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**COURSE: CHM102**

**DEPARTMENT: MEDICAL LABORATORY SCIENCE**

**COLLEGE: MEDICAL AND HEALTH SCIENCES**

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**SOLUTION TO ASSIGNMENT**

1. Step 1 – If the mass of the molecular ion is odd it contains at least one N.

N = 14 amu 105 – 14 = 91

Step 2 – Determine max # C’s

91/12 = 7.5 C7NH?

Step 3 – Add enough H’s to make up the rest of the mass.

C7NH? 7 H’s gives C7NH7. Using the formula

 IHD= $\frac{2N+2-M}{2}$

 7 x 12 = 84 (2(7.5) + 2 – 7)/2 = 5

1 x 14 = 14

105 – (84 + 14) = 7

Step 4 – Add an O atom.

C7NH7 ⇒ C6NOH3

(2(6.5) + 2 – 3)/2 = 6

1. **IMPORTANCE OF ORANIC COMPOUNDS**
* **In nucleic acids**

Nucleic 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 their sugars. Nucleic 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, and then to store information in the nucleus of all living cells of all living organisms on Earth.

* **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 arthropods, for example. A type of saccharide is important in the molecules that make up the DNA. In general, saccharides and their derivatives include many other important biomolecules that play primordial roles in the immune system, in fertilization, in blood clotting, and in the prevention of pathogenesis.

* **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 individual.

It requires a large number of organic molecules needed to keep cells and tissues healthy.

* **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, signaling lipid and acting as a structural component of cell membranes. Lipids have applications in the cosmetics industry and in the food industry, as well as nanotechnology.

* **In metabolism**

 The three main purposes of metabolism are energy / fuel conversion as energy for cellular processes, energy / fuel conversion to build blocks for proteins, lipids, nucleic 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.

 Metabolism is usually divided into two categories: catabolism, which is the decomposition of organic matter and the breakdown of glucose by cellular respiration; And in anabolism, which is the construction of components of cells such as proteins and nucleic acids.

* **In proteins**

 One type of organic molecule that must be present in every human's diet is protein. Proteins are omposed of chains of organic molecules called amino acids. The human body uses a combination of 20 different types of amino acids, arranged in specific sequences to make thousands of unique human proteins present in cells and tissues. 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 .

* **Hydrocarbons**

 Hydrocarbons are organic compounds that are made up entirely of hydrogen and carbon. There are many different types of hydrocarbons such as methane, ethane, propane, pentane and octane, among others. Most of the hydrocarbons found on Earth occur naturally in the Crude oil , Where the decomposed organic matter provides an abundance of coal and hydrogen, which, when joined, can be chained to form unlimited chains.

 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.. Some arthropods, such as the Brazilian bee, use particular hydrocarbon smells to differentiate members of their family.

1. **DIFFERENCES BETWEEN HOMOCYCLIC AND HETEROCYCLIC**

|  |  |  |
| --- | --- | --- |
| 1.2.3. | HOMOCYCLIC COMPOUNDS | HETEROCYCLIC COMPOUNDS |
| Homocyclic Compound ring contains only one types of atomHomocyclic Compounds have 100% carbon atoms in their ring. Examples Phenol, Toluene, Naphthalene, and Anthracene | Heterocyclic Compound ring contains at least two different types of atoms including carbon.Heterocyclic Compounds have mainly carbon and, in addition, heteroatoms such as nitrogen, oxygen, and sulphur are found in their ring.Tetrahydrofuran, Piperidine, Pyridine, Furan, and Pyrrole |

1. Retardation factor =$ \frac{distance moved by substance}{distance moved by solvent front}$

 Solvent front = 12.2cm

RF1 = $\frac{2.4CM}{12.2CM}$ = 0.20

RF2 = $\frac{5.6CM}{12.2CM}$ = 0.46

RF3 = $\frac{8.9CM}{12.2CM}$ = 0.73

1. **A** which uses tollens test to give a positive test result belongs to **Aldehydes.**

**B** which decolorizes bromine water belongs to **Alkenes.**

1. 2,4-Dintrophenylhydrazine test is employed for **ALDEHYDES AND KETONES.**
2. FUNCTIONAL GROUPS AND EXAMPLES
* **ALKANE – METHANE, ETHANE.**
* **ALKENE - ETHENE, PROPENE.**
* **ALDEHYDE – METHANAL, ETHANAL.**
* **KETONE – PROPANONE, BUTANONE.**
* **ESTER – ETHYL ETHANOATE, PROPYL ACETATE.**
* **ETHER – DIMETHYLETHER, DIPROPYLETHER.**
* **HALIDE – BROMOETHANE, METHYLBROMIDE.**