**Homework #5: Chemistry 1013 Spring 2015**

**Due Friday March 13**

**\_\_\_\_\_/25**

**Your name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Show work for all problems or you will receive no credit**

**5.1.** A sample of octane, C8H18 has a molecular weight=114 g/mol. A combustion scientist has

burned 19 μg of octane in a micro-reactor along with excess oxygen. How many molecules of octane did the scientist react ? Assume 1 mol count=6\*1023

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_octane molecules 3 pts

**5,2**. Circle the just legitimate empiric formulas among the compositions listed below: (2 pts)

a)H2O2 b)C3H9O c) P3H12Cl5 b) C8H18O2 c)N2O6

**5.3.** A sample of a mysterious green compound extracted from a sea slug is found to contain

0.279 g C, 0.168 g N and 0.0581 g H.

a) what is the empiric formula for the green compound ?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_green compound’s empiric formula (3 pts)

b) The molecular weight of the green compound is later found to be 215 g/mol. What is the

actual molecular formula for the green compound ?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ green compound’s molecular formula (2 pts)

**5.4.** A large sample of hydrocarbon CxHy is burned in excess oxygen to produce 176 grams of

CO2 and 36 grams of H2O . Given the molecular weights of CO2 and H2O, 44 and 18 g/mol

respectively, what is the empiric formula for the hydrocarbon ?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ empiric formula for CxHy  (3 pts)

5.5 The molecular formula for the hallucinogenic compound LSD (lysergice diethylamide) is

C20H25N3O, molecular mass 323 g/mol. (10 pts total/2 pts per problem)

a) how many moles of LSD do you have in a sample containing 24 g C ?

\_\_\_\_\_\_\_\_\_\_mol LSD

b) how many grams of O are in 0.5 moles of LSD ?

\_\_\_\_\_\_\_\_ g O

c) how many molecules of LSD do you have in a sample containing 0.0070 g N ?

(Assume 1 mol count =6\*1023. The atomic mass of N=14 g/mol)

\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules LSD

d) How many moles of H are combined with 0.15 g C in LSD ?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mol H

e) How many grams of H are in 12.92 g of LSD ?

\_\_\_\_\_\_\_\_\_\_\_\_ g H