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**CHEMICAL ENGINEERING**

**17/ENG01/008**

**CHM 102 ASSIGNMENT**

QUESTION

1. a) Suggest possible formulas for a molecular ion(mole) of 105.

**Answer:** From Chlorine which is 35.5.

**Molecular formula:C5H9Cl =104.5 =105**

**Structural formula: IHD= 2M+2-N-Number of halogens = 2×5+2-9-1 =1**

**2 2**

**CL**

1. b) Importance of organic compounds.

**Answer:**

1. Organic compounds such as butane can be used as cooking gas in homes.
2. Most of the sterilizing agents and disinfectants like phenols from aldehydes, e.t.c. are carbon compounds. Due to their properties like solubility, pH they can kill microbes and even human body cells.
3. Organic compounds like Diamonds,Graphite,Petroleum e.t.c are found to be highly valuable,durable and hardest in the world. Diamond and Graphite are both pure carbon compounds without any other elements inside. They are both highly used and expensive while petroleum in the other most valued resources on the earth for fuels need in the world.
4. Medicine is the prime store of organic compounds. Though not all are made of organic compounds. Most of the drugs contain organic compounds which are used to cure diseases, to study the pathophysiology of the diseases and also to diagnose the diseases.
5. Food materials are solely made of carbon compounds e.g carbohydrates, proteins, and fats. Even vitamins are organic in nature. Study of the requirement of body for various purposes like pregnancy, disease condition, body fitness, e.t.c experts advice use of vitamins. Among beverages alcohol is an organic substance.
6. c) Differentiate between homocyclic and heterocyclic compounds.

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| HOMOCYCLIC COMPOUNDS | | HETEROCYCLIC COMPOUNDS |
| 1 | Homocyclic compounds are cyclic 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. |
| 2 | Homocyclic compounds consists of only carbon atoms and also known are also known as Carbon cyclic. | There should be at least this different elements present as members and also should be at least three atoms to form a ring. |

1. a) 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.

**Answer:** Given:

Let the distance of the bands be A ,B and C

Hence:

Distance moved by the band A=2.4cm

Distance moved by the band B=5.6cm

Distance moved by the band C=8.9cm

Distance of the solvent front=12.2m

RF for A= Distance moved by the band A =2.4cm =0.1967=0.2

Distance moved by the solvent front 12.2cm

RF for B = Distance moved by the band **B** = 5.6cm = 5.6cm =0.7295=0.7

Distance moved by the solvent front 12.2cm 12.2cm

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

**Answer:** The organic compound of A is an Aldehyde compound and the organic compound of B is an Alkene compound.

1. c) 2,4-Dinitrophenylhydrazine test is employed for?

**Answer:** Aldehydes and Ketones

1. d) List seven functional groups of organic compounds giving two example of each group.

**Answer:**

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| **ORGANIC COMPOUND** | | **FUNCTIONAL GROUPS** | **TWO EXAMPLE EACH** |
| **1** | **Alkyl-halides/ Haloalkenes** | **-F , -Cl , -I** | **CH3Cl and C2H5Cl** |
| **2** | **Alkanols** | **-OH** | **CH3OH and C2H5OH** |
| **3** | **Esters** | **-C=O**    **OR** | **CH3COOCH3 (Methylethanoate)**  **And**  **C2H5COOC2H5 (Ethylpropanoate)** |
| **4** | **Amines** | **-NH2** | **CH3NH2 AND C2H5NH2** |
| **5** | **Alkanals** | **-COH** | **CH3CHO (Methanal)**  **And**  **C2H5CHO (Ethanal)** |
| **6** | **Alkanoic acids** | **-COOH** | **CH3COOH (Methanoic acid)**  **And**  **C2H5COOH (Ethanoic acid)** |
| **7** | **Alkanones** | **-C=O** | **CH3(C=O)CH3 (Propanone)**  **AND**  **C2H5(C=O)C2H5 (Pentanone)** |