

Name: Correction.

Concentration Quiz

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1. Calculate the concentration in g/L for each of the following:

a. 15 g of NaCl dissolved in 300 L of water

$$m = 15 \text{ g}$$

$$V = 300 \text{ L}$$

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

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

$$C = \frac{15 \text{ g}}{300 \text{ L}}$$

$$C = 0.05 \text{ g/L}$$

b. 500 mg of KCl dissolved in 120 mL of water

$$m = 500 \text{ mg} \div 1000 = 0.5 \text{ g}$$

$$V = 120 \text{ mL} \div 1000 = 0.12 \text{ L}$$

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

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

$$C = \frac{0.5 \text{ g}}{0.12 \text{ L}}$$

$$C = 4.17 \text{ g/L}$$

c. 1.5 kg of NaBr dissolved in 18 L of water

$$m = 1.5 \text{ kg} \cdot 1000 = 1500 \text{ g}$$

$$V = 18 \text{ L}$$

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

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

$$C = \frac{1500 \text{ g}}{18 \text{ L}}$$

$$C = 83.33 \text{ g/L}$$

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2. Place the solutions in increasing order of concentration:

a. 5 g/L

$$a. \frac{5 \text{ g}}{\text{L}} = \frac{5 \text{ g}}{1000 \text{ mL}} = \boxed{0.005 \text{ g/mL}}$$

b. 2 g / 500 mL

$$b. \frac{2 \text{ g}}{500 \text{ mL}} = \boxed{0.004 \text{ g/mL}}$$

c. 10% m/V

$$c. \frac{10}{100} = \frac{x \text{ g}}{100 \text{ mL}}, \quad \frac{10 \text{ g}}{100 \text{ mL}} = \boxed{0.1 \text{ g/mL}}$$

$x = 10 \text{ g}$

d. 30 g/mL

Answer: b a c d.

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3. You dissolve 50 g of sugar into 300 g of water

a. Calculate the mass of the solution

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

$$M_{\text{solution}} = 300 \text{ g} + 50 \text{ g}$$

$$M_{\text{solution}} = 350 \text{ g}$$

b. Calculate the % m/m

$$M_{\text{solute}} = 50 \text{ g}$$

$$M_{\text{solution}} = 350 \text{ g}$$

$$\% \text{ m/m} = x\%$$

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

$$\% \frac{m}{m} = \left(\frac{50 \text{ g}}{350 \text{ g}} \right) \cdot 100$$

$$\% \frac{m}{m} = 14.3\%$$

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4. You are given 33 g of a 18% salt solution

a. Calculate the mass of salt in the solution

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

$$M_{\text{solution}} = 33 \text{ g}$$

$$\% \text{ m/m} = 18\%$$

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

$$18\% = \left(\frac{x \text{ g}}{33 \text{ g}} \right) \cdot 100$$

$$0.18 = \frac{x \text{ g}}{33 \text{ g}}$$

$$M_{\text{solute}} = 5.94 \text{ g}$$

b. Calculate the amount of water in the solution

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

$$33 \text{ g} = 5.94 \text{ g} + x \text{ g}$$

$$x \text{ g} = 33 \text{ g} - 5.94 \text{ g}$$

$$M_{\text{solvent}} = 27.06 \text{ g}$$

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5. Calculate the % V/V of an alcohol solution made with 45 mL of alcohol and 2.7 L of water.

$$V_{\text{solute}} = 45 \text{ mL}$$

$$V_{\text{solvent}} = 2.7 \text{ L} \cdot 1000 = 2700 \text{ mL}$$

$$V_{\text{solution}} = 2745 \text{ mL}$$

$$\% \frac{V}{V} = x\%$$

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

$$\% \frac{V}{V} = \left(\frac{45 \text{ mL}}{2745 \text{ mL}} \right) \cdot 100$$

$$\% \frac{V}{V} = 1.64\%$$

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