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i. $m/z = 105$

$$C_n H_n = 105 / 13 \quad \therefore C = 12, H = 1 = 12 + 1 = 13 \\ = 8R1$$

\therefore Since it is an odd m/z value, it indicates the presence of one Nitrogen or Oxygen



Since $O = 16$ and $CH_4 = 16 = (C = 12 \text{ and } H_4 = 4) = 12 + 4 = 16$

" $N = 14$ and $CH_2 = 14 = (C = 12 \text{ and } H_2 = 2) = 12 + 2 = 14$

ii) $m/z = 105 = C_8 H_9$

$$= \text{IHD for } C_8 H_9 = \frac{2n+2-m}{2} = \frac{2(8)+2-9}{2}$$

$$= 4.5$$

$\therefore C_8 H_9$ is not a possible molecular formula because IHD is not a whole number



iii) $C_8 H_9 = CH_2 + N = C_7 H_7 N$

$$\text{IHD for } C_7 H_7 N = \frac{2n+2-m+1}{2} = \frac{2(7)+2-7+1}{2}$$

$$\text{IHD} = 5$$

$\therefore C_7 H_7 N$ is a possible molecular formula.

iv) $C_8 H_9 = 2CH_2 + 2N = C_6 H_5 N_2$

$$\text{IHD for } C_6 H_5 N_2 = \frac{2(6)+2-5+2}{2} = \text{IHD} = 5.5$$

$\therefore C_6 H_5 N_2$ is not a possible molecular formula because it is not a whole number.

v) $C_8 H_9 = 3CH_2 + 3N = C_5 H_3 N_3$

$$\text{IHD for } C_5 H_3 N_3 = \frac{2(5)+2-3+3}{2} = \text{IHD} = 5.5$$

$\therefore C_5 H_3 N_3$ is not a possible molecular formula.

vi) $C_8 H_9 = CH_2 + CH_4 + N + O = C_6 H_3 N O$

$$= \text{IHD} = \frac{2(6)+2-3+1-1}{2}$$

$$= 5.5$$

$C_6 H_3 N O$ can't be a possible molecular formula

vi) $C_8H_9 - CH_4 + O = C_7H_5O$
 $IHD = \frac{2(7) + 2 - 5 - 1}{2} = \frac{10}{2} = 5$

C_7H_5O is a possible molecular formula.

vii) $C_8H_9 - 2CH_4 + 2O = C_6H_5O_2$
 $IHD = \frac{2(6) + 2 - 1 - 2}{2} = \frac{11}{2} = 5.5$

$C_6H_5O_2$ can't be a possible formula.

~~viii) $C_8H_9 - 3CH_4 + 3O = C_5H_5O_3$~~

Possible formulae are: C_7H_5O , and C_7H_7N

2. Importance of Organic Compounds

- i) Organic compounds are found in valuables like Diamonds, graphites, petroleum and hydrocarbons.
- ii) Organic compounds are sources of fuels: coal, wood, natural gas, petrol.
- iii) Organic compounds play a role in medicine: penicillin, streptomycin, chloramycetin, sulphadiazine, morphine, Aspirin, Iodoform etc.
- iv) Organic compounds are used in making explosives like: Nitroglycerine, T.N.B, T.N.T.
- v) Used for making dyes such as malachite green, Alizarin etc.
- vi) Organic compounds are found in food and are sources of carbohydrate, protein, fat, vitamin, enzymes etc.
- vii) Organic compounds are used in the production of household and other common articles such as: soap, cosmetics, perfumes, detergents, paper, rubber, plastic, leather, paint, photographic films etc.

3. Homocyclic Compounds

i. These are compounds having atoms of the same element as ring members. They consist of ~~only atoms~~

ii. They contain atoms of same element bonded to each other forming a ring

iii) Examples are: benzene, cyclohexane, toluene etc

iv) ~~Element Rings~~ contain atoms of the same element

Heterocyclic compounds.

These are compounds having atoms of different elements as ring members including carbon atoms.

They contain atoms at least two different elements bonded to each other forming a ring (composition)

Examples are pyran (contains oxygen), thiocane (contains carbon and sulfur) etc.

Rings contain atoms of different elements

$$2a. R_f = \frac{\text{Distance moved by substance}}{\text{Distance moved by solvent front}} = \frac{2}{12.2} = 0.1639$$

i) For 2.4 cm; $R_f = \frac{2.4 \text{ cm}}{12.2 \text{ cm}} = \underline{0.197}$

ii) For 5.6 cm; $R_f = \frac{5.6 \text{ cm}}{12.2 \text{ cm}} = \underline{0.459}$

iii) For 8.9 cm; $R_f = \frac{8.9 \text{ cm}}{12.2 \text{ cm}} = \underline{0.7295}$

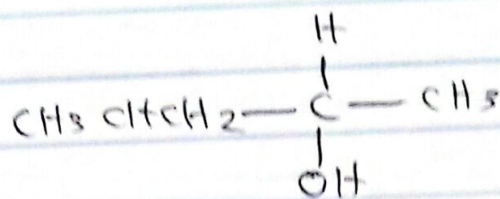
b A = Aldehyde
B = Alkene.

c Test for ketone and aldehyde.

VII (Alcohol) \rightarrow (OH)



Cyclohexanol



2-pentanol