CHEM 1310 Review: **Reactions, Solutions, & Stoichiometry**

1. Predict the products of the following reactions. Include the phase of each product. If there is no driving force for the reaction, write NR.

a. $Pb(II)(CH_3COO)_2$ (aq) + Na_3PO_4 (aq) ->

b. $AgNO_2$ (aq) + NaCl (aq) ->

c. NH_4OH (aq) + NaCl (aq) ->

d. BaI (aq) + $MgSO_4$ (aq) ->

e. $CaCl_2$ (aq) + NaOH (aq) ->

2. Calcium hydroxide is formed from the reaction of calcium oxide with water. What mass of calcium hydroxide can be produced from a mixture of 25.0 g of calcium oxide and 12.0 g of water? Identify limiting and excess reagents, calculate the mass (in grams) of excess reagent remaining.

3. 92 g of sulfur hexafloride is produced from the reaction of sulfur in excess fluorine. If this corresponds to an 18% yield, what mass of sulfur was used for the reaction? Hint: Determine the theoretical yield of sulfur hexafloride.

$$S\ (s) + 3\ F_2\ (g) \rightarrow SF_6\ (g)$$

4. What is the minimum volume of 1.1 M NaOH that must be reacted with excess chorine gas to yield 2.2 grams of sodium hypochorite?

$$NaOH\ (aq) + Cl_2\ (g) \rightarrow NaClO\ (aq) + NaCl\ (aq) + H_2O\ (l)$$

5. Calcium chloride is reacted with silver nitrate.

a. Write the balanced reaction, and net ionic equations. Include the phase of each product.

b. If exactly 1.4 g of solid is formed, what mass of each reactant was used?

c. Which reactant is limiting?

d. If 2.0 mL of each reactant was used, what are the molarities of the calcium chloride and silver nitrate solutions?

e. If 2.0 mL of 1.2 M silver nitrate is reacted with excess calcium chloride, what is the theoretical yield of the solid product?

6. What is the difference between a strong, a weak, and a nonelectrolyte? Give an example of each.

7. If 100.0 mL of acetic acid is titrated to equilibrium with 10.0 mL of 1 M KOH, what is the concentration (in units of molarity) of the acetic acid solution?