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**MATRIC NUMBER: 17/MHS01/314**

**COURSE: CHM 102**

1a.

For the first possible formula;

 If there is nitrogen, 105-14 = 91

 $\frac{91}{12}=7.54$

 Thus, there are 7 carbon atoms

 91-(12\*7) = 7

 The formula is C7NH7

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

 Where N is the number of carbon atoms

 M is the number of hydrogen atom

$⟹$IHD = $\frac{\left(2\*7\right)+2-7}{2}=$

For the second possible formula;

 If there is nitrogen, 105 – 14 = 91

 And for oxygen, 91- 16 = 75

 $\frac{75}{12}=6.25$

 Thus, there are 6 carbon atoms

 75- (12\*6) = 3

 The formula is C6NH3O

For a third possible formula;

 Number of carbon atoms, $\frac{105}{12}=8.75$

 Thus there are 8 carbon atoms

 105- (12\*8) = 9

 The formula is C8H9

1b. Importance of Organic compounds:

1. They are useful in lipids; these are substances of biological origin and are soluble in solvents. Lipids help store energy, signal lipids and act as a structural component of cell membranes. Lipids are also useful in the cosmetic, food and nanotechnology industry.
2. They are useful in nucleic acids. Nucleic acids are the most important of all biomolecules. They create and encode, and then store information in the nucleus of all living cells of all living organisms on Earth.
3. They are used in metabolism; with the main purposes of fuel conversion ass energy for cellular purposes, fuel conversion to build blocks for proteins, lipids, nucleic acids, and carbohydrate, as well as elimination of nitrogenous wastes.
4. They are used as hydrocarbons. Hydrocarbons are the primary source of energy for most civilizations today. Also used by some arthropods to differentiate members of their family by their smells.
5. They are used in proteins. Proteins are composed of amino acids; when arranged in specific sequences these make thousands of unique human proteins present inhuman cells and tissues.
6. They are used in carbohydrates. Carbohydrates play an important role in living organisms. Such as, polysaccharides store energy, a saccharide is important in the molecules that make up the DNA.

1c. Difference between heterocyclic and homocyclic compounds

|  |  |
| --- | --- |
| HETEROCYCLIC | HOMOCYCLIC |
| Cyclic compound that contains different atoms as ring members | Cyclic compound that contains the same atoms as ring members. |
| Atoms of different elements are found in the ring. | Atoms of only the same elements are found in the ring. |
| e.g. Pran, Azocibe, Thiocane, e.t.c. | e.g. Benzene, Toluene, cyclohexane, e.t.c. |

2a. Rf = $\frac{dist. of sustance}{dist. of solvent front}$

 Dist. of solvent front =12.2 cm

Rf with sub. dist. at 2.4cm

 Rf = $\frac{2.4}{12.2}=0.197$

Rf with sub. dist. at 5.6cm

 Rf = $\frac{5.6}{12.2}=0.459$

Rf with sub. dist. at 8.9cm

 Rf = $\frac{8.9}{12.2}=0.736$

2b. A is an aldehyde

 B is an alkyne or alkene

2c. Test for ketones or aldehyde

2d.

1. Alkyl halides e.g. CH3Cl, C2H5Br
2. Ketone e.g. CH3COC2H5, CH3COCH3
3. Aldehyde e.g. C2H5CH0, C4H9CHO
4. Ester e.g. CH3COOC2H5, C4H9COOCH3
5. Alcohol e.g. C2H5OH, C5H11OH
6. Amine e.g. C2H5CNH2, C4H9CNH2
7. Alkene e.g. C2H4, C10H20