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**MATRIC NO: 17/MHS01/003**

**COURSE: CHM 102**

**ANSWERS**

1. Suggest possible formulas for a molecular for a molecular ion (m/z) of 105

**Solution**

**M/z** = 105

If the mass of the molecular ion is odd, it contains at least one N where N stand for **nitrogen** with molar mass N = 14 amu

i.e 105-14=91

91/12 =7.5, C7NH?

Add enough **hydrogen** to make up the rest of the mass

7 x 12 =84, 84+14= 98

105-98= 7

i.e C7NH7

In order to find the **hydrogen deficiency**, formula is given by

**Hydrogen deficiency**=

i.e. **HD** = = 5

Next is to add oxygen with molecular mass of : O= 16 amu

Recall N= 14 amu

105-N= 105-14= 91

Subtract the molecular mass of oxygen as well

91- 16= 75

To find the number of carbons, 75/12 = 6.25

C6NH?O

To find the number of atoms of hydrogen, 6 x 12= 72

75-72= 3

˜ C6NH3O

To find **hydrogen deficiency, Hydrogen deficiency**=

HD= = 5.75

**NOTE**- the **hydrogen deficiency** is solved for in order to know the number of double bonds, triple bond or rings in a compound.

**THEREFORE**, the chemical compounds formed are as follows:

* C7NH7
* C6NH3O

1. What is the importance of organic compounds?

ANS

* **Medicine**- Though not al but many medicines are made of organic substances like **antibiotics, anticancer drugs, painkillers, anti depressants, anesthetics etc**
* **Food**- food materials are made of carbon compounds. **Carbohydrates, proteins, fats even vitamins** are organic in nature, these constituents perform various functions, carbohydrate is required for energy, proteins for growth, fat to minimize heart disease etc.
* **Cleaning agents**- Organic solvents are used to clear impurities e.g. **fatty matter from pulp** is used in removing petroleum ether
* **Sterilizing agents**- most sterilizing agents such as **phenol, formaldehyde** and the likes are carbon compounds and as a result of their **solubility’s, PH** they call microbes and even human body cells
* **Valuables**- carbon compounds are found to be highly **valuable, durable and hardest** in the world e.g **Diamond** and **graphite** which are carbon compounds, both are expensive especially Diamond and are highly used in making jewelry

1. Difference between homocyclic and heterocyclic compounds

ANS

**Homocyclic compound**s are those that have atoms of the same element in the ring while **heterocyclic compounds** are those that have carbon as well as atoms of other elements in the ring.

**QUESTION 2**

1. If the distance of the solvent front is 12.2 cm. 2.4 cm,5.6cm and 8.9 cm are distances of different bands respectively. Calculate the retardation factor of the available bands.

**SOLUTION**

Rf =

Distance of the solvent front= 12.2 cm

* Band 1 = 2.4cm

**Rf1**= = 0.197

* Band 2= 5.6cm

**Rf2**=

* Band 3 = 8.9cm

**Rf3**=

1. Two organic compounds were labeled A and B. A gave a positive test result ( dark grey precipitate) to Tollens test and B decolorizes bromine water.

Suggest the family to which these organic compounds belong.

**ANS**

B is **Alkene** as it decolorizes bromine water

A is **Aldehyde** as it tests positive in tollens test to give dark grey precipitate

1. 2,4 dinitrophenylhydrazine test is employed for?

Testing **aldehyde** and **ketone**

1. List 7 functional groups of organic compounds giving two examples of each group

|  |  |
| --- | --- |
| FUNCTIONAL GROUP | EXAMPLES |
| ALKANE | C6H14, C2H6 |
| ALKENE | C2H4, C4H8 |
| ALKYNE | C3H4, C5H8 |
| ALKANOL | C2H5OH, C4H9OH |
| ALKANOIC ACID | C2H5OOH, C4H9OOH |
| AMINE | CH3NH2, C2H5NH2 |
| HALIDE | C2H5Br, C6H13I |