Part 1—terminology

_____ is the study of quantity relationships in a chemical reaction. You are always given information about one substance in the reaction and asked for information about another substance. You "make the switch" between the two substances using the _____ ratio. When a reaction is carried out in a laboratory, the amount of product is called the _____ yield. The amount of product expected to be formed based on working the problem out mathematically is called the _____ yield. To calculate the _____ yield, you divide the _____ yield by the _____ yield, and then multiply by 100 percent. When looking at a chemical reaction, the reactant that runs out first is called the _____ reactant, and the reactant that has some left over is called the _____ reactant.

Part 2—problems SHOW ALL WORK!!

1. How many moles of potassium hydroxide are needed to completely react with 3.47 moles of aluminum sulfate according to the following BALANCED equation?

$$6 \ KOH \ + \ Al_2(SO_4)_3 \ \rightarrow \ 2 \ Al(OH)_3 \ + \ 3 \ K_2SO_4$$
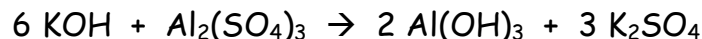
2. Calcium carbonate and sodium chloride react to produce sodium carbonate and calcium chloride according to the following BALANCED equation. How many moles of calcium chloride will be produced if 13.0 g of calcium carbonate are reacted?

$$CaCO_3 \ + \ 2 \ NaCl \ \rightarrow \ Na_2CO_3 \ + \ CaCl_2$$
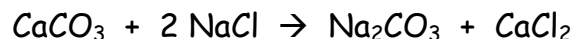
3. When mercury (II) nitrate is heated, it decomposes to form mercury (II) oxide, nitrogen dioxide, and oxygen gas according to the following BALANCED equation. $2\ Hg(NO_3)_2 \rightarrow 2\ HgO + 4\ NO_2 + O_2$

   a. How many grams of mercury (II) oxide will be produced if 27.0 g of mercury (II) nitrate react?

   b. How many moles of oxygen gas will be produced if 3.5 g of nitrogen dioxide are produced?

   c. When 12.0 g of mercury (II) nitrate are decomposed in the lab, it is found that 7.56 g of mercury (II) oxide are produced. What is the actual yield, the theoretical yield, and the percent yield?

4. If 5.6 g of copper (II) oxide are reacted with 8.6 g of hydrogen according to the following BALANCED reaction, how many grams of copper metal will be produced? $CuO + H_2 \rightarrow Cu + H_2$

   The limiting reactant is _____, and the excess reactant is _____.