Name_____ Date_____ Period_____

Solutions/Concentrations Worksheet #1: % Composition & Molarity

1) If 18.0 g sodium sulfate are dissolved in 207 g H_2O, what is the percent composition of solute in this solution?

$207 + 18 = 225\ g$

$$\frac{18.0\ g\ Na_2SO_4}{225\ g\ Soln} \times 100 = \boxed{8.00\%\ Na_2SO_4}$$

2) Calculate the mass of sodium chloride in a 5.00% solution which has a mass of 755 g.

5 per 100

$$\frac{755\ g\ Soln}{} \left| \frac{5\ g\ NaCl}{100\ g\ Soln} \right. = \boxed{37.8\ g\ NaCl}$$

$$\frac{5\ g\ NaCl}{100\ g\ Soln} \left| \frac{755\ g\ Soln}{} \right. = \boxed{37.8\ g\ NaCl}$$

3) Silver nitrate is a chemical used in photography and in the manufacturing of mirrors. What mass of solvent (water) must be used to make 1000.0 g of a 2.00% solution of silver nitrate?

So 98% H_2O

$$\frac{98\ g\ H_2O}{100\ g\ Soln} \left| \frac{1000\ g\ Soln}{} \right. = \boxed{980\ g\ H_2O}$$

4) What is the mass of solute in 375 mL of solution if the solution is 85.0% water and the density of the solution is 1.60 g/mL?

15% Solute

$$\frac{15\ g\ Solute}{100\ g\ Soln} \left| \frac{1.60\ g\ Soln}{1\ mL\ Soln} \right| \frac{375\ mL\ Soln}{} = \boxed{90.0\ g\ Solute}$$

5) Calculate the molarity of a 1250 mL solution that contains 225 g of $MgCl_2$.

$$\frac{1\ mol\ MgCl_2}{95.21\ g\ MgCl_2} \left| \frac{225\ g\ MgCl_2}{1250\ mL\ Soln} \right| \frac{1000\ mL\ Soln}{1\ L\ Soln} = \boxed{1.89\ \frac{mol\ MgCl_2}{L\ Soln}}$$

6) Calculate the mass of potassium chloride required to make 0.750 liters of a 2.50 M solution.

$$\frac{74.55\ g\ KCl}{1\ mol\ KCl} \left| \frac{2.5\ mol\ KCl}{1\ L\ Soln} \right| 0.75\ L = \boxed{140\ g\ KCl}$$

7) How many milliliters of a 1.50 M sulfuric acid solution can be made using 49.3 g of sulfuric acid?

$$\frac{1000\ mL\ Soln}{1\ L\ Soln} \left| \frac{1\ L\ Soln}{1.5\ mol\ H_2SO_4} \right| \frac{1\ mol\ H_2SO_4}{98.09\ g\ H_2SO_4} \left| 49.3\ g\ H_2SO_4 = \boxed{335\ mL\ Soln} \right.$$

8) Calculate the molarity of a solution that contains 10.0 g of magnesium hydroxide dissolved in enough water to make 0.500 liters of solution.

$$\frac{1\ mol\ Mg(OH)_2}{58.33\ g\ Mg(OH)_2} \left| \frac{10.0\ g\ Mg(OH)_2}{0.500\ L\ Soln} \right. = \boxed{0.343\ \frac{mol\ Mg(OH)_2}{L\ Soln}}$$

9) What mass of lead (II) nitrate must be used to make 2.00 liters of a 0.100 M lead (II) nitrate solution?

$$\frac{331.22\ g\ Pb(NO_3)_2}{1\ mol\ Pb(NO_3)_2} \left| \frac{0.100\ mol\ Pb(NO_3)_2}{1\ L\ Soln} \right| 2.00\ L\ Soln = \boxed{66.2\ g\ Pb(NO_3)_2}$$