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**College: MEDICINE AND HEALTH SCIENCES**

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**A.** if the mass of the molecular ION is an odd number, it contains at least one nitrogen atom

E.g. 105-14=91

Step 2-determine NCs

91/12=7.5 C7HN

Step 3-add enough hydrogen molecules to make up the molecule

7\*12=84

1\*14=14

105-(84+14)=7

7Hs gives C7NH7

(2n+2.7)/2 =2(7.5) +2-7/2 =5.25

Step 4-add an O atom

C7NH9->C6H3NO

(2(6.5)) + (2.3)/2=5.5

C7H7N-azocine

C6H3NO-pryan-3-carbonitrite

Other formula include

C8H9-2phenylethyl

**b.** **Importance of organic chemistry**:

Firstly, all living organisms (redundant) contain carbon; the three basic macromolecules of life are Carbohydrates (CH2O), Fats (lipids) (CHO) and Proteins (CHON).

**Medicine:** Drugs used for treatment of diseases are made of organic compounds. Hence they are water insoluble, bitter in taste and also easily movable in the body tissues. Further drug delivery an option to deliver the drug to deeper body location needs enhancement of lipid solubility and minimize water solubility. Most diseases in humans have some course or pathway before complete death ensues and this can be recognized by the organic functional groups change in the normal and diseased condition.Thus change in the organic components helps us to study the course and severity of the disease

**Food**: Food materials are solely made of carbohydrates (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).

**Cleansing agents:** In industries and labs, organic solventare 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.

**Sterilizing agents**: Most of the sterilizing agents and disinfectants (phenol, formaldehyde) are carbon compounds. Due to their properties like solubility, pH they can kill microbes and even human body cells.

c. Differences between homocyclic and heterocyclic

Homocyclic compounds (**carbocyclic compounds** or **isocyclic compounds)** as their rings are formed with only one type of atoms, mainly carbon. They can be further classified into alicyclic and aromatic compounds. **Alicyclic compounds** are the compounds that behave more like aliphatic compounds; they can be saturated or unsaturated. E.g.cyclopropane. Aromatic compounds consist of a cyclic structure with double and single bonds arranged alternately. Due to the presence of double bonds, aromatic compounds are considered as unsaturated even though these compounds do not undergo addition reactions eg naphthalene, and anthracene.

Heterocyclic compounds are the cyclic compounds in which the rings contain at least two different types of atoms (including a carbon atom). The atoms other than the carbon atoms present in the ring are known as **heteroatoms** e.g. Nitrogen, sulphur, and oxygen. They can be either aromatic or aliphatic; their rings may be fused or bridged with another heterocyclic ring or Homocyclic ring e.g. vitamin B group (thiamine, riboflavin, etc.), steriods (cardiac glycosides), amino acids (tryptophan, histidine etc.), and alkaloids (reserpine, pilocarpine etc). They may be aliphatic or aromatic in nature. Based on that, they are further classified into two groups; (a) **alicyclic heterocyclic compounds** that resemble the properties of typical aliphatic compounds, and (b) **aromatic heterocyclic compounds** that resemble the properties of most of the aromatic compounds including benzene. Examples for alicyclic heterocyclic compounds are tetrahydrofuran and piperidine and Examples of aromatic heterocyclic compounds include pyridine, furan, and pyrrol

**Question 2**

1. Retardation factor= Distance travelled by substance/Distance travelled by solvent front.

Solvent front=12.2

Rf1=8.9/12.2

 =0.72cm2

Rf2=5.6/12.2

 =0.45cm2

Rf3=2.4/12.2

 =0.19cm2

(b)A uses tollens test to give a positive result which produced an aldehyde solution

 B-an alkene solution

(c)2,4-Dinitrophenylhydrazine test is employed for the qualitatively test for carbonyl roups associated with aldehydes and ketones.

D)

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| FUNCTIONAL GROUPS | EXAMPLES |
| alkanols | Butanol, hexanol |
| alkanal | Ethanal, heptanal |
| alkene | Ethene, hexene |
| alcohol | Ethanol, methanol |
| ketone | Propanone, hexanone |
| amine | Ethanamine, butanamine |
| Carboxylic acid | Ethanioc acid, propanioc acid. |