Stoichiometry Review #3

1. When sulfuric acid (H_2SO_4) reacts with sodium hydroxide to form water and sodium sulfate.

    a. Write the balanced chemical equation for the reaction:

    b. What is the mole ratio of sodium hydroxide to sodium sulfate?

    c. What is the mole ratio of H_2SO_4 to sodium sulfate?

2. Zinc reacts with hydrochloric acid to produce zinc chloride and hydrogen gas according to the following equation: $\mathbf{Zn + 2HCl \rightarrow ZnCl_2 + H_2}$

    What is the maximum number of moles of zinc chloride that will be produced when 6.5 moles of hydrochloric acid are reacted with an abundance of zinc metal?

3. Aluminum bromide and potassium sulfate react to form potassium bromide and aluminum sulfate in the following reaction: $\mathbf{2AlBr_3 + 3K_2SO_4 \rightarrow 6KBr + Al_2(SO_4)_3}$

    If 2.5 moles of aluminum bromide are reacted with an excess of potassium sulfate, what is the maximum mass of potassium bromide that will be produced?

4. How many moles of aluminum chloride are needed to produce 63.4 grams of chlorine gas when aluminum chloride decomposes according to the following equation: $\mathbf{2AlCl_3 \rightarrow 2Al + 3Cl_2}$

5. How many grams of water are produced if 12.3 grams of propane (C_3H_8) are reacted with excess oxygen according to the following equation: $\mathbf{C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O}$