Questions 15 - 18 are based on the following formulas:

A) Al2(SO4)3 B) PCl5 C) CsI D) FePO4

\_\_\_\_\_\_\_\_15. The name of this compound contains a numerical prefix

\_\_\_\_\_\_\_\_16. The name of this substance contains a roman numeral

\_\_\_\_\_\_\_\_17. Of these substances, the one with the highest formula mass.

\_\_\_\_\_\_\_\_18. Of these substances, the one with the highest % of metal ions, by mass.

\_\_\_\_\_\_\_\_19. Sulfur dioxide can be oxidized by the oxygen in the air to form sulfur trioxide

How many grams of oxygen gas are required to convert 32.0 grams of sulfur dioxide to sulfur trioxide? A) 8.00 g B) 16.0 g C) 32.0 g D) 64.0 g

\_\_\_\_\_\_\_\_20) How many oxygen atoms are contained in 2.74 g of Al2(SO4)3? (mm=342)

A) 12 B) 6.02 × 1023 C) 7.22 × 1024 D) 5.79 × 1022

\_\_\_\_\_\_\_\_21) How many moles of sodium carbonate contain 1.773 × 1017 carbon atoms?

A) 5.890 × 10-7 B) 2.945 × 10-7 C) 1.473 × 10-7 D) 8.836 × 10-7

E) 9.817 × 10-8

\_\_\_\_\_\_\_\_22) What is the mass of a sample of nitrogen trichloride that contains the same number of molecules as 220. grams of carbon dioxide? A) 5.00 g B) 60.3 g C) 603 g

D) 6030 g

Problems: Show work!

I. In order to find the density of a U.S. penny, 10 pennies are weighed on an analytic balance. The mass is recorded as 24.672 g . A graduated cylinder is filled with water to a volume of

34.5 mL. The pennies are added to the graduated cylinder, which now reads 37.8 mL.

A. Find the density of the pennies to the correct number of significant figures.

B. Using exactly the same measuring equipment, if the experiment is done with ONE penny, instead of ten, how many significant figures would be reported in the calculated density? Explain your answer.

II. 2352 grams of FeS2 is allowed to react with 1408 grams of O2 according to the following equation.

FeS2 + O2 → Fe2O3 + SO2

A. Balance the equation.

B. Determine the limiting factor in the reaction. (show work)

C. How many grams of Fe2O3 would be produced in this reaction, if there is 100% yield?

D. How many moles, and how many grams of the non-limiting reactant remain after

the reaction occurs?

III. GeF3H is formed from GeH4 and GeF4 in the combination reaction:

GeH4 + 3Ge F4 → 4GeF3H

If the reaction yield is 92.6%, how many moles of GeF4 are needed to produce 8.00 mol of GeF3H?

IV. Combustion of 8.80 grams of an organic compound containing only C , H, and O produces 17.60 grams of CO2 and 7.20 grams of H2O.

A. What is the empirical formula of the compound?

B. If the compound has a molar mass of 88, what is the molecular formula of the compound?

C. How many grams of CO2 would be produced in the combustion of 8.00 moles of this substance?