

Name Zack Lee Date \_\_\_\_\_

**Stoichiometry Review Sheet**  
*Quantitative Chemistry*

For the following problems, be sure to show your work and use significant figures!



a. Balance the equation.

b. How many moles of Cr are needed to react with 2.0 moles  $\text{S}_8$ ?

$$2.0 \text{ mol S}_8 \times \frac{16 \text{ mol Cr}}{3 \text{ mol S}_8} = 11 \text{ mol Cr}$$

c. If 67.0 grams Cr react, how many moles of  $\text{Cr}_2\text{S}_3$  are produced?

$$67.0 \text{ g Cr} \times \frac{1 \text{ mol Cr}}{52.00 \text{ g Cr}} \times \frac{8 \text{ mol Cr}_2\text{S}_3}{16 \text{ mol Cr}} = 0.644 \text{ mol Cr}_2\text{S}_3$$

d. How many grams of  $\text{S}_8$  are needed to produce 10.0 moles of  $\text{Cr}_2\text{S}_3$ ?

$$10.0 \text{ mol Cr}_2\text{S}_3 \times \frac{3 \text{ mol S}_8}{8 \text{ mol Cr}_2\text{S}_3} = 3.75 \text{ mol S}_8$$

e. How many grams of Cr are needed to produce 100. grams of  $\text{Cr}_2\text{S}_3$ ?

$$100. \text{ g Cr}_2\text{S}_3 \times \frac{1 \text{ mol Cr}_2\text{S}_3}{200.19 \text{ g Cr}_2\text{S}_3} \times \frac{16 \text{ mol Cr}}{8 \text{ mol Cr}_2\text{S}_3} \times \frac{52.00 \text{ g Cr}}{1 \text{ mol Cr}} = 52.0 \text{ g Cr}$$

2. 100.0 grams of propane ( $\text{C}_3\text{H}_8$ ) burn in <sup>O<sub>2</sub></sup> oxygen to create carbon dioxide and water vapor.



a. How many grams of carbon dioxide should be produced?

$$100.0 \text{ g C}_3\text{H}_8 \times \frac{1 \text{ mol C}_3\text{H}_8}{44.096 \text{ g C}_3\text{H}_8} \times \frac{3 \text{ mol CO}_2}{1 \text{ mol C}_3\text{H}_8} \times \frac{44.010 \text{ g CO}_2}{1 \text{ mol CO}_2} = 299.4 \text{ g CO}_2$$

b. How many grams of water vapor should be produced?

$$100.0 \text{ g C}_3\text{H}_8 \times \frac{1 \text{ mol C}_3\text{H}_8}{44.096 \text{ g C}_3\text{H}_8} \times \frac{4 \text{ mol H}_2\text{O}}{1 \text{ mol C}_3\text{H}_8} \times \frac{18.015 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 163.4 \text{ g H}_2\text{O}$$

a. If the reaction only produces 289 grams of carbon dioxide, what is the percent yield?

$$\frac{289 \text{ g CO}_2}{299.4 \text{ g CO}_2} \times 100\% = 96.5\%$$



a. Balance the equation.

b. If 4.95 grams Al react with 0.500 moles  $\text{O}_2$ ...

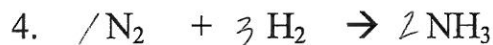
- Determine the limiting reactant. : Al

$$4.95 \text{ g Al} \times \frac{1 \text{ mol Al}}{26.98 \text{ g Al}} \times \frac{2 \text{ mol Al}_2\text{O}_3}{4 \text{ mol Al}} = 0.092 \text{ mol Al}_2\text{O}_3$$

$$0.500 \text{ mol O}_2 \times \frac{2 \text{ mol Al}_2\text{O}_3}{3 \text{ mol O}_2} = 0.333 \text{ mol Al}_2\text{O}_3$$

- What is the excess reactant?  $\text{O}_2$

- How many moles of  $\text{Al}_2\text{O}_3$  are produced? 0.092 mol  $\text{Al}_2\text{O}_3$



a. Balance the equation.

b. If 28 grams of  $\text{N}_2$  react with 14 grams of  $\text{H}_2$ ...

- Determine the limiting reactant.  $\text{N}_2$

$$28 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28 \text{ g N}_2} \times \frac{2 \text{ mol NH}_3}{1 \text{ mol N}_2} = 2.0 \text{ mol NH}_3$$

$$14 \text{ g H}_2 \times \frac{1 \text{ mol H}_2}{2.0 \text{ g H}_2} \times \frac{2 \text{ mol NH}_3}{3 \text{ mol H}_2} = 4.7 \text{ mol NH}_3$$

- How many GRAMS of  $\text{NH}_3$  are produced?

$$2 \text{ mol NH}_3 \times \frac{17 \text{ g NH}_3}{1 \text{ mol NH}_3} = 34 \text{ g NH}_3$$

- How many GRAMS of excess reactant remain?

$$28 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28 \text{ g N}_2} \times \frac{3 \text{ mol H}_2}{1 \text{ mol N}_2} \times \frac{2.0 \text{ g H}_2}{1 \text{ mol H}_2} = 6 \text{ g H}_2$$

$14 \text{ g H}_2 - 6 \text{ g H}_2 = 8 \text{ g H}_2$

5. A student performs a reaction and collects 11.0 grams of the product. She calculates that she should have collected 12.7 grams. What is the percent yield for the reaction?

$$\frac{11.0 \text{ g}}{12.7 \text{ g}} \times 100\% = 86.6\%$$