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**ANSWERS**

1. Molecular ion = 105

According to the rule of 13

105÷13 = 8R1

Where n = 8 and r = 1

Using CnHn+r

= C8H9

Also If it contains oxygen, add O and subtract CH4, therefore we have

C7H5O, C6HO2

If Nitrogen is present, add N add subtract CH2, therefore we have

C7H7N, C6H5N2, C5H3N3,C4HN4, C6H3NO

Therefore, possible formulas include; C8H9, C7H5O, C6HO2, C7H7N, C6H5N2, C5H3N3,C4HN4, C6H3NO

1. **IMPORTANCE OF ORGANIC COMPOUNDS**

* Organic compounds are important because they make up the three basic macromolecules of life which are carbohydrates, fats and proteins.
* Organic compounds create energy production in biological life (metabolism).
* Organic compounds are found in all life forms.
* Proteins, an organic compound, create the structural parts of cells that are later built into the tissues and organs that make up the entire body of an organism.
* Organic molecules make up a large portion of the human diet and are found in all food consumed by an individual.
* Crude fuel is refined in gasoline, propane, diesel, kerosene and natural gas so cars and heating systems can work.

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| **Homocyclic Compounds** | **Heterocyclic Compounds** |
| * Homocyclic compound ring contains only one type of atom | * Heterocyclic compounds ring contains at least two different types of atoms including carbon |
| * Homocyclic compounds have 100% carbon atoms in their ring | * Heterocyclic compounds have mainly carbon in addition, heteroatoms such as nitrogen, oxygen and Sulphur are found in their ring. |
| * Sub-divisions include alicyclic homocyclic and aromatic homocyclic. | * Sub-division include alicyclic heterocyclic and aromatic heterocyclic. |
| * Examples include phenol, toluene, naphthalene and anthracene. | * Examples are tetrahydrofuran, pyridine, furan, pyrrole. |

1. Retardation factor = distance moved by substance ÷ distance moved by solvent front
2. Rf = 2.4÷ 12.2

= 0.197

1. Rf = 5.6÷12.2

= 0.456

1. Rf = 8.9÷12.2

= 0.730

1. A belongs to the alkanal /aldehyde family.

B belongs to the alkene family.

1. 2,4-dinitrophenylhydrazine test is employed for alkanals and ketones.

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| **Functional Group** | **General Formula** | **Examples** |
| 1. -f, -Cl, -Br, -I | R-X | Chloromethane, 1,1-dichloromethane |
| 1. -OH | ROH | Methanol, Ethanol |
| 1. -COH | RCOH | Ethanal, butanal |
| 1. -COOH | RCOOH | Ethanoic acid, Propanoic acid |
| 1. –COOR’ | RCOOR’ | Methylethanoate, Ethylethanoate |
| 1. -CO- | RCOR’ | Propan-2-one, Pentan-3-one |
| 1. –NH2 | RNH2 | Methylamine, ethylamine |