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CHM 102: ASSIGNMENT

QUESTION 1

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

Solution: C_7H_7N

- b. 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= $\frac{\text{distance moved by band A}}{\text{Distance of the solvent front}} = \frac{2.4\text{cm}}{12.2\text{cm}} = 0.19$

Retardation factor of band B= $\frac{\text{distance moved by band B}}{\text{Distance of the solvent front}} = \frac{5.6\text{cm}}{12.2\text{cm}} = 0.46$

Retardation factor of band C= $\frac{\text{distance moved by band C}}{\text{Distance of the solvent front}} = \frac{8.9\text{cm}}{12.2\text{cm}} = 0.73$

- 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

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