WS 9.3 ***Name:_____p._____***

Thermite Reaction: $Al_{(s)} + Fe_2O_{3(s)} \text{ -----> } Al_2O_{3(s)} + Fe_{(s)} + \text{energy}$

1a. Balance the equation (above).
b. Suppose you are using 10.0 grams of aluminum powder in the reaction.
What mass of Fe_2O_3 powder would be necessary to react with the aluminum?

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. $C_3H_{8\,(g)} + 5\ O_{2(g)} \text{ -------> } 3\ CO_{2(g)} + 4\ H_2O_{\,(g)}$

a. What mass of oxygen gas is necessary to react with 1.20×10^{24} molecules of propane (C_3H_8)?

b. If 50.0 grams of propane (C_3H_8) are allowed to react with 1.48 moles of oxygen, how many molecules of H_2O should form?

c. How many moles of oxygen gas would need to react, in order to produce 0.558 moles of carbon dioxide?