## Dougherty Valley HS Chemistry Stoichiometry – More Limiting Reagent Stoich Practice

Name:



Period:

Seat#:

- Show work and include ALL units.
- Try to do these limiting reagent problem without the template. Please try doing it WITHOUT looking at the template either! See if you can do it all on your own!
- Do these on binder paper.
- Label clearly so I know what I am looking at. Box and label final answers!
- **1)** Consider the unbalanced reaction  $l_2O_5(g) + CO(g) \rightarrow CO_2(g) + l_2(g)$ 
  - 80.0 grams of iodine(V) oxide,  $I_2O_5$ , reacts with 28.0 grams of carbon monoxide, CO.
    - a) Determine the mass of iodine  $I_2,$  which could be produced?  $50.7 \ g$
    - b) If only 0.160 moles of iodine,  $I_2$  was produced, what mass of iodine was produced? 40.6 g
    - c) What percentage yield of iodine was produced? 80.1%
- 2) Zinc and sulphur react to form zinc sulphide according to the equation.  $Zn + S \rightarrow ZnS$ 
  - If 25.0 g of zinc and 30.0 g of sulphur are mixed,
    - a) Which chemical is the limiting reactant? Zn
    - b) How many grams of ZnS will be formed? 37.26 g
    - c) How many grams of the excess reactant will remain after the reaction is over? 17.7g
- **3)** Mg is ignited in pure oxygen.
  - a) Which element is in excess when 3.00 grams of Mg is ignited in 2.20 grams of pure oxygen?
  - b) What mass is in excess? 0.23 g
  - c) What mass of MgO is formed? 4.97 g
- 4) How many grams of Al<sub>2</sub>S<sub>3</sub> are formed when 5.00 grams of Al is heated with 10.0 grams S? 13.91 g
- 5) When MoO<sub>3</sub> and Zn are heated together they react Zn(s) + MoO<sub>3</sub>(s) -----> Mo<sub>2</sub>O<sub>3</sub>(s) + ZnO(s) What mass of ZnO is formed when 20.0 grams of MoO<sub>3</sub> is reacted with 10.0 grams of Zn? 12.45 g
- 6) Silver nitrate, AgNO<sub>3</sub>, reacts with ferric chloride, FeCl<sub>3</sub>, to give silver chloride, AgCl, and ferric nitrate, Fe(NO<sub>3</sub>)<sub>3</sub>. In a particular experiment, it was planned to mix a solution containing 25.0 g of AgNO<sub>3</sub> with another solution containing 45.0 grams of FeCl<sub>3</sub>.
  - a) Write the chemical equation for the reaction.
  - b) Which reactant is the limiting reactant? AgNO<sub>3</sub>
  - c) What is the maximum number of moles of AgCI that could be obtained from this mixture? 0.147 mol
  - d) What is the maximum number of grams of AgCI that could be obtained? 21.9 g
  - e) How many grams of the reactant in excess will remain after the reaction is over? 37.04 g

7) Solid calcium carbonate, CaCO<sub>3</sub>, is able to remove sulphur dioxide from waste gases by the reaction:

 $CaCO_3 + SO_2$  + other reactants ----->  $CaSO_3$  + other products

In a particular experiment, 255 g of CaCO<sub>3</sub> was exposed to 135 g of SO<sub>2</sub> in the presence of an excess amount of the other chemicals required for the reaction.

- a) What is the theoretical yield of CaSO<sub>3</sub>? 253.2 g
- b) If only 198 g of CaSO<sub>3</sub> was isolated from the products, what was the percentage yield of CaSO<sub>3</sub> in this experiment? 78.21%
- 8) 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

 $C_6H_6 + Cl_2$  ----->  $C_6H_5Cl + HCl$ benzene chlorobenzene