

Name: \_\_\_\_\_

Period: \_\_\_\_\_

Seat#: \_\_\_\_\_

- 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  $\text{I}_2\text{O}_5(\text{g}) + \text{CO}(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{I}_2(\text{g})$   
80.0 grams of iodine(V) oxide,  $\text{I}_2\text{O}_5$ , reacts with 28.0 grams of carbon monoxide, CO.
- Determine the mass of iodine  $\text{I}_2$ , which could be produced? 50.7 g
  - If only 0.160 moles of iodine,  $\text{I}_2$  was produced, what mass of iodine was produced? 40.6 g
  - What percentage yield of iodine was produced? 80.1%
- 2) Zinc and sulfur react to form zinc sulfide according to the equation.  $\text{Zn} + \text{S} \rightarrow \text{ZnS}$   
If 25.0 g of zinc and 30.0 g of sulfur are mixed,
- Which chemical is the limiting reactant? Zn
  - How many grams of ZnS will be formed? 37.26 g
  - How many grams of the excess reactant will remain after the reaction is over? 17.7 g
- 3) Mg is ignited in pure oxygen.
- Which element is in excess when 3.00 grams of Mg is ignited in 2.20 grams of pure oxygen?
  - What mass is in excess? 0.23 g
  - What mass of MgO is formed? 4.97 g
- 4) How many grams of  $\text{Al}_2\text{S}_3$  are formed when 5.00 grams of Al is heated with 10.0 grams S? 13.91 g
- 5) When  $\text{MoO}_3$  and Zn are heated together they react  $\text{Zn}(\text{s}) + \text{MoO}_3(\text{s}) \rightarrow \text{Mo}_2\text{O}_3(\text{s}) + \text{ZnO}(\text{s})$   
What mass of ZnO is formed when 20.0 grams of  $\text{MoO}_3$  is reacted with 10.0 grams of Zn? 12.45 g
- 6) Silver nitrate,  $\text{AgNO}_3$ , reacts with ferric chloride,  $\text{FeCl}_3$ , to give silver chloride,  $\text{AgCl}$ , and ferric nitrate,  $\text{Fe}(\text{NO}_3)_3$ .  
In a particular experiment, it was planned to mix a solution containing 25.0 g of  $\text{AgNO}_3$  with another solution containing 45.0 grams of  $\text{FeCl}_3$ .
- Write the chemical equation for the reaction.
  - Which reactant is the limiting reactant?  $\text{AgNO}_3$
  - What is the maximum number of moles of  $\text{AgCl}$  that could be obtained from this mixture? 0.147 mol
  - What is the maximum number of grams of  $\text{AgCl}$  that could be obtained? 21.9 g
  - How many grams of the reactant in excess will remain after the reaction is over? 37.04 g
- 7) Solid calcium carbonate,  $\text{CaCO}_3$ , is able to remove sulphur dioxide from waste gases by the reaction:  
 $\text{CaCO}_3 + \text{SO}_2 + \text{other reactants} \rightarrow \text{CaSO}_3 + \text{other products}$   
In a particular experiment, 255 g of  $\text{CaCO}_3$  was exposed to 135 g of  $\text{SO}_2$  in the presence of an excess amount of the other chemicals required for the reaction.
- What is the theoretical yield of  $\text{CaSO}_3$ ? 253.2 g
  - If only 198 g of  $\text{CaSO}_3$  was isolated from the products, what was the percentage yield of  $\text{CaSO}_3$  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 than 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

