Dougherty Valley HS Chemistry
Adv. Chemical Ratios – More Combustion Analysis

Worksheet #11

Name: **Period:** **Seat#:**

Directions: Do these problems on a piece of binder paper. Staple this sheet to the front of your binder paper. Show all work for ANY math problem. Include ALL units. Some answers provided at the end of the question. The answers are underlined.

1) Tartaric acid is the white, powdery substance that coats tart candies such as Sour Patch Kids. Combustion analysis of a 12.01g sample of tartaric acid, which contains only carbon hydrogen and oxygen produces 14.08g CO_2 and 4.32g H_2O. Determine the empirical formula for tartaric acid. *$C_2H_3O_3$*

2) When 1.00 g of a compound containing only carbon and hydrogen is burned completely, 3.14 g of CO_2 and 1.29 g of H_2O is produced. What is the empirical formula? *CH_2*

3) Aniline, a starting compound for urethane plastic foams, consists of C, H, and N. Combustion of such compounds yields CO_2 (carbon dioxide), H_2O (water), and N_2 as products. If the combustion of 9.71 mg of Aniline yields 6.63 mg of H_2O and 1.46 mg of N_2, what is its empirical formula? The molecular weight of Aniline is 93 amu. What is its molecular formula? *Both are C_6H_7N*

4) 0.658 g of a compound containing only carbon, hydrogen, and oxygen is burned in excess O_2. CO_2 (1.285 g) and H_2O (0.658g) are produced. The molar mass of the compound is determined by mass spectrometry to be 90 g/mole. Determine the empirical and molecular formulas. *C_2H_5O, $C_4H_{10}O_2$*

5) When 0.100 mole of a compound of carbon, hydrogen and nitrogen was burned completely in oxygen, 26.4 g of CO_2, 6.30 g of H_2O, and 4.60 g of NO_2 were produced. What is the empirical formula of the compound? *C_6H_7N*

6) The combustion of an 8.23 mg sample of unknown substance gave 9.62 mg of carbon dioxide and 3.94 mg of water. Another sample, weighing 5.32 mg, gave 13.49 mg of silver chloride in a halogen analysis. Determine the percent composition for this organic compound. *31.96% C, 5.36% H, 62.72% Cl*

7) Ethylene glycol (62.07 g/mol) is used as an automobile antifreeze and in the manufacture of polyester fibers. The name glycol steams from the sweet taste of this poisonous compound. Combustion of 6.38 g of ethylene glycol give 9.06 g CO_2 and 5.58 g H_2O. The compound contains only C, H, and O. what are the mass percentages of the elements in ethylene glycol? *38.7% C, 9.79% H, 51.5% O*

8) Researchers used a combustion method to analyze a compound used as an antiknock additive in gasoline. A 9.394 g sample of the compound yielded 31.154 g of carbon dioxide and 7.977 g of water in the combustion. Calculate the percent composition of the compound. C: 90.5%, H: 9.5%