**NAME:** IBEZIM, Emily Chika

**DEPARTMENT:** MEDICINE AND SURGERY

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**QUETION 1:**

1a). Possible formulae for a molecular ion (m/z) of 105 are:

i). C6H14F

ii). C4H9S0

iii). C5H9Cl

iv). C6H10Na

v). C5H1302

1b). IMPORTANCE OF ORGANIC COMPOUNDS:

Organic compounds play an important role in our daily activities. There is any hardly work of life where we do not need the organic compounds. The food we eat is essentially a mixture of organic compounds. The changes which the food undergoes in our bodies are organic chemical reactions. The clothes we wear, whether of cotton or synthetic fiber, all are organic in character. The soap, cosmetics, perfume, oils, plastics, explosives, rubber, dye stuffs, paper, insecticides, etc are all organic compounds. In the medicinal field, organic compounds are indispensible. Antibiotics, aspirin, iodoform, etc are organic compounds. There is hardly any industry which is not dependent on organic compounds.

Also, organic compounds are important because all living organisms(redundant) contain carbon. The three basic macromolecules of life are carbohydrates, fats(lipids) and proteins. These three macromolecules are also the basic components of many cycles that drive earth, primarily the carbon cycle including the exchange of carbon between plants and animals in photosynthesis and cellular respiration.

1c). DIFFERENCES BETWEEN HOMOCYCLIC AND HETEROCYCLIC COMPOUNDS:

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| **HOMOCYCLIC COMPOUNDS** | **HETEROCYCLIC COMPOUNDS** |
| 1.) Homocyclic compound ring contains only one type of atom | Heterocyclic compound ring contains at least two different types of atoms including carbon |
| 2.)Homocyclic compound 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 |
| 3.) The subdivisions of Homocyclic compounds are; alicyclic homocyclic and aromatic homocyclic | The subdivisions for the heterocyclic compounds are alicyclic heterocyclic and Aromatic heterocyclic |
| 4.) Examples of Homocyclic compounds are; phenol, toluene, naphthalene and anthracene | Examples of heterocyclic compounds are; tetrahydrofuran, piperidine, pyridine, furan and pyrrole |

**QUESTION 2:**

Rf = Retardation factor, Ds1 = distance of solvent front for first band, Ds2 = distance of solvent front for second band, Ds3 = distance of solvent front for third band

2a). Rf = Ds/Df=

Migration distance of the substance ÷ Migration distance of the solvent front

Rf1 = Ds1/Df = 2.4cm ÷12.2cm = 0.20

Rf2 = Ds2/Df = 5.6cm ÷ 12.2cm = 0.46

Rf3 = Ds3/Df = 8.9cm ÷12.2cm = 0.73

2b). Organic Compound A = An Aldehyde, tests positive to Tollens test

Organic Compound B = An unsaturated compound (Alkene or Alkyne)

2c). 2,4-dinitrophenylhydrazine test is employed for Aldehydes and Ketones.

2d). FUNCTIONAL GROUPS OF ORGANIC COMPOUNDS WITH EXAMPLES.

FUNCTIONAL GROUP

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| **NAME** | **GENERAL FORMULA** | **EXAMPLES** |
| 1.) Alcohols | ROH | i) ethanol ii) methanol |
| 2.) Aldehydes | R COH | i) propanal ii) butanal |
| 3.) Ketones | RCORI | i) propanone ii)methanone |
| 4.) Carboxylic Acids | RCOOH | i) ethanoic acid ii)butanoic acid |
| 5.) Esters | RCOORI | i) methylpropanoate  ii) ethylbutanoate |
| 6.) Haloalkanes | RX | i) chloropropane  ii) bromopentane |
| 7.) Amines | RNH2 | i) propylamine  ii) methylamine |