NAME: OLOFINTOYE ODUNAYO CHRISTIANAH

DEPARTMENT: NURSING

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1. A. STEP 1: If the mass of the molecular ion is odd, it contains at least one Nitrogen (N)

 N= 14 a.m.u

 105-14 = 91

 STEP 2: Determine the maximum number of carbon atoms (C=12)

 $\frac{91}{12}=7.583$

 Maximum number of carbon is 7 = C7N

 STEP 3: Add Hydrogen

 $12×7=84$

No of hydrogen =$105-\left(84+14\right)=7$

 = C7H7N

 STEP 4: Find the IHD

 IHD= $\frac{\left(2×7\right)+2-7+1}{2}=\frac{10}{2}=5$

 

 STEP 5: Add one oxygen atom

 C7H7N; to add one oxygen atom we remove one carbon and four hydrogen atom

 $12+\left(4×1\right)=16$

 The atomic mass number for oxygen is 16, therefore, we have C6H3NO

 IHD= $\frac{\left(2×6\right)+2-3+1}{2}=\frac{12}{2}=6$

 

B. The importance of organic compounds are:

* Carbohydrates, an organic compound give life forms the energy needed to maintain cellular function.
* Organic compounds released into the atmosphere deplete ozone layers and cause smog.
* Ancient life forms buried beneath the surface of the Earth turned into hydrocarbons that form the basis of humanity’s mechanical energy consumption.
* Organic compounds serve as the basis of all carbon based life on Earth, an element that all living organisms contain.
* Organic compounds create energy production in biological life.

 C. Differences between homocyclic and heterocyclic compounds are as follows:

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| --- | --- |
| HOMOCYCLIC COMPOUNDS | HETEROCYCLIC COMPOUNDS |
| Homocyclic compound ring contains only one type of atom. | Heterocyclic compound ring contains at least two different types of atom including carbon. |
| They have 100% composition of carbon atom in their rings. | Heterocyclic have mainly carbon atoms and, in addition, heteroatom such as nitrogen, oxygen, and sulphur are found in their ring. |
| They are sub-divided into alicyclic homocyclic and aromatic homocyclic. | They are sub-divided into alicyclic heterocyclic and aromatic heterocyclic. |
| Examples are phenol, toluene, naphthalene and anthracene. | Examples are tetrahydrofuran, pyridine, furan, pyrrole, and piperidine. |

1. A. RF =$\frac{distance moved by the substance}{distance moved by the solvent front}$

 RFa= $\frac{2.4cm}{12.2cm}=0.1967≅0.20$

 RFb=$\frac{5.6cm}{12.2cm}=0.459≅0.50$

 RFc=$\frac{8.9cm}{12.2cm}=0.729≅0.73$

B. Organic compound A which gave a positive test result to Tollens test belongs to the ALDEHYDE family.

 Organic compound B which decolourizes Bromine water belongs to the ALKENE family.

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

D. Functional groups of organic compounds and their examples are as follows;

|  |  |
| --- | --- |
| FUNCTIONAL GROUPS | EXAMPLES |
|  Alkanol / Alcohols (-OH) | Ethanol, Propanol. |
| Alkanone / Ketones (-C=O) | Hexanone, Pentanone. |
| Alkyl halides / Haloalkanes(-F, -Cl, -Br, -I) | 2- Iodopropane, 1, 2-dichloroethane. |
| Ethers (-OR) | Diphenyl ether, Diethyl ether. |
| Aldehydes / Alkanals (-COH) | Phenylmethanal, Propanal. |
| Amines (-NH2) | Diphenylamine, Trimethylamine. |
| Carboxylic acid / Alkanoic acid | Pentanoic acid, Propanoic acid. |