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QUESTION 1

1. Fragment at m/z =105
Step1- if the mass of the molecular ion is odd it contains at least one nitrogen N= 14 atoms
105-14=91
Step2- determine max NC’S
$\frac{91}{12 } $= 7.5 $C\_{7}HN$?
Sep3- add enough H’s to make up the rest of the mad
7×12=84
1×14=14
105-(84+14) =7
7H’S gives $C\_{7}NH\_{7}$
(2n+2-7)/2= 2(7.5) +2-7/2 =5.25
Step4- add an O atom
$C\_{7}NH\_{9 }\rightarrow C\_{6}H\_{3}NO$ $C\_{7}H\_{7}N$- Azocine
 $C\_{6}H\_{3}NO- $Pyran-3-carbonitrile
$\frac{(2\left(6.5\right)) + (2-3) }{2}$­­­­­­­­­­­­­­­­­­­­­­­­ = 5.5 ~ 6

Other formula include;

$C\_{8}H\_{9}$ – 2-Phenylethyl

1. Organic compounds play an important role in our daily activities. There is hardly any walk of life where we do not need the organic compounds. The food that we eat is essentially a mixture of organic compounds. The changes which the food undergoes in our bodies are organic chemical reactions. The clothes that we wear whether of cotton or synthetic fiber are all organic in character. The soaps, cosmetics, perfumes, oils, plastics, explosives, rubber, paper, insecticides, e.t.c are all organic compounds. In the medical field, organic compounds are indispensable. Antibiotics, sulpha drugs, alkaloids, aspirin. Iodoform, e.t.c are organic compounds. The following list clearly illustrates the importance of organic compounds.
* Food: carbohydrates, proteins, fats, vitamins, enzymes, etc.
* Clothes: cotton, silk, wool, nylon, rayon, dacron, etc.
* Fuels: coal, wood, natural gas, petrol, etc.
* Medicines: penicillin, morphine, aspirin, cocaine, iodoform, etc.
* Household and other common articles: cosmetics, perfumes, soaps, plastics, leathers, etc.
1. Differences between homocyclic and heterocyclic compounds

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| HOMOCYCLIC COMPOUNDS | HETEROCYCLIC COMPOUNDS |
| Homocyclic Compound ring contains only one types of atom. | Heterocyclic Compound ring contains at least two different types of atoms including carbon. |
| Homocyclic Compounds have 100% carbon atoms in their ring. | Heterocyclic Compounds have mainly carbon and, in addition, heteroatoms such as nitrogen, oxygen, and sulphur are found in their ring. |
| They are sub-divided into Alicyclic homocyclic and Aromatic homocyclic | They are sub-divided into Alicyclic heterocyclic and Aromatic heterocyclic |
| Some examples are Phenol, Toluene, Naphthalene, and Anthracene | Some examples are Tetrahydrofuran, Piperidine, Pyridine, Furan, and Pyrrole |

QUESTION 2

1. H Retardation Factor, $R\_{f}$ **=** $\frac{Distance moved by substance}{Distance moved by the solvent front}$

For Distance moved in 2.4cm, $R\_{f}=\frac{2.4}{12.2}=0.197$ $\~ 0.20$

For Distance moved in 5.6cm, $R\_{f}=$$\frac{5.6}{12.2 }=0.459 \~ 0.50$

For Distance moved in 8.9cm, $R\_{f}= \frac{8.9}{12.2}=0.729 \~ 0.73$

1. Compound A belongs to aldehyde functional group while compound B belongs to alkene functional group.
2. 2,4-Dinitrophenylhydrazine (DNPH, Brady's reagent, Borche's reagent) is the chemical compound C6H3(NO2)2NHNH2. Dinitrophenylhydrazine is a red to orange solid. It is a substituted hydrazine, and is often used to qualitatively test for carbonyl groups associated with aldehydes and ketones. The hydrazone derivatives can also be used as evidence toward the identity of the original compound. The melting point of the derivative is often used, with reference to a database of values, to determine the identity of a specific carbonyl compound. It is relatively sensitive to shock and friction; it is a shock explosive so care must be taken with its use. To reduce its explosive hazard, it is usually supplied wet.
3. Functional groups and examples.

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| FUNCTIONAL GROUP | EXAMPLES |
| Alkanes | Methane, ethane |
| Alkenes | Propene, butene |
| Alkyne | Pentyne, hexyne |
| Alkanol | Methanol, ethanol |
| Alkanal | Propanal, butanal |
| Carboxylic acid | Pentanoic acid, hexanoic acid |
| Ketone | Propanone, pentanone |