**WORKSHOP 6C: Solution Stoichiometry**   Section _____

Write balanced equations and show calculation setups for all the problems below.

1.   A 1.192 g sample of oxalic acid, $H_2C_2O_4$, is placed in a 100.0 mL volumetric flask and filled to the mark with water. What is the molarity of the solution?

2.   How many grams of sodium dichromate should be added to a 50.0 mL volumetric flask to prepare a 0.025 M sodium dichromate solution when the flask is filled to the mark with water?

3.   A chemist wants to prepare 0.250 M HCl(aq).   Commercial hydrochloric acid   is 12.4 M. How many milliliters of the commercial acid does the chemist require to make up 1.50 L of the dilute acid?

4.   If 35.4 g of aluminum are treated with 721 mL of 5.86 M HCl, how many grams of hydrogen gas will theoretically be formed?

5.   The concentration of hydrogen peroxide in a solution is determined by titrating   a 10.0 mL sample of the solution with permanganate ion under acidic conditions, producing manganese(II) ion and oxygen gas. If it takes 13.5 mL of 0.109 M MnO_4^- solution to reach the equivalence point, what is the molarity of the hydrogen peroxide solution?

6.   A flask contains 49.8 mL of 0.150 M calcium hydroxide solution. How many milliliters of 0.350 M sodium carbonate are required to react completely with the calcium hydroxide?

7.   During the developing process of black and white film, silver bromide is removed from photographic film by the fixer. The major component of the fixer is sodium thiosulfate. What mass of silver bromide can be dissolved by 1.00 L of 0.200 M sodium thiosulfate?

$AgBr(s) + S_2O_3^{-2}(aq) \rightarrow Ag(S_2O_3)_2^{-3}(aq) + Br^-(aq)$ *(unbalanced)*
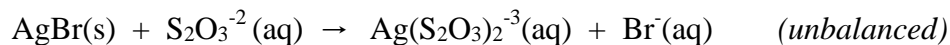
8.   A 3.33 gram sample of iron ore is transformed to a solution of iron(II) sulfate, and this solution is titrated with 0.150 M potassium dichromate. If it required 41.4 mL of potassium dichromate solution to titrate the iron(II) sulfate solution, what is the percentage of iron in the ore?

$$Fe^{+2}(aq) \; + \; Cr_2O_7^{-2}(aq) \; \rightarrow \; Fe^{+3}(aq) + \; Cr^{+3}(aq) \qquad\qquad \textit{(unbalanced)}$$