \cdot 0,5L$$

$$m = 15g$$

5. Calculate the volume of solution prepared if you dissolve 20g of solute and make a 2g/L solution.

$$C = 2 \text{ g/L}$$

$$m = 20 \text{ g}$$

$$V = ? \text{ L}$$

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

$$V = \frac{20 \text{ g}}{2 \text{ g/L}}$$

$$V = 10 \text{ L}$$

6. You have 680g of a solute and 2.2L of water. Calculate the % m/V.

$$C \% \text{ m/V} = X \%$$

$$M_{\text{solute}} = 680 \text{ g}$$

$$V_{\text{solution}} = 2.2 \text{ L} \rightarrow 2200 \text{ mL}$$

$$\% \frac{m}{V} = \frac{M_{\text{(solute)}} \text{ g}}{V_{\text{(solution)}} \text{ mL}} \cdot 100$$

$$\% \frac{m}{V} = \frac{680 \text{ g}}{2200 \text{ mL}} \cdot 100$$

$$\% \frac{m}{V} = 30.9 \%$$

7. Calculate the % m/m of a solution where 5g of sugar are dissolved in 150g of water.

$$C \% \frac{m}{m} = X \%$$

$$M_{\text{(solute)}} = 5 \text{ g}$$

$$M_{\text{(solution)}} = M_{\text{(solute)}} + M_{\text{(solvent)}}$$

$$= 5 \text{ g} + 150 \text{ g} = 200 \text{ g}$$

$$\% \frac{m}{m} = \frac{M_{\text{(solute)}}}{M_{\text{(solution)}}} \cdot 100$$

$$\% \frac{m}{m} = \frac{5 \text{ g}}{200 \text{ g}} \cdot 100$$

$$\% \frac{m}{m} = 2.5 \%$$

8. You have 300mL of a 17% V/V solution. Calculate the volume of solvent.

$$C \% \text{ V/V} = 17 \%$$

$$V_{\text{(solute)}} = X \text{ mL} = 51 \text{ mL}$$

$$V_{\text{(solution)}} = 300 \text{ mL}$$

$$\% \text{ V/V} = \frac{V_{\text{(solute)}}}{V_{\text{(solution)}}} \cdot 100$$

$$17 \% = \frac{X \text{ mL}}{300 \text{ mL}} \cdot 100$$

$$0.17 = \frac{X \text{ mL}}{300 \text{ mL}}$$

$$51 \text{ mL} = X$$

$$V_{\text{(solution)}} = V_{\text{(solute)}} + V_{\text{(solvent)}}$$

$$300 \text{ mL} = 51 \text{ mL} + V_{\text{(solvent)}}$$

$$V_{\text{(solvent)}} = 249 \text{ mL}$$