# **GENERAL CHEMISTRY II ASSIGNMENT:**

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**MATRIC NO: 17/MHS01/160**

**COURSE TITLE: GENERAL CHEMISTRY II**

**COURSE CODE: CHEM 102**

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**QUESTION 1:**

**a.**) Where; N= no. of mole of carbon

 H= no. of mole of hydrogen

 For the first formula;

 Subtracting Nitrogen (14) from 105; 105 – 14 = 91

 Dividing by 12; 91/12 = 7.6

 Thus, no. of mole of carbon = 7.

 Multiplying the mole by 12; 7x12 = 84

 Subtracting 84 from 91; 91-84 = 7.

 Thus; no. of mole of Hydrogen = 7.

 Therefore the formula for the molecular ion (m/z) of 105 = C7NH7.

 For the second formula;

 Subtracting Nitrogen (14) from 105; 105 – 14 = 91

 Then subtracting from 16; which is for oxygen; 91 – 16 = 75

 Dividing by 12; 75/12 = 6.3

 Thus, no. of mole of Carbon = 6.

 Multiplying the mole by 12; 6x12 = 72

 Subtracting 72 from 75; 75-72 = 3

 Thus no. of mole of Hydrogen = 3.

 Therefore; the formula for a molecular ion (m/z) of 105 = C6NH30.

 Thus; the possible formulas for a molecular ion (m/z) of 105 are; C7NH7 and C6NH30.

**b.)** **Importance of Organic Compounds include;**

 i.) Organic Compounds have versatile bonding patterns and are parts of all organisms.

 ii.) Organic Compounds are important because all living organisms (redundant) contain carbon.

 iii.) It is important because it is the study of life and all of the chemical reactions related to life.

 iv.) It plays a part in development of common household chemicals, food, plastics, drugs, fuels.

 v.) In terms of food; it provides carbohydrate, protein, fats, vitamins, enzymes.

**c.) Differences between Homocyclic and Heterocyclic compounds include;**

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| **HOMOCYCLIC COMPOUNDS** | **HETEROCYCLIC COMPOUNDS** |
| **i.)** It is made up of carbon atoms only. | It is made up of more than one kind of atoms. |
| **ii.)** They are cyclic compounds having atoms of the same elements as ring members. | They have atoms of different elements as ring members including carbon atoms. |
| **iii.)** Ring contains atoms of the same elements. | Ring contains atoms of different elements. |
| **iv.)** Contains atoms of the same elements bonded to each other forming a ring. | Contains atoms of at least two different elements bonded to each other forming a ring. |
| **v.)** Examples include; benzene, cyclohexane, toluene, cyclohexanol, etc | Examples include; pyran, azocine, thiocane, etc |
|  |  |

**QUESTION 2:**

**a.)** Rf = Distance moved by substance

Distance moved by solvent

 Solvent = 12.2cm

 Substance distances = 2.4cm, 5.6cm, 8.9cm

 **i.)** Rf = 2.4cm

 12.2cm

 = 0.19.

 **ii.)** Rf = 5.6cm

 12.2cm

 = 0.46.

 **iii.)** Rf = 8.9cm

 12.2cm

 = 0.73.

**b.)** For test A; the family of the Organic Compound in which it belongs to is Aldehydes.

 For test B; the family of the Organic Compounds in which it belongs to is Alkenes.

**c.)** 2, 4-Dinitrophenylhydrazine test is employed for qualitatively detect the carbonyl functionality of a ketone or aldehyde functional group. It is also employed as evidence towards the identification of the original compound.

**d.) The functional groups with its examples include;**

 **i.)** Hydroxyl- examples include; Alcohol and Carboxylic acid molecules.

 **ii.)** Carbonyl- examples include; Ketones and Esters.

**iii.)** Carboxyl- examples include; Carboxylic acids and Aldehydes.

**iv.)** Amino- examples include; Alkyl group and Nitrogen.

 **v.)** Thiol- examples include; Hydroxyl group and amino acid cysteine.

**vi.)** Phosphate- examples include; structural unit of DNA and RNA and electron transfer component of energy rich molecule such as ATP.

**vii.)** Aldehyde- examples include; Alkyl group and Hydrogen atom.