Honors Unit 6 Review

Name_____

1. Define the following:
   a. Molar mass
   b. Mole
   c. Mole ratio
   d. Molecular formula
   e. Empirical formula
   f. Limiting reagent
   g. Excess reagent
   h. Theoretical yield
   i. Actual yield
   j. Percent yield
   k. Molarity

Stoichiometry: Moles to Moles , Mass to Mass

Use the following equation for problems 2-5.

$2Al + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 3H_2$

2. Write 6 mole ratios that can be derived from the above equation.
3. If you have 5 mole of Al, how many moles of hydrogen can you produce?
4. If you have 95 g of H_2SO_4, how many moles of Al do you need to react fully?
5. How many grams of $Al_2(SO_4)_3$ would be produced from 13.6 g of Al?

Stoichiometry: Limiting Reagents and Percent Yield

6. The burning of 18.0 g of methane produces 55.0 g of carbon dioxide. What is the theoretical yield of CO_2? What is the percent yield?
   $CH_4 + 2\ O_2 \rightarrow CO_2 + 2H_2O$

7. Calculate the mass of water produced from the reaction of 24.0 g of H_2 and 160.0g of O_2. What is the limiting reagent? How much of the excess reagent is left over?

   $2\ H_2 + O_2 \rightarrow 2\ H_2O$

8. What is the limiting reagent when 49.84 g of nitrogen react with 10.7 g of hydrogen to make ammonia?

   $N_2 + 3H_2 \rightarrow 2NH_3$

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Molarity and Dilutions

9. How many moles of P_2O_5 are present in 75 mL of a 4 M solution?

10. What is the molarity of a solution made from 55 g of KNO_3 diluted to 500 mL?

11. If you have a stock solution of H_2SO_4 that is 18M and you want 275 mL of a 3 M solution of H_2SO_4, how much of the stock solution would need to use?

12. How many mL would you need of 2 M HCl solution to get 3.5 g of $BaCl_2$ from the following reaction:

$$Ba(OH)_2 + 2HCl \rightarrow BaCl_2 + 2H_2O$$

13. If 36.0 ml. of H3PO4 react exactly with 80.0 ml. of 0.500 M NaOH, what is the concentration of the phosphoric acid?

14. Throwing some scrap iron in a gold (III) nitrate solution causes the gold metal to precipitate. How much 0.50 M gold nitrate solution would react with 224 grams of iron metal? (Iron (II) nitrate and gold metal are the products)