Name_____ Date_____ Period_____

Solutions/Concentrations/Dilutions Worksheet #3: % Composition & Molarity

1. If 48.0 g of sodium bromide are dissolved in 138 g of H_2O, what is the percent composition of solute in this solution?

$$\frac{48.0\text{ g NaBr}}{186\text{ g Soln}} \times 100 = \boxed{25.8\%\ \text{NaBr}}$$

2. Calculate the molarity of a 500.0 mL solution that contains 285 g of $NaBr_2$.

$$\frac{1\text{ mol NaBr}_2}{182.79\text{ g NaBr}_2} \left| \frac{285\text{ g NaBr}_2}{500.0\text{ mL Soln}} \right| \frac{1000\text{ mL Soln}}{1\text{ L Soln}} = \boxed{3.12\ \frac{\text{mol NaBr}_2}{\text{L Soln}}}$$

3. Calculate the molarity of a solution that contains 40.0 g of potassium hydroxide dissolved in enough water to make 0.500 liters of solution.

$$\frac{1\text{ mol KOH}}{56.11\text{ g KOH}} \left| \frac{40.0\text{ g KOH}}{0.500\text{ L Soln}} \right. = \boxed{1.43\ \frac{\text{mol KOH}}{\text{L Soln}}}$$

4. What is the mass of solute in 985 mL of a solution if the solution is 85.0% water and the density of the solution is 1.40 g/mL?

↳ $\frac{85\text{ g } H_2O}{100\text{ g Soln}} \rightarrow \frac{15\text{ g Solute}}{100\text{ g Soln}}$

$$\frac{15\text{ g Solute}}{100\text{ g Soln}} \left| \frac{1.40\text{ g Soln}}{1\text{ mL Soln}} \right| \frac{985\text{ mL Soln}}{} = \boxed{207\text{ g Solute}}$$

5. Calculate the mass of sodium nitrate in a 15.0% solution that has a mass of 250.0 g.

↳ $\frac{15\text{ g NaNO}_3}{100\text{ g Soln}}$

$$\frac{15\text{ g NaNO}_3}{100\text{ g Soln}} \times 100 = \boxed{37.5\text{ g NaNO}_3}$$

6. What mass of potassium chloride must be used to make 2.00 liters of a 0.800 M potassium chloride solution?

↳ $\frac{0.800\text{ mol KCl}}{1\text{ L Soln}}$

$$\frac{74.55\text{ g KCl}}{1\text{ mol KCl}} \left| \frac{0.800\text{ mol KCl}}{1\text{ L Soln}} \right| \frac{2.00\text{ L Soln}}{} = \boxed{119\text{ g KCl}}$$

7. How many milliliters of concentrated hydrochloric (12.1 M) (M_C) are needed to make 500.0 mL (V_D) of a 3.00 M (M_D) dilute solution? (V_C)

$M_CV_C = M_DV_D$

$$\frac{(12.1\text{ M})(V_C)}{12.1\text{ M}} = \frac{(3.00\text{ M})(500.0\text{ mL})}{12.1\text{ M}}$$

$$\boxed{V_C = 124\text{ mL}}$$

8. Ammonium nitrate is a common fertilizer. What mass of solvent (water) must be used to make 5000.0 g of a 5.00% solution of ammonium nitrate? NH_4NO_3

$\frac{5.00\text{ g } NH_4NO_3}{100\text{ g Soln}}$ $\frac{95.0\text{ g } H_2O}{100\text{ g Soln}}$

$$\frac{95.0\text{ g } H_2O}{100\text{ g Soln}} \left| \frac{5000.0\text{ g Soln}}{} \right. = \boxed{4750\text{ g } H_2O}$$

9. If 56.0 mL (V_C) of concentrated sulfuric acid (18.0 M) (M_C) is diluted with water to a final volume of 2.00 L, then what is the new molarity (M_D) of the diluted solution? 2000 mL = V_D

$M_CV_C = M_DV_D$

$$\frac{(18.0\text{ M})(56.0\text{ mL})}{2000\text{ mL}} = \frac{M_D(2000\text{ mL})}{2000\text{ mL}}$$

$$\boxed{M_D = 0.504\text{ M}}$$