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Mechatronics
17/ENG05/022
CHM 102 ASSIGNMENT

QUESTION 1

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

Answers

- Benzophenone - (C₆H₅)₂CO
- 4-Chlorobenzophenone - C₁₃H₉ClO

b.) What are Importance of Organic Compounds?

- **Food:** Carbohydrate, protein, fats, vitamins, enzymes, etc.
- **Clothes:** Cotton, silk, wool, nylon, rayon, dacron
- **Fuels:** Coal, wood, natural gas, petrol, etc.
- **Medicines:** Penicillin, Morphine, aspirin, cocaine, etc.
- **Dyes:** Indigo, malachite green, alizarin, etc.
- **Insecticides:** D.D.T, gammexane, malathion, etc.
- **Explosives:** Nitroglycerin, Nitrocellulose, T.N.B, T.N.T

c.) Differentiate between homocyclic and heterocyclic compounds.

HETEROCYCLIC COMPOUNDS	HOMOCYCLIC COMPOUNDS
Heterocyclic Compounds are cyclic compounds having atoms of the different elements as ring members including carbon atoms.	Homocyclic compounds are cyclic compounds having atoms of the same element as ring members.
Ring contains atom of different elements.	Ring contains atoms of the same element.
Contain atoms of at least two different elements bonded to each other forming a ring.	Contain atoms of the same element bonded to each other forming a ring.
Examples include pyran, azocine, thiocane, etc.	Examples include benzene, cyclohexane, toluene, cyclohexanol, etc.

Question 2

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

Let **A, B and C be 2.4 cm, 5.6 cm and 8.9 cm respectively.**

R_{f,A} = 2.4/12.2 = 0.20

R_{f,B} = 5.6/12.2 = 0.46

R_{f,C} = 8.9/12.2 = 0.73

b.) Two organic compounds were labelled A and B. A gave a positive test result (dark grey PPT) to Tollens test and B decolorizes bromine water. Suggest the family to which these compounds belong.

- **A** belongs to the **aldehydes** family because the **Tollens** test is the test for aldehydes and therefore they react positively to it.
- **B** can belong to the **Alkene** family because **alkenes** are known to be able to decolorize bromine water.

c.) 2,4- Dinitrophenylhydrazine test is employed for?

- 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 ppt (known as dinitrophenylhydrazone.)

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

- **Alkanes**- methane, butane
- **Alkenes**- ethene, butene
- **Alkynes**- ethyne, butyne
- **Alcohol**- methanol, heptanol
- **Aldehydes**- methanal, butanal
- **Carboxylic acids**- ethanoic acid, butanoic acid
- **Ketones**- propanone, butanone