**COSTAATT**

**CHEM 111 – Concepts in Chemistry I**

**Lesson 5**

**Worksheet 1 – Calculations involving interconversion of mass, moles and no. of atoms or molecules.**

1. How many moles are in 15 grams of lithium?

2. How many grams are in 2.4 moles of sulfur?

3. How many grams are in 4.5 moles of sodium fluoride, NaF?

4. How many moles are in 98.3 grams of aluminum hydroxide, Al(OH)3?

5. How many moles are present in 2.45 x 1023 molecules of CH4?

6. How many grams are there in 7.4 x 1023 molecules of AgNO3?

7. Calculate the number of moles in 42.15g of magnesium carbonate.

8. Calculate the number of atoms in 1.5 mol HCl.

9. Calculate the mass of 1.5 x 1023 formula units of MgSO4.

10. Calculate the number of molecules in 34g of ammonia.

11. Calculate the following:

(RAMs: H = 1; O = 16; Na = 23; Cl = 35.5; Ca = 40; Cu = 64)

(a) The number of moles contained in 37g of calcium hydroxide, Ca(OH)2.

(b) The mass of 0.125 mol of copper (II) oxide, CuO.

12. Work out the mass of the following:

(RAMs: H = 1; C = 12; N = 14; O = 16; Na = 23; Pb = 207)

(a) 1 mole of lead(II) nitrate, Pb(NO3)2

(b) 4.30 moles of methane, CH4

(c) 0.24 moles of sodium carbonate crystals, Na2CO3.10H2O

**COSTAATT**

**CHEM 111– Concepts in Chemistry I**

**Lesson 5**

**Worksheet 2 – Percent Composition, Empirical & Molecular Formulae**

1. Calculate the *percent composition* of all the elements in the following compounds:

(i) Cr2O3 (ii) CuBr2 (iii) NaOH (iv)N2S2

2. Determine the *empirical formula* for each compound described below.

(i) A compound contains 0.0130 mol carbon, 0.0390 mol hydrogen, and 0.0065 mol oxygen.

(ii) A compound consists of 72.2% magnesium and 27.8% nitrogen by mass.

3. Determine the *molecular formula* for each compound described below.

(i) A compound has an empirical formula of NO2 and a molar mass of 92.02 g/mol.

(ii) Ibuprofen, a common headache remedy, has an empirical formula of C7H9O and a molar mass of approximately 215 g/mol.

4. An organic compound contained C – 66.7%, H – 11.1%, O – 22.2% by mass. Its relative formula mass was 72. Find

(a) the empirical formula of the compound

(b) the molecular formula of the compound

(RAMs: H = 1; C = 12; O = 16)