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**DEPARTMENT: MEDICINE AND SURGERY**

**COURSE: GENERAL CHEMISTRY II**

**MATRIC NUMBER: 17/MHS01/051**

ASSIGNMENT

1a. Provide formula for the molecular ion (m/z) of 105

1. Molecular ion =105

SOLUTION

STEP 1: It contains at least one N

N=14

105-14=91

STEP 2: Determine the maximum number of C’s

91/12= 7.5

STEP 3: Add enough H’s to make up the rest of the mass

C₇NH?

7H’s gives C₇NH₇

7X12=84

1X14=14

105-(84+14) =7

From the formula

(2(7.5)+2-7)/2 = 5

STEP 4: Add an O atom

C₇NH₇=C₆NOH₃

(2(6.5)+2-3)/2 = 6

1. IMPORTANCE OF ORGANIC COMPOUNDS

1.In nuclei acids

Nuclei acids are essential biopolymers for all life forms (DNA is included in this category). They are composed of many elements but mainly coal and hydrogen, although there are also oxygen atoms in sugar.

 Nuclei acids are the most important of all biomolecules. They are found in abundance in all living things, where their function is to create and encode. Then store information in the nucleus of all living organisms on earth.

2. In carbohydrates

A carbohydrate is a biological molecule consisting of carbon, hydrogen and oxygen. In biochemistry, the term is synonymous with a group of elements that may include sugars, celluloses and starch.

 Carbohydrates play an important role in living organisms. Polysaccharides serve to store energy and as structural components in plants and anthropods. Many other biomolecules play primordial roles in the immune system , in fertilization, in blood clotting, and in the prevention of pathogenesis.

3. As the basis of food

Food materials are created from carbon compounds via carbohydrates, proteins, and fats. All the food we consume is reconstituted material and extracts of plants or animals. Organic molecules make up a large portion of the human diet and are found in all food consumed by an imdividual. It requires a large number of organic molecules needed to keep cells and tissues healthy.

4. In lipids

A lipid is a term used to define substances of biological origin that are soluble in solvents. It consists of a group of molecules that occur in nature like fats, waxes,sterols, monoglycerides and triglycerides, among others. The main functions of lipids include storing energy, signalling lipid and acting as a structural component of cell membranes. Lipids also have applications in the cosmetics industry and in the food industry, as well as nanotechnology.

5. In metabolism

The three main purposes of mrtabolism are energy/fuel conversion as energy for cellular processes, energy/fuel conversion to build blocks for protein, lipids, nuclei acids, and some carbohydrates, as well as the elimination of nitrogenous waste. These reactions allow organisms to grow and reproduce, maintain their structures, and respond to the environment.

6. In proteins

One type of organic molecule that must be present in every human’s diet is protin. Proteins are composed of chains of organic molecules called amino acids. Protein is important in a diet to provide a source of amino acids – protein is broken down inside the stomach and intestines – and the amino acids that make up the diet protein are absorbed inside the body and are used to make their own proteins.

7.Hydrocarbons

Hydrocarbons are organic compounds that are made up entirely of hydrogen and carbon. Hydrocarbons are the primary source of energy for most civilizations today. The prominent use of hydrocarbons is as a source of fuel. In their solid form hydrocarbons can take the form of asphalt.

1. DIFFERENTIATE BETWEEN HOMOCYCLIC AND HETEROCYCLIC COMPOUNDS

Homocyclic compounds are cyclic compounds having atoms of the same elememt as ring members.

Heterocyclic compounds are cyclic compounds having atoms of the different element as ring members including carbon atoms.

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| HOMOCYCLIC COMPOUNDS | HETEROCYCLIC COMPOUNDS |
| Homocyclic compounds are cyclic compounds having atoms of the same element as ring members. | Heterocyclic compounds are cyclic compounds having atoms of the different elements as ring members including carbon atoms. |
| Ring contains atoms of the same element. | Ring contains atoms of different elements. |
| Contain atoms of the same element bonded to each other forming a ring. | Contain atoms of at least two different elements bonded to each other forming a ring. |
| Examples include benzene, cyclohexane, toluene, cyclohexanol, etc. | Examples include pyran, azocine, thiocane, etc. |

2a. Distance of the solvent front=12.2cm

 Distance moved by first band=2.4cm

 Retardation factor Rf= distance moved by substance/distance moved by solvent front

Retardation factor of first band= 2.4cm/12.2cm

 =0.20

 Distance moved by second band=5.6cm

 Retardation factor of second band=5.6cm/12.2cm

 =0.50

 Distance moved by third band=8.9cm/12.2cm

 =0.73

b. Organic compound A that gives a positive test result (dark grey precipitate) to Tollens test is **ALDEHYDES.**

 Organic compound B that decolourizes bromine water is **ALKENES**

c. 2,4-Dinitrophenylhydrazine test is employed for **Aldehydes and Ketones.**

d. Some functional groups of organic compounds with examples

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| Organic compounds | Functional group | Examples  |
| 1. Alkenes
 | RH | CH₄-methaneC₂H₆-Propane |
| 1. Alkenes
 | RR’ | CH₂=CH₂-PropeneCH₃CH₂=CH₂CH₃-Butene |
| 1. Haloalkane/Alkyl halides
 | RX | CHCl₃-chloroformCH₂Cl₂-dichloromethane |
| 1. Alkanols/Alcohol
 | ROH | CH₃OH-MethanolC₂H₅OH-Ethanol |
| 1. Aldehyde
 | RCOH | CH₃CHO-EthanalCH₃CH₂CHO-Propanal |
| 1. Carboxylic acid/Alkanoic acid
 | RCOOH | CH₃COOH-Ethanoic acidHCOOH-Formic acid |
| 1. Alkanones
 | RCOR’ | Propanone5-octyne-3-one |