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**COURSE CODE: CHEM 102**

**DEPT: MEDICINE AND SURGERY**

**COLLEGE: MBBS**

**Question 1:**

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

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| m/z= 105. It is odd, therefore, it has Nitrogen  Taking Nitrogen= 14amu  105 – 14= 91  To find the mass number of Carbon  91 ÷ 12= 7.6  Therefore, 7 is the number of mole of carbon  For Hydrogen: 7\*12=84  91 – 84 = 7, therefore, 7 is the number of mole of hydrogen  The formula is C7NH7  Oxygen was introduced: 105 – 14 = 91  Taking O = 16: 91 – 16 = 75  75 ÷ 12 = 6.25  6\*12 = 72  Therefore, 72 is the number of carbon atoms  75 – 72 = 3  Therefore, 3 is the number of hydrogen atoms  The formula is **C6NOH3** | To find hydrogen deficiency:  = (2N + 2 – H)  2  = {2(7.6) + 2 – 7}  2  = 15.2 - 5  2  = 5.1  To find hydrogen deficiency:  = (2N + 2 – H)  2  = {2(6.25) + 2 – 3}  2  = 12.5 – 1  2  = 5.75 |

1. What are the importance of organic compounds
2. They are important constituents of the food we eat.
3. They are used in industries for production of antiseptic.
4. Ethanol is a staple in the beverage industry.
5. They are important in medicine for production of drugs.
6. They are important constitutes of crude oil therefore used as fuels for automobiles.
7. `Differentiate between homocyclic and heterocyclic compounds

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| Homocyclic compounds | Heterocyclic compounds |
| 1. Homocyclic compound rings contain only one kind of atom. | Heterocyclic compound rings contain at least two kinds of atoms including carbon. |
| 1. Contain 100% carbon atom in their ring. | Contain mainly carbon atoms and in addition heteroatom’s such as nitrogen in their ring. |
| 1. E.g. phenol, toluene. | E.g. tetrahydrofuran, furan. |

**QUESTION 2:**

1. 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.

Retardation factor= distance of solute ÷ distance of solvent.

For band A=2.4cm, retardation factor= 2.4cm ÷ 12.2cm = 0.20

For band B=5.67m, retardation factor= 5.6cm ÷ 12.2cm = 0.46

For band C=8.9cm, retardation factor= 8.9cm ÷ 12.2cm = 0.73

1. Two organic compounds were labeled A and B. A gave a positive test result (dark grey participate) to Tollens test and B decolorizes Bromine water. Suggest the family to which these organic compounds belong.

Compound A belongs to aldehyde family.

Compound B belongs to alkyne family.

1. 2,4- Dinitrophenylhydrazine test is employed for ………………………….

Aldehyde and Ketones.

1. List 7 functional groups of organic compounds giving two examples of each group.

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| Functional groups | Examples |
| 1. –OH | Methanol, Ethanol |
| 1. –COOH | Ethanoic acid, Propanoic acid |
| 1. –NH2 | Methylamine, Ethylamine |
| 1. –F, -Cl, -Br, -I | Iodomethane, Bromoethane |
| 1. –COH | Methanal, Ethanal |
| 1. –OR | Dimethyl ether, 1Methoxyethane |
| 1. C=C | Ethene, Propene |