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**Course: CHM102**

**QUESTION 1**

1. Suggest possible formulas for a molecular ion (m/z) of 105.
2. What are the importance of organic compounds
3. Differentiate between homocyclic and heterocyclic compounds

**QUESTION 2**

1. If the distance of the solvent front is 12.2 cm. 2.4cm, 5.6 cm and 8.9cm are distances of the different bands respectively. Calculate the Retardation factor of the available bands.
2. Two organic compounds were labelled 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.
3. 2,4-Dinitrophenylhydrazine test is employed for: **test for aldehydes and ketones**
4. List 7 functional groups of organic compounds giving two examples of each group.

**Answers**

QUESTION 1

1. Possible formula for m/z of 105

Possible Formula:

i. C7H7N

ii.C6H5CO+

iii.C7H8O

iv. C7H5O+

m/z=105

a.m.u o Nitrogen(N)=14

105-14=91 a.m.u of Carbon(C) =12.00

91/12=7.58 ; no of carbon atoms =7

C7H7N

1. Importance Of Organic Chemistry

* In **Medicine** in the production of many synthetic drugs used in curing diseases
* **Food**: Food materials are solely made of carbon compounds viz. carbohydrates (CHO), proteins (NH2-CH-COOH), and fats (CH-COO-CH). Even vitamins are organic in nature.
* **Cleansing agents:** In industries and labs, organic solvents are widely used to clear off impurities. For example in drug extraction from plants, the fatty matter from the pulp is removed using petroleum ether. Thus organic chemistry through its knowledge of polarity, solubility, partition factors uses solvents to separate components for better use.
* **Sterilizing agents**: Most of the sterilizing agents and disinfectants like phenol, formaldehyde etc are carbon compounds. Due to their properties like solubility, pH they can kill microbes and even human body cells.

1. Differences between Homocyclic and Heterocyclic Organic Compounds.

|  |  |
| --- | --- |
| HOMOCYCLIC | HETEROCYCLIC |
| They contain only one type of atom | They contain at least two different types of atoms including carbon |
| They have 100% carbon atoms in their ring composition | They have mainly carbon and in addition, heteroatoms such as nitrogen, oxygen and sulphur are found in their ring. |
| They are divided into Alicylic and Aromatic Homocyclic Com. | They are divided into Aliphatic and Aromatic Heterocyclic Com |
| Examples include: Phenol, Toluene, Naphthalene and anthracene | Examples include tetrahydrofuran, pyridine,  Furan and pyrrole. |

QUESTION 2

1. Retardation Factor(Rf) = distance moved by substance/distance moved by solvent front

Solvent Front: 12.2cm

Rf1=

Rf2=

Rf3=

b. Compound A(Aldehyde) and Compound B(Unsaturated hydrocarbons)

c. 2,4-Dinitrophenylhydrazine test is employed for:

**test for aldehydes and ketones**

d. Functional groups and their examples

* Alcohol- Ethanol(C2H5OH) and Propanol(C3H7OH)
* Carboxylic Acid- Propanoic acid(C2H5COOH) and Methanoic acid(CH3COOH)
* Haloalkanes- Chloroethane(C2H5Cl) and Bromomethane(CH3Br)
* Esters- ethyl ethanoate and methyl propanoate
* Amides- Ethanamide(CH3CONH2) and Methanamide(HCONH2)
* Alkanones- Propanone and Butanone
* Aldehydes- Ethanal (C2H5CHO) and Propanal (C3H7CHO)