**Quiz 4 Chemical Principles I Chem 1984 Fall 2013**

**Your name: \_\_\_\_\_\_\_\_\_\_answers\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 30 pts**

**Show work or you receive no credit**

1. A compound contains 1.020 g H, 16.325 g S and 32.655 g O. Given that the atomic masses H=1 g/mol, S=32 g/mol and O =16 g/mol, what is the **empiric formula** of the compound ? 5 pts

Elt mass at. wt mol=mass/at. wt =n n/nmin

H 1.020 1 1.02 1.02/0.51=2

S 16.325 32 0.51 0.51/51=1

O 32.655 16 2.04 2.04/0.51=4 Empiric formula=\_H2SO4\_\_\_\_\_\_\_\_\_\_\_

1. A compound containing 26.08% C, 4.35 % H and 69.56% O has a molecular weight of 368 g/mol. What is the **molecular formula** of the compound given the atomic masses: C=12 g/mol, H=1 g/mol and O=16 g/mol. 5 pts

Elt mass at. wt n=mol=mass/at. wt n/nmin

C 26.08 12 2.17 1

H 4.35 1 4.35 2 empiric form.=CH2O2 mol. Wt= 36

O 69.56 16 4.35 2 368/46=8=> C8H16O16 = molecular form.

1. An unknown hydrocarbon Cx Hy is burned in oxygen to make 5.866 g CO2 and 3.600 g H2O. Given that the molecular weight of CO2=44 g/mol and the molecular weight of H2O=18 g/mol, what is the empiric formula of the hydrocarbon ? 5 pts

Mol H2O= 3.6/18=0.2 mol=> 2\*0.2 mol H=0.4 mol H

Mol CO2= 5.866/44 =0.133 = mol C => mol H/mol C=0.4/0.133 =3 empiric formula = CH3

1. A 1.0 g sample of M1O1 is reacted with H2 gas to make 0.3214 g H2O (Molecular weight of H2O=18 g/mol ) . Assuming all the O in the H2O comes from O in MO:
2. How many moles of O are in the 1.0 gram sample of M1O1 ? 4 pts

Mol H2O=mol O=0.3214/18=0.0.01786

Mol O in 1 gram of MO= \_0.01786\_\_\_\_\_\_\_\_\_\_\_

1. How many grams of M are in the 1.0 gram sample of M1O1 ? (1 mol O = 16 g/mol)

Mol O\*16=0.01786\*16=0.2857 g O=> 1-0.2857 = g M=0.7143

Grams M in 1.0 g M1O1 sample\_= \_\_0.7143\_\_\_ 4 pts

1. What element is M ? \_\_\_\_\_Ca\_\_\_\_\_\_\_\_\_ (use Periodic Table on back of this quiz) 5 pts

**0.7143/0.01786~40 g/mol=> Ca**

4) Balance the reactions below: 7 pts total/1 pt per correct coefficient

\_\_1\_C9H20 + \_14\_\_\_O2 🡪 \_\_9\_\_\_\_CO2 + \_10\_\_H2O

\_1\_\_\_ Ca3(PO4)2 + \_\_4\_\_H3PO4 🡪 \_\_3\_\_Ca(H2PO4)2