Name: _____ **Date:** _____ **Per:____**

Chemistry - Stoichiometry Lab Alternative Assignment   <u>**Total: 16/20 = max score possible**</u>

Please use the Stoichiometry Limiting Lab Document to help you with this assignment. You must show all work to receive credit.

1. Define Theoretical Yield:

2. Define Actual Yield:

3. What is the equation for determining percent yield?

4. What is the equation used to determine Absolute Error?

5. What is the equation used to determine Percent Error?

6. In the reaction between CO and Fe_3O_4, the theoretical yield in an experiment is calculated to be 47.2 g Fe. When a careless chemistry student carries out the experiment, the actual yield is 28.5 g Fe. Calculate the percentage yield.
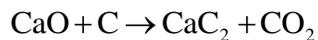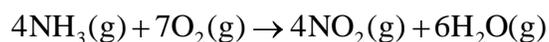
7. Determine the mass of CO_2 produced when 64.2 g of CaO is reacted with 50.0 g of C according to the unbalanced equation

$$CaO + C \rightarrow CaC_2 + CO_2$$

8. Ammonia reacts with oxygen to form nitrogen dioxide and water according to the following equation:

$$4NH_3(g) + 7O_2(g) \rightarrow 4NO_2(g) + 6H_2O(g)$$

You react ammonia and oxygen, and at the end of the experiment you find that you produced 40.0 g of water and have 8.52 g of ammonia left over. Determine the mass of oxygen reacted.
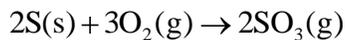
9. For the reaction

$$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$$

37.5 g solid $CaCO_3$ is mixed with 51.6 g HCl. What number of grams of CO_2 will be produced?

10. For the reaction

$$2Cl_2(g) + 4NaOH(aq) \rightarrow 3NaCl(aq) + NaClO_2(aq) + 2H_2O(l)$$

11.9 g Cl_2 is reacted with 10.8 g NaOH. How many moles of NaCl are produced?

11. For the reaction

$$2S(s) + 3O_2(g) \rightarrow 2SO_3(g)$$

if 5.26 g of S is reacted with 10.0 g of O_2, how many grams of SO_3 will be produced?

12. Sodium and water react according to the equation

$$2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$$
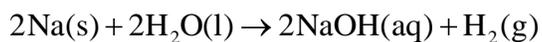
What number of moles of H_2 will be produced when 4.0 mol Na is added to 3.1 mol H_2O?

13. You react 25.0 g hydrogen gas with 51.9 g oxygen gas. Determine the mass of water that can be produced from these reactants.

14. Consider the following reaction: $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$
    How many grams of steam must react to produce 367. g of Fe_3O_4?

15. You react 22.7 g of nitrogen gas with 22.7 g of hydrogen gas. Determine the mass of ammonia that can be produced from these two reactants.

Use the following to answer questions 16-19:

Lead(II) nitrate reacts with sodium iodide.   Create the balanced chemical equation for this reaction.

16. If I start with 20.0 grams of lead(II) nitrate and mix it with 15.0 grams of sodium iodide, how many grams of sodium nitrate can be formed?

17. If I start with 10.0 grams of lead(II) nitrate and mix it with 10.0 grams of sodium iodide, which reactant is limiting?

18. If I start with 15.0 grams of lead(II) nitrate and mix it with 15.0 grams of sodium iodide, how many grams of excess reactant do I have left over?

19. If I start with 30.0 grams of lead(II) nitrate and mix it with 25.0 grams of sodium iodide, determine the actual yield of solid product if my percent yield is 85% ? (ignore significant figures)

20. 20.0 g of hydrogen gas reacts with 20.0 g of oxygen gas in a balloon.   Which best describes what is in the balloon after the reaction is complete?