Stoichiometry: Ch 9 Name:_____

Conversion of Moles: Ch 9.1-9.3 pg 298-306 Period: _____ Row: _____

1. Cookie Recipe: 1 batch = 2 eggs, 0.5 lbs flour, 0.25 lbs butter, 1 lb sugar And other stuff….

a. If I want to make cookies and only have 0.5 lbs of sugar, how many batches can be made?

b. If I have 1 lb of butter and want to use all of it, how many eggs will be needed?

2. You are making 7 batches of cookies for a bake sale. A single recipe calls for 2.5 cups of flour. If you have a full 5 lb. bag of flour in the pantry, do you have enough flour to complete the job? Explain why or why not. Show all work. *Given conversion factor: 4 cups flour = 1 lb flour*

3. You are making 29 s'mores and have a bag of 32 marshmallows and 2 packages of chocolate bars (6 bars a package) and 38 gram crackers. Do you have enough ingredients? Explain why or why not…If not, what do you have too much of? What do you not have enough of?

- 1 smore = 1 marshmallow +2 gram crackers, + ½ chocolate bar)

3. In the above problem, in relating it to chemistry…

1. what is/are your reactant(s): _____
2. what is/are your product(s): _____

4. Balance the following reaction: ___ Al + ___ O_2 → ___ Al_2O_3

a. What are the reactant(s)? _____ b. What are the product(s)? _____

3. Write 3 mole ratios for this reaction.

d. How many moles of Aluminum are needed to form 4.5 moles of Aluminum Oxide?

5. In the below equations, carbon dioxide exhaled by astronauts can be removed by its reaction with lithium hydroxide. How many moles of lithium hydroxide are required to reaction with 10 mole CO_2? $CO_{2\,(g)} + 2LiOH_{(s)} \rightarrow Li_2CO_{3\,(s)} + H_2O_{(l)}$

6. How many moles of ammonia are produced when 0.80 moles of nitrogen reacts with hydrogen?
$N_{2\,(g)} + 3H_{2(g)} \rightarrow 2NH_{3\,(g)}$

7. Write the **balanced** chemical reaction for showing the single replacement reaction of solid Magnesium with Hydrochloric acid (HCl).

8. In the above problem…

a. If you have 2 "parts" magnesium and 4 "parts" hydrochloric acid, how many "parts" of hydrogen gas can be made? _____

b. Would you be able to produce 2 "parts" of magnesium chloride if you had 2 "parts" hydrochloric acid? Why or why not?

Conversion of Amounts in Moles to Mass: pg 306-311: Solve. Show all work to receive full credit.

9. When magnesium burns air, it combines with oxygen to form MgO: $2Mg + O_2 \rightarrow 2MgO$. What mass in grams of magnesium oxide (MgO) is produced from 2.00mol of magnesium?

10. The first step in industrial manufacture of nitric acid is the catalytic oxidation of ammonia.
$4NH_{3\,(g)} + 5O_{2\,(g)} \rightarrow 4NO_{\,(g)} + 6H_2O_{(g)}$ If the reaction is run using 625 g NH_3 and excess oxygen:

a. How many moles of NO are formed?

b. How many moles of H_2O are formed?

11. Chlorine is used by textile manufacturers to bleach cloth. Excess chlorine is destroyed by its reaction with sodium thiosulfate, $Na_2S_2O_3$ in the following reaction:

$Na_2S_2O_3(aq) + 4Cl_2(g) + 5H_2O(aq) \rightarrow 2NaHSO_4(aq) + 8HCl(aq)$

a. How many grams of $Na_2S_2O_3$ are needed to react with 0.12 mol of Cl_2?

b. How many grams of HCl can form from 0.12 mol of Cl_2?

c. How many grams of H_2O are required for the reaction of 0.12 mol of Cl_2?

d. How many moles of H_2O react if 0.24 mol HCl is formed?

12. The incandescent white of a fireworks display is caused by the reaction of pure solid, elemental phosphorous with O_2 to give P_4O_{10}.

a. Write the <u>balanced</u> chemical equation for the reaction.

b. How many grams of O_2 are needed to combine with 6.850 g of P?

c. How many grams of P_4O_{10} can be made from 8.129 g of O_2?

d. How many grams P are needed to make 7.460 g P_4O_{10}?

13. When copper metal is added to silver nitrate in solution, silver metal and copper(II) nitrate are produced. What mass of silver is produced from 100. g Cu?

14. What mass of aluminum is produced by the decomposition of 5.00 kg of Al_2O_3?