Name_____Date_____Block_____

Due ☞ Test Day!

Pretest: Unit 9 Stoichiometry

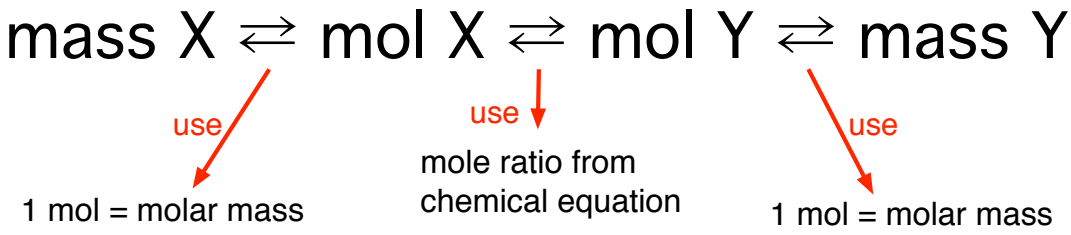
The following is an overview of the concepts, ideas, and problems we have covered in this unit. You are, however, responsible for <u>all</u> material covered, regardless if found here or not! Therefore, be sure to review <u>all</u> your notes, worksheets, assignments, handouts, readings, labs, problems, etc.. On the day of the test you will want to be well-acquainted with the material <u>and</u> organized, you will not want to waste time trying to understand an idea or searching for some needed information. Arrive prepared!

<u>Chapter 9</u>

Be sure to read the <u>chapter summary on Page 304</u> and understand all the vocabulary listed at the bottom of that page:

- stoichiometry
- mole ratio
- mass-mass problems
- limiting reactant
- excess reactant
- percent yield
- actual yield
- theoretical yield

<u>Stoichiometric Calculations</u>



All stoichiometry problems will require a balanced chemical equation and stoichiometric calculations!!

1.) Balance the chemical equation below then use it to answer the following question:

___ C_2H_2 (g) + ___ O_2 (g) ➔ ___ CO_2 (g) + ___ H_2O (l)

a. How many <u>moles</u> of CO_2 can be produced from 4.5 <u>moles</u> of C_2H_2?

b. How many <u>grams</u> of oxygen are needed to make 4.84 <u>moles</u> of water?

c. How many <u>grams</u> of water will be produced from 3.0 <u>moles</u> of C_2H_2?

d. If 3.5 <u>grams</u> of C_2H_2 reacts in excess oxygen, how many <u>grams</u> of CO_2 will be produced?

e. How many <u>grams</u> of carbon dioxide can be produced from 0.635 <u>grams</u> of oxygen?

2.) Upon heating, calcium carbonate decomposes to produce calcium oxide and carbon dioxide. Write a balanced chemical equation for this reaction:

a.) Determine the theoretical yield of CO_2 if 235.0 g of $CaCO_3$ reacts completely.

b.) What is the percent yield of CO_2 if only 97.5 g of CO_2 is actually collected?

3.) 230.0 grams of solid zinc metal is placed in 100.0 grams of hydrochloric acid.

a. Write a balanced chemical equation for this single-replacement reaction.

b. How many grams of hydrogen gas will be produced?

c. What is the limiting reactant? _____.

d. Which reactant is in excess and by how much?

4.) Aqueous solutions containing 10.0 grams of copper(II) nitrate and 10.0 grams of ammonium phosphate are mixed together.

a. Write a complete and balanced chemical equation for this double-replacement reaction.

b. How many grams of copper(II) phosphate will be produced? (Box correct answer!)

c. What is the limiting reactant?_____.

d. Which reactant is in excess and by how much?

5.) Chromium (III) oxide reacts with water and nitrogen to produce ammonium dichromate.

a. Write a complete and balanced chemical equation for this synthesis reaction.

b. How many grams of ammonium dichromate will be produced if 5.00 grams of the chromium (III) oxide is mixed with 5.00 grams of water and an excess of nitrogen? (Box your answer!)

c. What is the limiting reactant?_____.

d. Which reactant is in excess and by how much?

e. What is the percent yield of $(NH_4)_2Cr_2O_7$ if only 7.15 g are produced?

6.) The reaction of sodium peroxide and water produces sodium hydroxide and oxygen gas. The following balanced chemical equation represents the reaction.

$$2Na_2O_2(s) + 2H_2O(l) \rightarrow 4NaOH(s) + O_2(g)$$

a. How many moles of sodium hydroxide are produced when 1.00 mol sodium peroxide reacts with water?

1.00 mol Na_2O_2 X = _____ mol NaOH

b. How many moles of oxygen gas are produced when 0.500 mol Na_2O_2 reacts with water?

0.500 mol Na_2O_2 X = _____ mol O_2

c. How many moles of sodium peroxide are needed to produce 1.00 mol sodium hydroxide?

1.00 mol NaOH X = _____ mol Na_2O_2

d. How many moles of water are required to produce 2.15 mol oxygen gas in this reaction?

2.15 mol O_2 X = _____ mol H_2O

e. How many moles of water are needed for 0.100 mol of sodium peroxide to react completely in this reaction?

0.100 mol Na_2O_2 X = _____ mol H_2O

f. How many moles of oxygen are produced if the reaction produces 0.600 mol sodium hydroxide?

0.600 mol NaOH X = _____ mol O_2

7.) $2NaOH (s) + CO_2 (g) \rightarrow Na_2CO_3 (s) + H_2O (l)$

How many moles of Na_2CO_3 can be produced if 1.85 mol NaOH and 1.00 mol CO_2 are allowed to react?