WS 9.3 **Name:_____p._____**

1. When is it possible to <u>just</u> use a ratio from the balanced equation (for example 6 HCl / 2 Fe) to correctly convert between an amount of reactant and an amount of product? Check all that apply.

_____ When converting from grams of reactant to grams of product.
_____ When converting from molecules of reactant to molecules of product.
_____When converting from molecules of reactant to grams of product.
_____ When converting from grams of reactant to moles of product.
_____ When converting from moles of reactant to moles of product.
_____ When converting from grams of reactant to molecules of product.

2. $Au_2S_3 + 3\ H_2 \text{ -----> } 2\ Au + 3\ H_2S$

a. If 50.0 grams of gold (III) sulfide are allowed to react with 3.82×10^{22} molecules of hydrogen gas, how many moles of gold can be produced?

b. Which substance was the limiting reactant?_____
c. Which substance was the excess reactant?_____

3. $N_{2(g)} + 3\ H_{2(g)} \text{ -------> } 2\ NH_{3(g)}$

a. If 1.20×10^{23} nitrogen molecules react with 2.07 grams of hydrogen, how many grams of ammonia (NH_3) can form?

b. Suppose that only 6.27 grams of product are collected in part (a). Calculate the percent yield for the reaction.

c. What mass of nitrogen would be required to react with 0.669 moles of hydrogen gas?

4. $Au_2S_3 + 3 H_2 \text{ -----> } 2 Au + 3 H_2S$

a. If 0.100 moles of gold (III) sulfide are allowed to react with 3.05 grams of hydrogen gas, what mass of H_2S can be produced?

b. Which substance was the limiting reactant?_____

c. Which substance was the excess reactant?_____

d. Calculate the percent yield, if lab calculations show that 10.3 grams of H_2S were collected.

e. How many moles of gold sulfide would need to react, to produce 1.11×10^{22} atoms of gold?

5. $N_{2(g)} + 2 O_{2(g)} \text{ -------> } 2 NO_{2(g)}$

a. What mass of oxygen must react to make 0.857 moles of nitrogen dioxide?

b. If 5.0 grams of nitrogen are allowed to react with 0.22 moles of oxygen, how many molecules of nitrogen dioxide should form?

c. If you have 0.558 moles of nitrogen, how many moles of nitrogen dioxide would be able to form?