Name: John - Kalipa Soala
Matric No: 17/MHS01/171
Department: Medicine and Surgery (MBBS)
Course: General Chemistry II
Course Code: CHM 102

1a. Suggest possible formulas for a molecular ion (m/z) of 105.

Mass total - 105

Mass total - Nitrogen = Mass of carbon and hydrogen

105 - 14 = 91

$\frac{91}{12}$ = 7 remainder 7

We have 7 carbon atoms
7 hydrogen atoms
1 nitrogen atoms

∴ The possible molecular formula is C_7H_7N.

Assuming oxygen is present

Mass Total = 105

Mass Total - Mass of Nitrogen + Mass of Oxygen = Mass of Carbon and Hydrogen

= 105 - 30 = 75

∴ $\frac{75}{12}$ = 6 remainder 3

C_6H_3ON is the possible molecular formula

b What are the importance of organic compounds?

i) It is used in the production of dyes and fuels.
ii) It is used in the production of clothes
iii) It is used in the production of explosions.
iv) It is used in the production of medicine.
v) It is used in the production of insecticide.

c. Differentiate between homocyclic and heterocyclic compounds.

	Homocyclic Compounds	Heterocyclic Compounds
1)	Homocyclic compounds are compounds that the atoms present in the ring belong to the same element.	Heterocyclic compounds are compounds that there are both carbon and other atoms present in the ring.
2)	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 the ring
3)	Examples are Phenol, Toluene, Naphthalene and Anthracene	Examples are tetrahydrofuran, Piperidine, Pyridine, Furan and Pyrrole.

2a. If the distance of the solvent front is 12·2cm; 2·4cm, 5·6cm and 8·9cm are distances of the different bands respectively. Calculate the Retardation factor of the available bands.

$$Rf = \frac{\text{Distance of the bonds}}{\text{Distance of the solvent front}} = \frac{2.4}{12.2} = 0.1967$$

$$Rf = \frac{\text{Distance of the bonds}}{\text{Distance of the solvent front}} = \frac{5.6}{12.2} = 0.459$$

$$Rf = \frac{\text{Distance of the bonds}}{\text{Distance of the solvent front}} = \frac{8.9}{12.2} = 0.73$$

2b. Two organic compounds were labelled A and B. A gave a positive test result (dark grey precipitate) to Tollens test and B decolourizes Bromine water. Suggest the family to which these organic compounds belong.

A belongs to the functional group aldehyde
B belongs to the functional group alkene

2c 2,4- Dinitrophenylhydrazine test is employed for Ketone and Aldehyde.

2d. List 7 functional groups of organic compounds giving two examples of each group.

	Class	Functional Group	Examples
1	Alkane	$-\overset{|}{\underset{|}{C}}-$	Methane (CH_4), Ethane (C_2H_6)
2.	Alkene	$\diagdown C=C \diagup$	Ethene ~~Methene~~ (C_2H_4), Propene (C_3H_6)
3.	Alkyne	$-C\equiv C-$	Ethyne (C_2H_2), Pentyne (C_5H_8)
4	Ketones	$\diagdown C=O \diagup$	Propanone (CH_3COCH_3) Butanone (C_4H_8O)
5	Alkanoic Acid	$-C(=O)OH$	Methanoic Acid ($HCOOH$) Propanoic Acid ($C_3H_6O_2$)
6.	Aldehyde	$R-C(=O)-H$	Propanal (CH_3CHCOH) Butanol (C_4H_8O)
7.	Alkanoates	$-COOR$	Ethyl Ethanoate ($C_4H_8O_2$) Ethyl Butanoate ($C_6H_{12}O_2$),