1. $3 \ BaCl_{2 \ (aq)}$ + $2 \ Na_3PO_{4 \ (aq)}$ --------> $Ba_3(PO_4)_{2(s)}$ + $6 \ NaCl_{(aq)}$

a. If 56.3 grams of barium chloride react with excess sodium phosphate, how many grams of barium phosphate should form? Show your answer before and after rounding for significant figures.

b. Learn the formula for % yield: % yield = $\dfrac{\text{actual (lab) value}}{\text{expected (stoichiometry) value}}$ x 100%

c. Suppose that when the reaction in (a) is done in lab, only 53.3 grams of barium phosphate precipitate are actually collected. What was the percent yield for the reaction?

d. What mass of sodium phosphate is needed to produce 0.872 moles of sodium chloride in the reaction?

e. If 1.0 moles of sodium phosphate react, how many moles of barium phosphate will form?

2. $3 \ Cu_{(s)}$ + $8 \ HNO_{3 \ (aq)}$ -------> $3 \ Cu(NO_3)_{2 \ (aq)}$ + $4 \ H_2O_{(l)}$ + $2 \ NO_{(g)}$
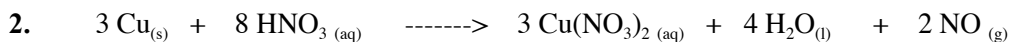
a. If 1.0×10^{22} copper atoms react, what mass of NO gas should form?

b. Suppose that the actual mass of NO collected in (a) is only 0.31 grams. Calculate the % yield.

c. If 10.0 grams of copper react, what mass of water can form in the reaction?

3. $2\ Fe_{(s)}\ +\ 6\ HNO_{3\ (aq)}\ \xrightarrow{\hspace{1cm}}\ 2\ Fe(NO_3)_{3\ (aq)}\ +\ 3\ H_{2(g)}$
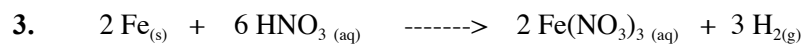
a. How many moles of nitric acid (HNO_3) are needed to react with 0.247 moles of iron?

b. If 15.2 grams of iron react, how many grams of hydrogen gas should form?

c. Suppose that when the reaction in part b (above) occurs, only 0.790 grams of hydrogen are collected. Calculate the % yield.

d. If 0.821 moles of nitric acid (HNO_3) react, how many molecules of hydrogen gas should form?

e. How many moles of nitric acid (HNO_3) are needed to completely react with 1.80×10^{22} atoms of iron?

f. If 0.198 moles of nitric acid (HNO_3) react, how many moles of ferric nitrate should form?