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DEPT: MEDICINE & SURGERY

COURSE: CHM 102

 ASSIGNMENT

**Question 1**

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**= $\frac{2N+2-H}{2}$

i.e. **HD** = $\frac{2\left(7.5\right)+2-7}{2}$ = 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**= $\frac{2N+2-H}{2}$

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

B –

 1- Organic [compounds](http://socratic.org/chemistry/a-first-introduction-to-matter/compounds) are important because all living organisms (redundant) contain carbon. The three basic macromolecules of life are Carbohydrates (CH2O), Fats (lipids) (CHO) and Proteins (CHON).

 2 - They are used in the production of drugs

1. - **Petroleum**: furnish the energy that sustains life
2. - **Polymers** are used in the production of cloths, cars, plastics, kitchen appliances etc
3. **-Cleaning agents**- Organic solvents are used to clear impurities e.g. **fatty matter from pulp** is used in removing petroleum ether
4. **-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
5. **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

C –

 The **key difference** between homocyclic compounds and heterocyclic compounds is that in homocyclic compounds,**the ring of homocyclic compounds is made up carbon atoms only, whereas that of heterocyclic compounds is made up of more than one kind of atoms.**

**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 =$\frac{distance of the band }{distance of the solvent front}$

Distance of the solvent front= 12.2 cm

* Band 1 = 2.4cm

**Rf1**= $\frac{2.4cm}{12.2 cm}$= 0.197

* Band 2= 5.6cm

**Rf2**= $\frac{5.6cm}{12.2cm}=0.459$

* Band 3 = 8.9cm

**Rf3**= $\frac{8.9cm}{12.2cm}=0.730$

1. Two organic compounds were labelled 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

**C –**

Brady's test. 2,4-Dinitrophenylhydrazine can be used to qualitatively detect the **carbonyl functionality of a ketone or aldehyde functional group**. A positive test is signalled by the formation of a yellow, orange or red **precipitate** (known as a dinitrophenylhydrazone).

D-

1. NH2 – e.g : methylamine, ethylamine
2. COH – e.g : ethanol, pentanal
3. OR – e.g : ethylacetate, methylethanoate
4. C=OH – e.g : propan-2-one, butan-2-one
5. OH- e.g : methanol, propanol
6. F, Cl, Br – e.g : florobutane, bromopropane
7. C-OH=O – e.g : ethanoic acid, butanoic acid