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**MATRIC. NO: 17/ENG04/022**

 **CHM102- GENERAL CHEMISTRY II**

 **ANSWERS**

**QUESTION 1**

1. Step 1 – If the mass of the molecular ion is odd it contains at least one N.

$$N=14amu $$

$$105-14=91$$

Step 2 – Determine the number of C atoms

 $\frac{91}{12}=7.5$ $ C\_{7}NH$

Step 3 – Add enough H’s to make up the rest of the mass.

 $C\_{7}NH$

 $C⇒7×12=84$

 $N⇒1×14=14$

$105-\left(84+14\right)=7$

$7 H^{'}s$ gives $C\_{7}NH\_{7}$

$$IHD =\frac{2\left(7.5\right)+2-7}{2}=5$$

 Step 4 – Add an O atom.

 $C\_{7}NH\_{7}⇒C\_{6}NOH\_{3}$

 $IHD= \frac{2(6.5)+2-3}{2}=6$

1. The importance of organic compounds are as follows;
	* Sterilizing Agents: Due to properties such as solubility and pH, organic compounds such as phenol, formaldehyde etc. can kill microbes and even human body cells. They kill the bacteria and other microbes due to either dissolving the microbe cell wall or damaging the protein layer. Apart from solvent, gases such as ethylene oxide are used for sterilization of drugs and manufactured substances.
	* Cleansing Agents: In industries and labs, organic solvent is 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.
	* Food: Food materials are solely made of organic compounds e.g. carbohydrate (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). It also used to produce beverages such as alcohols.
	* Medicine: Organic compounds are used in the production of drugs although not all drugs. They are also used in the diagnosis of diseases, they aim to check for the organic functional group levels as a parameter of the disturbed substance in the body.
	* Analytic substance: Organic compounds are used to develop end point indicator in titration.
2.

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| **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 the different elements as ring members including carbon atoms.
 |
|  * The ring of a Homocyclic compound contains atoms of the same element.
 | * The ring of a Heterocyclic compound contains atoms of different elements.
 |
|  * 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.
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| * Some examples of Homocyclic compounds include benzene, cyclohexane, toluene, cyclohexanol, etc.
 | * Some examples of heterocyclic compounds include pyran (contain oxygen), azocine (contain carbon and nitrogen), thiocane (contain carbon and sulfur), etc.
 |

**QUESTION 2**

1. Distance travelled by solvent front $=12.2cm$

Distance travelled by band 1 $=2.4cm$

Distance travelled by band 2 $=5.6cm$

Distance travelled by band 3 $=8.9cm$

* $R\_{f1}$ $=\frac{distance travelled by band 1 }{distance travelled by solvent front }$

$ $ $=\frac{2.4 cm}{12.2cm}$

 $=0.196cm$

 $≃0.20cm$

* $R\_{f2} =\frac{distance travelled by band 2}{distance travelled by solvent front }$

 $ =\frac{5.6cm}{12.2cm}$

 $=0.459cm$

 $≃0.46cm$

* $R\_{f3}=\frac{distance travelled by band 3}{distance travelled by solvent front}$

 $=\frac{8.9cm}{12.2cm}$

 $=0.729cm$

 $≃0.73cm$

1. The organic compound A belong the aldehydes OR alkanal family (RCHO). WHILE the organic compound B belong to the alkene family (C=C)
2. 2,4-Dinitrophenylhydrazine test is employed for **ALKANAL OR ALKANONES**
3.

|  |  |
| --- | --- |
| **FUNCTIONAL GROUP** | **EXAMPLE** |
| * $-OH$
 | * $CH\_{3}OH$ (Methanol)
* $C\_{3}H\_{7}OH$(Propanol)
 |
| * $-COOH$
 | * $CH\_{3}COOH$(Ethanoic acid)
* $C\_{2}H\_{5}COOH$(Propanoic acid)
 |
| * $-OR'$
 | * $CH\_{3}OCH\_{3}$(Dimethyl ether)
* $CH\_{3}OC\_{2}H\_{5}$(Methoxyethane)
 |
| * $-X(Br, Cl)$
 | * $CH\_{3}Br$(Bromomethane)
* $CH\_{3}Cl$(Chloromethane)
 |
| * $-CHO$
 | * $CH\_{2}O$(Methanal)
* $CH\_{3}CHO$(Ethanal)
 |
| * $-COR'$
 | * $CH\_{3}COC\_{2}H\_{5}$(Butan-2-one)
* $CH\_{3}COCH\_{3}$(Propanone)
 |
| * $-CONH\_{2}$
 | * $CH\_{3}CONH\_{2}$(Ethanamide)
* $C\_{2}H\_{5}CONH\_{2}$(Propanamide)
 |