**Name: Period: Seat#:**

**Worksheet #3**

* **Show work and include ALL units.**
* **Do these on binder paper.**
* **Label clearly so I know what I am looking at. Box and label final answers!**
* **Some answers are provided at the end of the problem. They are underlined.**

1. Consider the unbalanced reaction \_\_\_\_\_I2O5(g) + \_\_\_\_\_CO(g) 🡪 \_\_\_\_\_CO2(g) + \_\_\_\_\_I2(g)  
   80.0 grams of iodine(V) oxide, I2O5, reacts with 28.0 grams of carbon monoxide, CO.
2. Determine the mass of iodine I2, which could be produced? *50.7 g*
3. If only 0.160 moles of iodine, I2 was produced, what mass of iodine was produced? *40.6 g*
4. What percentage yield of iodine was produced? *80.1%*
5. Zinc and sulfur react to form zinc sulfide according to the equation. Zn + S 🡪 ZnS

If 25.0 g of zinc and 30.0 g of sulfur are mixed,

1. Which chemical is the limiting reactant? *Zn*
2. How many grams of ZnS will be formed? *37.26 g*
3. How many grams of the excess reactant will remain after the reaction is over? *17.7 g*
4. Mg is ignited in pure oxygen.
   * 1. Which element is in excess when 3.00 grams of Mg is ignited in 2.20 grams of pure oxygen?
     2. What mass is in excess? *0.23 g*
     3. What mass of MgO is formed? *4.97 g*
5. How many grams of Al2S3 are formed when 5.00 grams of Al is heated with 10.0 grams S? *13.91 g*
6. When MoO3 and Zn are heated together they react Zn(s) + MoO3(s) ----------> Mo2O3(s) + ZnO(s)

What mass of ZnO is formed when 20.0 grams of MoO3 is reacted with 10.0 grams of Zn? *12.45 g*

1. Silver nitrate, AgNO3, reacts with ferric chloride, FeCl3, to give silver chloride, AgCl, and ferric nitrate, Fe(NO3)3.   
    In a particular experiment, it was planned to mix a solution containing 25.0 g of AgNO3 with another solution   
    containing 45.0 grams of FeCl3.
   * 1. Write the chemical equation for the reaction.
     2. Which reactant is the limiting reactant? *AgNO3*
     3. What is the maximum number of moles of AgCl that could be obtained from this mixture? *0.147 mol*
     4. What is the maximum number of grams of AgCl that could be obtained? *21.9 g*
     5. How many grams of the reactant in excess will remain after the reaction is over? *37.04 g*
2. Solid calcium carbonate, CaCO3, is able to remove sulphur dioxide from waste gases by the reaction:   
   CaCO3 + SO2 + other reactants ------> CaSO3 + other products

In a particular experiment, 255 g of CaCO3 was exposed to 13.5 g of SO2 in the presence of an excess amount of the other chemicals required for the reaction.

1. What is the theoretical yield of CaSO3? *253.2 g*
2. If only 198 g of CaSO3 was isolated from the products, what was the percentage yield of CaSO3 in this experiment? *78.21%*
3. A research supervisor told a chemist to make 100 g of chlorobenzene from the reaction of benzene with chlorine and to expect a yield no higher that 65%. What is the minimum quantity of benzene that can give 100 g of chlorobenzene if the yield is 65%? The equation for the reaction is: *106.7 g*

C6H6 + Cl2 -----------> C6H5Cl + HCl

benzene chlorobenzene