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 MATRIC NO: 17/MHS01/193

 COURSE CODE: CHEM 102

 **CHM 102: ASSIGNMENT**

**QUESTION 1**

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

**Solution:**

If the mass of the molecular ion is odd, it contains atleast one nitrogen atom N.

 N= 14amu

 105-41=91

 Determine the maximum number of carbon atoms

 91/12=7.5 hence 7 carbon atom maximum. C7 HN7

 (12= 105

 84+14+H=105

 98+H=105

 H=105-98

 H=7

 C7H7N is a possible formular

 Add an oxygen atom into the formular (-CH4 when adding O)

 C7NH7C6NOH3\

 The possible formulars are C7H7N, C6NOH3

1. What are the importance of organic compounds?

**Solution**

The importances of organic compounds are as follows:

* Organic compounds serve as the basis of all carbon-based life on Earth, an element that all living organisms contain
* Organic compounds also create energy production in biological life, depletion of the atmosphere and release energy from hydrocarbons
* Ancient life forms buried beneath the surface of the earth and transformed into hydrocarbons form the basis of all mankind’s mechanical energy consumption
* Organic compounds aids in metabolism

c. Differentiate between homocyclic and heterocyclic compounds

**Solution**

|  |  |
| --- | --- |
| HOMOCYCLIC COMPOUNDS  | HETEROCYCLIC COMPOUNDS  |
| Homocyclic compounds are cyclic compounds having atoms of the same element as ring members  | Heterocyclic compounds are cyclic compounds having atoms of the different elements as ring members including carbon atoms  |
| Homocyclic compounds have 100% carbon atoms in their rings  | Heterocyclic compounds have mainly carbon and in addition, heteroatoms such as nitrogen, oxygen and sulphur are formed in their rings  |
| Subdivided into two; alicyclic homocyclic and aromatic homocyclic  | Subdivided into two; alicyclic heterocyclic and aromatic heterocyclic  |
| Examples are Phenol, Toluene, Naphtalene, Anthracene, cyclohexane etc.  | Examples include pyran, azocine, thiocane, tetrahydrofuan, piperidine, pyridine, furan, pyrole etc.  |

 **QUESTION 2**

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

**Solution**

Distance of the solvent front= 12.2cm

Distance moved by band A=2.4cm

Distance moved by band B=5.6cm

Distance moved by band C= 8.9cm

Retardation factor of band A= distance moved by band A = 2.4cm = 0.19

 Distance of the solvent front 12.2cm

Retardation factor of band B= distance moved by band B = 5.6cm = 0.46

 Distance of the solvent front 12.2cm

Retardation factor of band C= distance moved by band C = 8.9cm = 0.73

 Distance of the solvent front 12.2cm

b. Two organic compounds were labeled A and B. A gave a positive test result (dark grey precipitate) to Tollens test and B decolourizes Bromine water. Suggest the family to which these organic compounds belong

**Answer**

Organic compound A: Aldehyde

Organic compound B: Alkene

1. 2,4- Dinitrophenylhydrazine test is employed for Aldehydes and Ketones

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

 **Answer**

* Alkyl group: e.g methane, ethane
* Alkenyl group: e.g methene, butene
* Alkynyl group: e.g propyne, acetylene
* Hydroxyl group: e.g methanol, ethanol
* Carboxyl group: e.g butanone, propanone
* Aldehyde group: e.g ethanal, methanal
* Haloformyl group: e.g acetyl chloride, butanoyl fluoride