NAME_____ DATE_____

Percent, ppm and ppb calculations:

1. What is the percent concentration of each of the following solutions?
   a. 54.0 g of $AgNO_3$ g is dissolved in 128 g of water.
   b. 4.22 g of K_2CO_3 is dissolved in 426 mL of water.
   c. 0.762 g of ZnF_2 is dissolved in 1.30 liters of water.

2. What is the ppm concentration of the solutions in Question 1?

3. What is the ppb concentration of the solutions in Question 1?

4. What weight of solute is needed to produce each of the indicated solutions?
   a. 500.0 L of a 6.40% NaCl solution.
   b. 450.0 g of a 0.40 ppm NaCl solution.
   c. 50.0 L of a 0.60 ppb NaCl solution.
   d. 136 L of a 14.2% LiNO3 solution.
   e. 42.2 g of a 7.60 ppm AgNO3 solution.
   f. 2.2 mL of a 7.60 ppb AgNO3 solution.

5. How many mL or grams of solution contain the given amount of solute?
   a. 500.0 g of NaCl in a 6.40% NaCl solution.
   b. 450.0 g of NaCl in a 0.40 ppm NaCl solution.
   c. 50.0 g of NaCl in a 0.60 ppb NaCl solution.
   d. 136 g of $LiNO_3$ in a 14.2% (m/v) $LiNO_3$ solution.
   e. 42.2 g of $AgNO_3$ in a 7.60 ppm $AgNO_3$ solution.
   f. 2.2 g of $AgNO_3$ in a 7.60 ppb (m/v) $AgNO_3$ solution.

Molarity and Equivalent calculations:

6. What will be the molarity of a solution prepared by dissolving the indicated solute in enough water to produce the indicated volume of solution?
   a. 15.4 g of $Sr(C_2H_3O_2)_2$ (205.72 g/mol) filled up to 340. mL.
   b. 176.2 g of Fe_2S_3 (207.91 g/mol) filled up to 1.42 liters.
   c. 3.22 g of $CuClO_3$ (147.00 g/mol) filled up to 40.0 liters.

7. How many grams of the following solutes would you need to prepare the indicated volume and concentration of the solutions given?
   a. 340. mL of a 1.82 M $Al(NO_3)_3$ (88.99 g/mol) solution.
   b. 25.0 mL of a 4.26 M KCN (65.11 g/mol) solution.
   c. 370. mL of a 0.00674 M $(NH_4)_2SO_4$ (130.15 g/mol) ammonium sulfate solution.

8. What should the final volume(mL) of each solution be so that the amount of solute dissolved will produce the indicated concentration.
   a. 2.86 g of Cu_2CO_3 (molar mass 187.10 g/mol) to produce a 0.640 M solution.
   b. How many liters of 4 M solution can be made using 100 grams of LiBr (86.84 g/mol)?
   c. How many liters of 0.88 M solution can be made with 25.5 grams of LiF (25.94 g/mol)?

Equivalent Calculations

9. What is the Eq/L for each of the following solutions?
   a. Cu^+ in 0.640 M Cu_2CO_3 (molar mass 187.10 g/mol)
   b. Cl^- in 0.9M NaCl (molar mass 58.44 g/mol)

NAME_____ DATE_____

Combined calculations

10. Calculate the concentrations for the following solutions.
   a. What will be the Na^+ (Eq/L) for 4.20% (m/v) Na_2CO_3 ?
   a. What is the %(m/v) for 0.64M KCl solution?
   b. What is the molarity of a 0.9% NaCl
   c. What is the Eq/L for Na^+ in a 0.9% NaCl solution? (molar mass NaCl 58.44 g/mol)

Dilution calculations ($C_1V_1 = C_2V_2$):

11. What will be the final concentration of the solution indicated that will result from the following dilutions?
   a. 14.0 mL of a 4.20 M Na_2CO_3 solution is diluted to 86.0 mL.
   b. 450. mL of a 1.22 % HCl solution is diluted to 1.26 liters.

12. To what volume should the indicated solution be diluted to produce a solution of the desired concentration?
   a. 12.0 mL of a 0.64 M KCl solution to produce a 0.19 M solution.
   b. 84.2 mL of a 4.60% KMnO4 solution to produce a 1.4% solution.

13. What volume of the indicated solution is needed to produce the volume and concentration of a diluted solution as indicated?
   a. 2.73 M NaOH solution to prepare 142 mL of a 0.540 M solution.
   b. 0.0076 ppm SnF2 solution to prepare 25.0 mL of a 0.00027 ppm solution.