

Unit 4 Study Guide, Hon

1. Define:
 - a. Chemical Equation
 - b. Catalyst
 - c. Endothermic
 - d. Exothermic
 - e. Molar Mass
 - f. Formula Mass
 - g. Percentage Composition
 - h. Empirical Formula
 - i. Word Equation
 - j. Activity Series
 - k. Mole Ratio
 - l. Limiting Reactant
 - m. Excess Reactant
 - n. Theoretical Yield
 - o. Actual Yield
 - p. Percentage Yield

2. Describe the five types of reactions learned in class.

3. Describe the steps to balance an equation, use a minimum of four steps.

4. What if the difference between coefficients and subsets?

5. Describe at least five different indications of a chemical reaction.

6. How does a chemist denote liquid, solid, gas, and aqueous.

7. In a chemical reaction, _____ yields (\rightarrow) _____.

8. Convert 15.0 g of potassium dichromate, $K_2Cr_2O_7$ into moles. (The molar mass of $K_2Cr_2O_7$ is 294.2 g.)

9. Write the following word formula in equation form:
 - a. aluminum sulfate and calcium hydroxide produces aluminum hydroxide and calcium sulfate
 - b. iron and oxygen produces iron(II) oxide
 - c. calcium oxide and water produces calcium hydroxide

10. Write the following equation formulas in word form:
 - a. $Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$
 - b. $NH_4NO_2 \rightarrow N_2 + 2H_2O$
 - c. $2HCl(aq) + Cr(s) \rightarrow H_2(g) + CrCl_2(aq)$

11. Balance the following equations
 - a. _____ Na + _____ HCl \rightarrow _____ H_2 + _____ NaCl
 - b. _____ $Fe_2(SO_4)_3$ + _____ KOH \rightarrow _____ K_2SO_4 + _____ $Fe(OH)_3$
 - c. _____ H_2SO_4 + _____ HI \rightarrow _____ H_2S + _____ I_2 + _____ H_2O

12. Predict the following reactions, make sure they can exist. If not, state NR and support why.
 - a. _____ $PBr_3 \rightarrow$
 - b. _____ HBr + _____ Fe \rightarrow
 - c. _____ $KMnO_4$ + _____ $ZnCl_2 \rightarrow$
 - d. _____ MnO_2 + _____ $Sn(OH)_4 \rightarrow$
 - e. _____ O_2 + _____ $C_5H_{12}O_2 \rightarrow$

13. Using the reaction $2C_3H_6 + 9O_2 \rightarrow 6CO_2 + 6H_2O$.
 - a. What is the mole ratio of Oxygen to Water?
 - b. What is the mole ratio of C_3H_6 to H_2O ?

14. What is the molar mass of tetraethyl lead, $\text{Pb}(\text{C}_2\text{H}_5)_4$?
15. What is the molar mass of tetraethyl lead, CaCO_3 ?
16. If the molar mass of CuCl_2 is 134.45g/mol, what is the percentage composition of copper in the compound?
17. What is the percentage composition of chloride in CuCl_2 by mass?
18. Write the equation for the reaction of iron (III) phosphate with sodium sulfate to make iron (III) sulfate and sodium phosphate.
- If you perform this reaction with 25 grams of iron (III) phosphate and an excess of sodium sulfate, how many grams of iron (III) sulfate can you make?
 - If 18.5 grams of iron (III) sulfate are actually made when you do this reaction, what is your percent yield?
 - If you do this reaction with 15 grams of sodium sulfate and get a 65.0% yield, how many grams of sodium phosphate will you make?
19. When lead (II) nitrate reacts with sodium iodide, sodium nitrate and lead (II) iodide are formed.

- a. Balance the following equation:



- If I start with 25.0 grams of lead (II) nitrate and 15.0 grams of sodium iodide, how many grams of sodium nitrate can be formed?
- What is the limiting reagent in the reaction described in problem 2?
- How many grams of lead(II) iodide is formed?
- How much of the nonlimiting reagent will be left over from the reaction in problem #2?
- If 6 grams of sodium nit are formed in the reaction described in problem #2, what is the percent yield of this reaction?