

Name: _____

Chem 121
Test 2, Spring 2009
Version A

You have 75 minutes to complete this 100 point test. You may use a scientific calculator.

Part 1: Fill-in the Blank (10 pts) Fill-in the blank with the best answer.

1. _____ is the study of mass relationships in a chemical compound and also the study of the mass of reactants and products in a balanced chemical reaction.
2. If the theoretical yield of a reaction is 29.3g and the actual yield is 18.5g, the percent yield is _____.
3. The numbers used to balance a chemical reaction are referred to as _____.
4. The _____ reactant determines the amount of product formed in a reaction.
5. A _____ is a solid that separates from solution or forms during a reaction.

Part 2: Reactions and Calculations (100 pts) Clearly show all work for credit.

1. (15 pts) Write the complete, ionic and net ionic equations for the reaction of $\text{Mn}(\text{C}_2\text{H}_3\text{O}_2)_2$ with Na_2CO_3

Complete: _____

Ionic: _____

Net Ionic: _____

2. (15 pts) Write the complete, ionic and net ionic equations for the reaction of HBr with $\text{Ca}(\text{OH})_2$.

Complete: _____

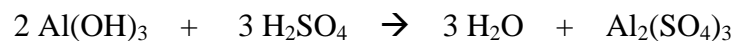
Ionic: _____

Net Ionic: _____

3. (5 pts) Trichlorobenzene is an organic solvent. It has an empirical formula of C_2HCl . What is the molecular formula of trichlorobenzene if its molar mass is 181.44 g/mol?

4. (15 pts) Nicotine, found in tobacco, is 74.03% C, 8.70% H and 17.27% N. What is the empirical formula of nicotine?

5. (15 pts) Aluminum hydroxide reacts with sulfuric acid to form water and aluminum sulfate. What mass of aluminum sulfate is formed if 1.52 g of $\text{Al}(\text{OH})_3$ is allowed to react with 0.250 L of 0.110 M H_2SO_4 ? (MM of $\text{Al}(\text{OH})_3 = 78.00 \text{ g/mol}$, MM of $\text{Al}_2(\text{SO}_4)_3 = 342.14 \text{ g/mol}$)



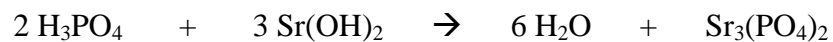
6. (20 pts) One of the newest sweeteners on the market is Splenda. This sweetener contains sucralose, $C_{12}H_{19}Cl_3O_8$.

a. What is the molar mass of sucralose?

b. What mass of sucralose must be dissolved in 250. mL of water to make a 0.100 M sucralose solution?

c. How many molecules of sucralose are there in the mass calculated in 6b?

7. (10 pts) The titration of a 0.155L sample of a H_3PO_4 solution of unknown concentration requires 0.250L of 0.550 M $Sr(OH)_2$ solution to reach the end point. What is the concentration of the unknown H_3PO_4 ?



8. (5pts) What volume of 0.400 M MgSO_4 is needed to make 250.0 mL of 0.125 M MgSO_4 ?

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