**Honors Chemistry Assignment Sheet- Unit 7**

**Extra Learning Objectives (beyond regular chem.)**:

* **Assign #1:** Calculate % comp, Empirical Formula, & molecular formula
* **Assign #2 :** Review oxidation numbers, Identify oxidation/ reduction reactions, & label the oxidation state of each

**Assignments Due day of Unit 7 Test**

* Use your textbook & reliable internet resources to learn material
* Answer Keys are posted on the WHS chemistry website (see “important handouts”)

**Honors Assign #1-% Comp, Empirical Formulas, & Molecular Formulas**

* Read each section in your book (shown below), see sample problems, & use reliable internet resources

**Percent Composition** (Pages 226-227 in textbook)

1. Determine the percent composition of each element of the following compounds:
   1. NaCl b. AgNO3

Total :Na= 22.99 + Cl= 35.45 = 58.44g

Na= 22.99 = **39.34%**

58.44

Cl= 35.45 = **60.66%**

58.44

c. Mg(OH)2 total: Mg= 24.31 + O 2 = 32 + H 2 = 2 = 58.31 g

H= 2.02 = **3.46%**

58.31

Mg= 24.31=  **41.67%**

58.31

O= 32 **= 54.87%**

58.31

1. What is the mass of carbon present in 635.45 grams of glucose (C6H12O6)? Molar mass of C6H12O6 = 180.16 g/mol.

**Empirical Formula & Molecular Formulas** (Pages 229-233 in textbook)

*Write the empirical formula for each of the following molecular formulas:*

1. a. N2O4 b.  NO2 c. C2H6

**NO2 Empirical formula = Molecular because \*\* CH3  
it is already reduced.**

d. C3H9 e. H2SO4 f. Hg2(NO3)2

1. Determine the **empirical formula** of a compound containing 63.50% silver, 8.25% nitrogen, and the remainder oxygen.

**Step 1: Turn % comp to moles Step 2: Convert moles to smallest whole # ratios**

= .589/.589 = 1 mol Ag **Step 3: use moles to write formulas**

= .589/.589 = 1 mol N **=AgNO3**

= 1.766/.589 = 3 mol O

|  |  |
| --- | --- |
| Ag= 63.50g | 1mol |
|  | 107.87 |

|  |  |
| --- | --- |
| N= 8.25g | 1mol |
|  | 14.01 |

|  |  |
| --- | --- |
| O= 28.25g | 1mol |
|  | 16g |

1. A sample is analyzed as containing 24.09 grams of potassium, 0.308 moles of manganese, & 7.42 x 1023 atoms of oxygen. What is the **empirical formula**?
2. a. What is the **molecular formula** of the molecule that has an empirical formula of CH2O and a molar mass of 120.12 g/mol?

**Step 1: find the multiplying factor between molecular & empirical**

Molecular formula mass = x

Empirical formula mass

Empirical mass = C + H2 + O = 30.02 (plug into equation)

120.12g = 4 🡪 Multiply all the subscripts by 4 -🡪 4(CH2O) = **C4H8O4**

30.02g

* 1. (Almost same question as above) What is the **molecular formula** of the molecule that has an empirical formula of CH2O and a molar mass of 60.04 g/mol?

60.04 = 2 🡪 2(CH2O) = **C2H4O2**

30.02

This is the same as in the above question, however, this molecular formula is only 2 x’s more than the empirical.

1. (Almost same question as above) What is the **molecular formula** of the molecule that has an empirical formula of CH2O and a molar mass of 30.02 g/mol?

**Since the Empirical formula mass and the Molecular formula mass are equal, this means CH2O is both the Molecular and Empirical formulas.**

1. A sample compound with a formula mass of 34.00 amu is found to consist of .44 g H and 6.92 g O. Find its **molecular formula**.   
   (Hint: even though it’s asking for the molecular formula, you will still need to find the empirical formula first. In the easier problems, like #5, they give you the empirical formula, but here, you’ll have to determine it first)
2. The molar mass of a compound is 92 g/mol. Analysis of a sample of the compound indicates that it contains 31.1 % N and 68.9% O. (error here!) Find its **molecular formula**. (again, you must find the empirical formula first in order to solve)

**Step 1: Empirical Forumla & then mass**

|  |  |
| --- | --- |
| N= 31.1 | 1mol  = 2.21 / 2.21 = 1  Empirical Formula: **NO2**    Empirical Mass: **46g**  = 4.31/ 2.21 = 1.95 🡪 2 |
|  | 14.01g |

|  |  |
| --- | --- |
| O= 68.9 | 1mol |
|  | 16 g |

**Step 2: Determine multiplying factor & multiply by the empirical formula**

92g = 2 🡪 2(NO2) = \*\*  **N2O4** \*\*

1. If 4.04 g of N combine with 11.46 g O to produce a compound with a formula mass of 108.0 amu, what is the **molecular formula** of this compound? (this one’s a bit tricky!)

**Honors Assign #2-Oxidation/ Reduction**

**Part I: Oxidation States (reviewed)** (pg 217 – 218 & Pages 591 in textbook)

* Assign oxidation numbers to each element in the compounds/ Ions below:  
  a. HF b. CI4 c. H2O d. PI3

*H = +1 F= -1*

e. CS2 f. Na2O2  g. H2CO3 h. NO2-

C= +4 S= -2 Na= +1 O= -1H= +1 C= +4 O= -2 N= +3 O= -2

i. SO4-2 j. ClO2- k. N2 l. Fe 3+

**Part II: Oxidation & Reduction**

1. What does it mean when an element has been oxidized? Reduced?

Oxidation= Increase in oxidation state (or loss of electrons thus a mone + charge)

Reduction= Decrease in oxid state ( or gain of electrons, thus a mone – charge)

1. Explain the helpful pneumonic devices “LEO goes GER” & “OIL RIG” for the oxidation/ reduction reactions.

“Oil rig” = Oxidation is loss of electrons

Reduction is gain

“leo says GER” = Lose electrons is oxidation , Gain electrons is reductions

#3   
a. reduction

1. Oxidation
2. Oxidation
3. Reduction
4. Reduction
5. Oxidation
6. Reduction
7. Reduction

#4

1. Redox reaction
2. Redox reaction
3. Not redox
4. Redox reaction
5. Not redox

#5

1. O (-2) is oxidized to O2 (zero)

N (+5) is reduced to N (+1)

1. H2 (zero) is oxidzed to H (+1)

Cu2+ (+2) is reduced to Cu (zero)

d. H2 (zero) is oxidzed to H (+1)

Cl2 (zero) is reduced to Cl (-1)