Answers

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a) $m/z = 105$

C_nH_n : $105/13$ $[13 : C \rightarrow 12 + H \rightarrow 1] = 8$ R 1

Since m/z is odd, it indicates presence of one nitrogen or oxygen: $O \Rightarrow CH_4$: $N \rightarrow CH_2$

i) $m/z = 105 : C_8H_9$

IHD for $C_8H_9 = \frac{2(8) + 2 - 9}{2}$

$= 4.5$ ∴ C_8H_9 is not possible because IHD is not a whole no.

ii) $C_8H_9 - CH_2 + N = C_7H_7N$

IHD for $C_7H_7N = \frac{2(7) + 2 - 7 + 1}{2} = 5$.

It is a possible molecular formula

iii) $C_8H_9 - 2CH_2 + 2N = C_6H_5N_2$

IHD for $C_6H_5N_2 = 6$ $\quad \frac{2(6)+2-5+2}{2} = 5.5$

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

iv) $C_8H_9 - 3CH_2 + 3N = C_5H_3N_3$

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

∴ Some possible molecular formulas for molecular ion of 105 are (i) C_7H_7N (ii) $C_5H_3N_3$ (iii) C_7H_5O

b) Importance of Organic Compounds

i) Three basic macromolecules of life (carbohydrates - #CH-2O#, fats/lipids - (#CHO#) and Protens #(CHON)# are framed 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 release of energy.

iv) Nucleotide - an organic compounds 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	Heterocyclic Compound
i. Its ring is made up of only one type of atom - carbon 100%	Its ring is made up of more than one type atom Mainly carbon with heteroatom like Nitrogen, Oxygen & Sulphur in the ring
ii. Examples include phenol, toluene, Napthalene, anthracene etc.	Examples include pyridine, tetrahydrofuran, piperidine, furan, pyride.

Question 2

a) R_f = distance moved by band / distance moved by solvent front

distance moved by band A = ~~12.1cm~~ 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
		- ~~B~~Bromomethane
v) Alcohol		- Propanol
		- ethanol
vi) Kektone		- Propanone
		- ethanone
vii) Carboxilic acid		- Propanoic acid
		- ethanoic acid