Name_____ Date_____ Period_____

Solutions/Concentrations Worksheet #2: % Composition & Molarity

1. If 23.0 g of sodium chloride are dissolved in 234 g of H_2O, what is the percent composition of solute in this solution?

$$\frac{23.0\text{ g NaCl}}{257\text{ g Soln}} \times 100 = \boxed{8.95\%\text{ NaCl}}$$

2. Calculate the molarity of a 1300.0 mL solution that contains 285 g of $SrCl_2$.

$$\frac{1\text{ mol } SrCl_2}{158.52\text{ g } SrCl_2} \left| \frac{285\text{ g } SrCl_2}{1300.0\text{ mL Soln}} \right| \frac{1000\text{ mL Soln}}{1\text{ L Soln}} = \boxed{1.38\ \frac{\text{mol } SrCl_2}{\text{L Soln}}}$$

3. Calculate the molarity of a solution that contains 20.0 g of sodium hydroxide dissolved in enough water to make 0.500 liters of solution.

$$\frac{1\text{ mol NaOH}}{40.0\text{ g NaOH}} \left| \frac{20.0\text{ g NaOH}}{0.500\text{ L Soln}} \right. = \boxed{1.00\ \frac{\text{mol NaOH}}{\text{L Soln}}}$$

4. What is the mass of solute in 445 mL of a solution if the solution is 75.0% water and the density of the solution is 1.20 g/mL?

↳ $\frac{75\text{ g } H_2O}{100\text{ g Soln}} \rightarrow \frac{25\text{ g Solute}}{100\text{ g Soln}}$

$$\frac{25\text{ g Solute}}{100\text{ g Soln}} \left| \frac{1.20\text{ g Soln}}{1\text{ mL Soln}} \right| \frac{445\text{ mL Soln}}{} = \boxed{134\text{ g Solute}}$$

5. Calculate the mass of sodium sulfate in a 25.0% solution that has a mass of 500.0 g.

↳ $\frac{25\text{ g } Na_2SO_4}{100\text{ g Soln}}$

$$\frac{25\text{ g } Na_2SO_4}{100\text{ g Soln}} \left| \frac{500.0\text{ g Soln}}{} \right. = \boxed{125\text{ g } Na_2SO_4}$$

6. What mass of potassium nitrate must be used to make 3.00 liters of a 0.200 M potassium nitrate solution?

↳ $\frac{0.200\text{ mol } KNO_3}{1\text{ L Soln}}$

$$\frac{101.11\text{ g } KNO_3}{1\text{ mol } KNO_3} \left| \frac{0.200\text{ mol } KNO_3}{1\text{ L Soln}} \right| \frac{3.00\text{ L Soln}}{} = \boxed{60.7\text{ g } KNO_3}$$

7. How many milliliters of a 6.0 M hydrochloric acid solution can be make using 72.3 g of hydrochloric acid?

↳ $\frac{6.0\text{ mol HCl}}{1\text{ L Soln}}$

$$\frac{1000\text{ mL Soln}}{1\text{ L Soln}} \left| \frac{1\text{ L Soln}}{6.0\text{ mol HCl}} \right| \frac{1\text{ mol HCl}}{36.46\text{ g HCl}} \left| \frac{72.3\text{ g HCl}}{} \right. = \boxed{330\text{ mL Soln}}$$

8. Ammonium nitrate is a common fertilizer. What mass of solvent (water) must be used to make 1500.0 g of a 5.00% solution of ammonium nitrate? NH_4NO_3

$\frac{5\text{ g } NH_4NO_3}{100\text{ g Soln}}$ $\quad \frac{95\text{ g } H_2O}{100\text{ g Soln}}$

$$\frac{95\text{ g } H_2O}{100\text{ g Soln}} \left| \frac{1500.0\text{ g Soln}}{} \right. = \boxed{1430\text{ g } H_2O}$$

9. Calculate the mass of lithium chloride required to make 0.850 liters of a 4.00 M solution.

↳ $\frac{4.00\text{ mol LiCl}}{1\text{ L Soln}}$

$$\frac{42.39\text{ g LiCl}}{1\text{ mol LiCl}} \left| \frac{4.00\text{ mol LiCl}}{1\text{ L Soln}} \right| \frac{0.850\text{ L Soln}}{} = \boxed{144\text{ g LiCl}}$$