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Question 1

A

Possible formulas for a molecular ion (m/z) of 105 include

* C8H9
* C7H5O

N=14amu. 105-14=91

91/12 = 7.5---------C7NH?

7\*12 = 84

1\*14 = 14

105 - (84+14) = 7

So therefore 7 hydrogen's gives C7NH7

Therefore... (2n +2 -no of hydrogen)/2

[2(7.5)+2-7]/12= 5.25

Then add an oxygen atom

* C7NH7 -------C6NOH3

[(2(6.5)+2-3)/2]=5.5

B

Importance of organic compounds

As the basis of food

Food materials are created from carbon compounds via carbohydrates, proteins and fats. All the food we consume is reconstituted material and extracts of plants or animals. Organic molecules make up a large portion of the human diet and are found in all food consumed by an individual. It requires a large number of organic molecules needed to keep cells and tissues healthy.

### **In proteins**

One type of organic molecule that must be present in every human's diet is protein. Proteins are composed of chains of organic molecules called amino acids. The human body uses a combination of 20 different types of amino acids, arranged in specific sequences to make thousands of unique human proteins present in cells and tissues. Protein is important in a diet to provide a source of amino acids - protein is broken down inside the stomach and intestines - and the amino acids that make up the diet protein are absorbed inside the body and are used to make their own proteins.

### **In Hydrocarbons**

Hydrocarbons are organic compounds that are made up entirely of hydrogen and carbon. There are many different types of hydrocarbons such as methane, ethane, propane, pentane and octane, among others. Most of the hydrocarbons found on Earth occur naturally in the [Crude oil](https://www.lifepersona.com/the-10-most-important-petroleum-characteristics) , Where the decomposed organic matter provides an abundance of coal and hydrogen, which, when joined, can be chained to form unlimited chains. Hydrocarbons are the primary source of energy for most civilizations today. The prominent use of hydrocarbons is as a source of fuel. In their solid form hydrocarbons can take the form of asphalt. The use of hydrocarbons is also prevalent in nature. Some arthropods, such as the Brazilian bee, use particular hydrocarbon smells to differentiate members of their family for example.

### **In metabolism**

The three main purposes of metabolism are energy / fuel conversion as energy for cellular processes, energy / fuel conversion to build blocks for proteins, lipids, nucleic acids, and some carbohydrates, as well as the elimination of nitrogenous waste. These reactions allow organisms to grow and reproduce, maintain their structures, and respond to the environment. Metabolism is usually divided into two categories: catabolism, which is the decomposition of organic matter and the breakdown of glucose by cellular respiration; And in anabolism, which is the construction of components of cells such as proteins and nucleic acids.

C

Difference between homocyclic and heterocyclic compounds

|  |  |
| --- | --- |
| Homocyclic compounds | heterocyclic compounds |
| Homocyclic compounds are cyclic compounds having atoms of the same element as ring members | Heterocyclic compounds are cyclic compounds having atoms of different elements as ring members including carbon atoms. |
| Homocyclic compounds contain atoms of the same element bonded to each other forming a ring. | Heterocyclic compounds contain atoms of at least two different elements bonded to each other forming a ring. |
| Some examples of homocyclic compounds include benzene, [cyclohexane](http://pediaa.com/difference-between-hexane-and-cyclohexane/), [toluene](http://pediaa.com/difference-between-toluene-and-benzene/#Toluene), cyclohexanol, etc. | Some examples of heterocyclic compounds include pyran (contain oxygen), azocine (contain carbon and nitrogen), thiocane (contain carbon and sulfur), etc. |
| It is sub divided into Alicyclic homocyclic and Aromatic homocyclic | It is sub divided into Alicyclic heterocyclic and Aromatic heterocyclic |

Question 2

A

Retardation factor = (distance moved by substance)/(distance moved by solvent front)

Distance moved by solvent front= 12.2cm

Distance moved by substance= 2.4cm, 5.6cm and 8.9cm

For 2.4cm, RF= 2.4/12.2 =0.1

For 5.6cm RF= 5.6/12.2 =0.5

For 8.9cm RF= 8.9/12.2 =0.7

B

A belongs to Aldehyde and alpha hydroxyl ketone functional groups .

B belongs to alkenes or alkyne family.

C

 2,4-Dinitrophenylhydrazine test is employed for aldehydes and ketones functional group.

D

7 functional groups of organic compounds

|  |  |
| --- | --- |
| Functional group | Examples |
| Alkanes | Methane and Octane |
| Alkenes | Ethene and butane |
| Alkynes | But-1-yne and oct-1-yne |
| **Esters** | Methyl propanoate and butyl octanoate |
| Ketone | 2-hexanone and 2-pentanone |
| Alkyl halide | 1-bromo hexane and 2-chloro pentane |
| Carboxylic acid | Ethanoic acid and butanoic acid |