

Answers

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$m/z = 105$

$C_n H_m : \frac{105}{13} \quad [13: C \rightarrow 12 + H \rightarrow 1] = 8 R 1$

Since  $m/z$  is odd, it indicates presence of one nitrogen or oxygen:  $O \rightarrow C H_4 : N \rightarrow C H_3$

i)  $m/z = 105 : C_8 H_9$

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

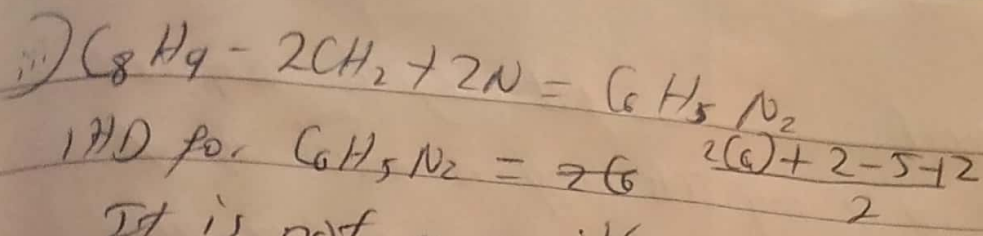
$= 4.5 \therefore C_8 H_9$  is not possible because

$IHD$  is not a whole no.

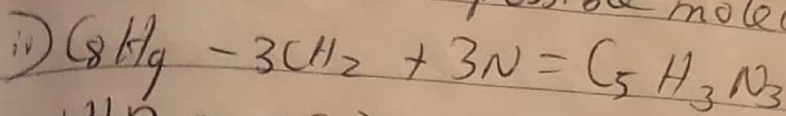
ii)  $C_8 H_9 - 2H_2 + N = C_7 H_7 N$

$IHD \text{ for } C_7 H_7 N = \frac{2(7) + 2 - 7 + 1}{2} = 5$

It is a possible molecular formula

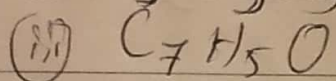
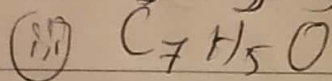
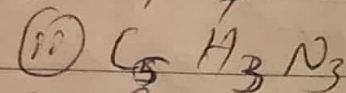


It is not a possible molecular formula since IHD isn't whole.



$IHD = \frac{2(5) + 2 - 3 + 3}{2} = 6$ . It is a possible molecular formula.

∴ The possible molecular formulas for molecular ion of 105 are



## b) Importance of Organic Compounds

(i) Three basic macromolecules of life (carbohydrates -  $\#CH_2O\#$ ,  $\#CH_2O\#$ , fats/lipids -  $\#CHO\#$ ) and proteins  $\#(CHON)\#$  are formed from organic compounds.

(ii) Carbon which is a main constituent of organic compounds helps in photosynthesis and cellular respiration.

(iii) Organic compounds create energy production in biological life, depletion of the atmosphere and <sup>release</sup> of energy.

(iv) Nucleotide - an organic compound forms amino acids and DNA.

(v) Crude oil is refined in gasoline, propane, diesel, kerosene & natural gas so cars and heating systems can work.

(vi) Organic compounds aid in metabolism.



Homocyclic compounds

i) Its ring is made up of only one type of atom - carbon 100%

ii) Examples include phenol, toluene, naphthalene, anthracene etc.

Heterocyclic compound

Its ring is made up of more than one type atom mainly carbon with heteroatoms like Nitrogen, Oxygen & Sulphur in the ring

Examples include pyridine, tetrahydrofuran, piperidine, furan, pyr, pyrid.

Question 2

a)  $R_{f0} = \frac{\text{distance moved by band}}{\text{distance moved by solvent front}}$

distance moved by band A = ~~12.4~~ 2.4 cm

✓ ✓ ✓ ✓ B = 5.6 cm

✓ ✓ ✓ ✓ C = 8.9 cm

solvent front = 12.2 cm

$$R_{fA} = \frac{2.4}{12.2} = 0.197$$

$$R_{fB} = \frac{5.6}{12.2} = 0.459$$

$$R_{fC} = \frac{8.9}{12.2} = 0.730$$

b) Since A gave a positive test result to Tollens test, it belongs to is an Aldehyde.  
Since B gas decolorized bromine water, it is an alkene

c) 2, 4-Dinitrophenylhydrazine test is employed for ketones and aldehydes

d) Functional groups — examples

i) Alkane — methane

— ethane

ii) Alkene — ethene

— butene

iii) Alkyl — ethyl

— propyl

iv) Halo alkane — 1-chloropropane

— ~~ethane~~ bromomethane

v) Alcohol — Propanol

— ethanol

— Propanone

vi) Ketone — ethanone

— Propanoic acid

vii) Carboxylic acid — ethanoic acid