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Department: GEOLOGY

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Course Title: General Chemistry II

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

Fragment at m/z =105
Step1- if the mass of the molecular ion is odd it contains at least one nitrogen N= 14 atoms
105-14=91
Step2- determine max NC’S
= 7.5 ?
Sep3- add enough H’s to make up the rest of the mad
7×12=84
1×14=14
105-(84+14) =7
7H’S gives
(2n+2-7)/2= 2(7.5) +2-7/2 =5.25
Step4- add an O atom
 - Azocine
 Pyran-3-carbonitrile
­­­­­­­­­­­­­­­­­­­­­­­­ = 5.5 ~ 6

Other formula include;

 – 2-Phenylethyl

**b. Importance of organic compounds**

 **1. Medicine**: Medicine is the prime store of organic compounds. Though not all but many medicines are made of organic substances. Like [antibiotics](https://www.studyread.com/antibiotics-definition-function-mechanism/), anticancer drugs, painkillers, anti-depressant, anesthetics etc.

**2.** **Food**: Food materials are solely made of carbon compounds viz. [carbohydrates](https://www.studyread.com/examples-carbohydrates-daily-life/)(CHO), proteins (NH2-CH-COOH), and fats (CH-COO-CH). Even vitamins are organic in nature. Study of the requirement of body for various purposes like pregnancy, disease condition, body fitness etc. experts advice use of vitamins (FOLIC acid in pregnancy), fat (minimize in heart diseases) and (protein rich diet for body building).Among beverages [alcohol](https://www.studyread.com/benefits-advantages-disadvantages-alcohol/)is an organic substance

**3.** **Cleansing agents:**In industries and labs, organic [solvents](https://www.studyread.com/examples-of-solvents/)are widely used to clear of impurities. For example in drug extraction from plants, the fatty matter from the pulp is removed using petroleum ether. Thus organic chemistry through its knowledge of polarity, solubility, partition factors uses solvents to separate components for better use.

**4.Sterilizing agents**: Most of the sterilizing agents and disinfectants like phenol, formaldehyde etc are carbon compounds. Due to their properties like solubility, pH they can kill microbes and even [human body cells](https://www.studyread.com/types-cells-human-body/).

**6. Valuables**: Diamonds, graphite, petroleum. Interestingly the carbon compounds are found to be highly valuable, durable and hardest in the world.Diamond and graphite are both pure carbon alone compound without any other elements inside. They are both highly used and expensive. Their properties are studies in organic chemistry. Petroleum is the other most valued resources on the earth for fuels needs in the world. These petroleum products are further diversified for various uses. And petroleum is one of the factors which influence the world economy.

**c.**

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| --- | --- | --- |
| **Features**  | **Homocyclic** **Compounds:**  | **Heterocyclic Compounds:**  |
| Definition | Homocyclic compounds are cyclic compounds having atoms of the same element as ring members. | Heterocyclic compounds are cyclic compounds having atoms of the different elements as ring members including carbon atoms. |
| Types of Atoms | The ring of a homocyclic compound contains atoms of the same element. |  The ring of a heterocyclic compound contains atoms of different elements. |
| Composition  | 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. |

**2.** Retardation Factor,  **=**

**a**. i. For Distance moved in 2.4cm, Rf=

**ii**. For Distance moved in 5.6cm, Rf

**iii.** For Distance moved in 8.9cm, Rf

**b.** Two organic compounds were labelled A and B. A gave a positive test result (dark grey precipitate) to Tollen’s test and B decolorizes Bromine water. Suggest the family to which these organic compounds belong.

*Compound A – Aldehydes, Ketones and Terminal Alkynes*

*Compound B –* *Unsaturated compound i.e.Alkene*

**2c**. *2, 4-Dinitrophenylhydrazine* test is employed for the qualitative test for [carbonyl groups](https://en.wikipedia.org/wiki/Carbonyl_group) associated with **Aldehyde and Ketones**

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

|  |  |
| --- | --- |
| Functional Group | Examples |
| Alkanoic Acid (R-COOH) | – Ethanoic Acid Butanoic Acid |
| Alkanol(R-OH) | MethanolEthanol |
| Alkyl-Halide(RX) | ChloromethaneBromopropane |
| Alkanal(R-COH) | EthanalPropanal |
| Esters(R) | Methylpropanoate Ethylbutanoate |
| Ketones/Alkanones(R) |  Propan-2-one Ethanone |
| Amides() |  – AcetamidePropanamide |