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**COLLEGE: MEDICINE AND HEALTH SCIENCES**

**DEPARTMENT: MEDICINE AND SURGERY**

**COURSE CODE: CHE 102**

Question 1:

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

N=14amu, 105-14=91

Step 2- Determine the maximum numbers of C’s

91/12=7.5

Taking the whole number before the decimal without approximating, this implies that the formula will be in the form $C\_{7}NH\_{m}$ where m is the number of moles of hydrogen.

Therefore, m=105-$\left\{\left(12×17\right)+(1×14)\right\}$

 =105-98

 =7

IHD=$\frac{2n+2-m}{2}$ where n is the number of moles of carbon

 = $\frac{2\left(7.5\right)+2-7}{2}$

 =$\frac{10}{2}$

 =5

**Hence the first formula is** $C\_{7}NH\_{7 }$ **and IHD=5**

Repeating the same procedure but now we introduce oxygen;

 O=16, 105-(16+4) = 75

Dividing by 12 in order to determine the maximum number of carbon atoms, we have;

 75/12=6.25

 our new formula is in the form $C\_{6}NOH\_{m}$

 m=105-$\left\{\left(12×16\right)+14+16\right\}$

 =105-102

 =3

 IHD=$\frac{2n+2-m}{2}$

 =$\frac{2\left(6.25\right)+2-3}{2}$

 $ =\frac{11.5}{2}$

 =5.75

 **hence the second formula is** $C\_{6}NOH\_{3}$ **and IHD=5.75**

B, IMPORTANCE OF ORGANIC COMPOUNDS:

 Organic compounds have versatile bonding patterns and are part of all organisms.

1. Medicine: Medicine is the prime store of organic compounds though not all but many medicines are made of organic substances. Like antibiotics, anticancer drugs, painkillers, anti-depressant, anesthetics etc.
2. Sterilizing agent: Most of the sterilizing agent and disinfectant like phenol, formaldehyde etc. are carbon compounds. Due to their properties like solubility, PH they can kill microbes and even human body cells. These kill the bacteria and other microbes due to either dissolving the microbe cell wall or damaging the protein layer etc. Their efficiency is enhanced by making small tweaks in the chemistry. Besides these solvents there are gases like ethylene oxide which are used for sterilization of drugs and manufactured substances.
3. Valuables: Diamonds, graphite, petroleum. Interestingly the carbon compounds are found to be highly valuable, durable and hardest in the world. Diamond and graphite are both pure carbon compound, they are both highly used and expensive. Their properties are studies in organic chemistry. Petroleum is the other most valued resources on the earth for fuels needed in the world. Petroleum is one of the factors that influence the world economy.
4. Analytic substances: Most substances we use like drugs, pesticide etc. are analyzed qualitatively using different types of titration, chromatography techniques and spectrophotometry. Here the reagent use like acid or bases or oxidative reductive species is organic in nature. The end point indicators in titration are developed by organic chemistry
5. Food: food materials or solely made up of carbon compound, carbohydrate, proteins, fat and even vitamins are organic in nature. All these classes of food are needed to keep us healthy. Alcohol which is a beverage is made up of organic substance.
6. Cleansing agent: In industries and labs, organic solvent is widely used to clear of impurities. For example, in drug extraction from plants, the fatty matter from the pulp is removed using petroleum either. Thus organic chemistry through its knowledge of polarity, solubility, partition factors uses solvents to seprate components for better use.

**DIFFERENCES BETWEEEN HOMOCYCLIS AND HETEROCYCLIC COMPOUNDS.**

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| **HOMOCYCLIC COMPOUNDS** | **HETEROCYCLIC COMPOUNDS** |
| These are cyclic compounds having atoms of the same element as ring members. | These are cyclic compounds having atoms of the different element as ring members including carbon atoms. |
| Contains atoms of the same element bonded to each other forming a ring | Contains atoms of at least two different elements bonded to each other forming a ring. |
| They have 100$\%$ carbon atoms in their rings | They have mainly carbon in addition to heteroatoms such as nitrogen, oxygen, and Sulphur in their rings. |
| Sub divided into alicyclic homocyclic and aromatic homocyclic | Sub divided into alicyclic heterocyclic and aromatic heterocyclic |
| Examples are phenol, toluene and anthracene | Examples are tetrahydrofuran, furan and pyridine |

i. $\frac{2.4cm}{12.2cm}=0.197$

ii. $\frac{5.6cm}{12.2cm}=0.456$

iii. $\frac{8.9cm}{12.2cm}=0.730$

1. Compound A is an aldehyde and compound B is an alkene.
2. 2,4-DNPH test is employed for aldehydes and ketones
3. Alkanes- butane and ethane

Alkenes - ethene and butane

Alkynes - ethyne and butyne

Alaknols- - ethanol and butanol

Carboxylic acid- butanoic acid and pentanoic acid

Esters- propanoate and butanoate

Aldehyde- propanol and butanol