NAME: TANGBAN MARYANN OSCAR

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DEPARTMENT: MEDICINE AND SURGERY

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1. a) According to the rule of 13 which states that the formula of a compound is a multiple “n” of 13 (the molar mass of CH) plus a reminder “r”.

 **CnHn+r**

* For oxygen, add oxygen and subtract **CH4**
* For nitrogen, add nitrogen and subtract **CH2**
* For chlorine, add chlorine and subtract **C2H11**

 According to the rule of 13,

 105÷13 = 8 remainder 1 (8r1).

 **CnHn+r**

Some possible formulae may include:

1. C8H9 = (12×8) + (1×9) = 105.
2. C7H5O = (12×7) + (1×5) + 16 = 105.
3. C7H7N = (12 ×7) + (1×7) + 14 = 105.
4. C6H5N2 = (12×6) + (1×5) + (14×2) = 105.
5. C6H3NO = (12×6) + (1×3) + 14 +16 = 105.

 b) Some importance of organic compounds include:

1. Organic compounds are used for the production of clothes (cotton, silk, wool, nylon, rayon, Dacron, etc.)
2. The food we eat constitute mainly of organic compounds, like carbohydrate, proteins, fats, vitamins, enzymes, etc.
3. Organic compounds are used for the production/manufacture of some certain drugs like penicillin, streptomycin, aspirin, cocaine, morphine, Chloromycetin, etc.
4. Organic compounds can be used for the manufacture of certain insecticides like Gammexane, Melathion, D.D.T, etc.
5. Organic compounds, constitute certain explosives like nitrocellulose, nitroglycerine, T.N.B., T.N.T, etc.

 C) Difference between homocyclic and heterocyclic compounds include:

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| S/N | HOMOCYCLIC COMPOUNDS | HETEROCYCLIC COMPOUNDS |
| 1. | The ring in homocyclic compounds contains only one type of atom. | The rings in heterocyclic compounds contain at least two different types of atoms including carbon. |
| 2. | Homocyclic compounds have 100% carbon atoms in their ring. | Heterocyclic compounds have mainly carbon and in addition, heteroatoms like nitrogen, oxygen, and sulphur are found in their ring.  |
| 3. | They constitute two sub-divisions, Alicyclic homocyclic compounds and Aromatic homocyclic compounds.  | They constitute two sub-divisions, Alicyclic heterocyclic compounds and Aromatic heterocyclic compounds. |
| 4. | Example include phenol, toluene, naphthalene and anthracene. | Examples include furan, pyrrole, pyridine, piperidine and tetrahydrofuran.  |
| 5. | Rings contains atoms of the same element. | Rings contains atoms of different elements. |

1. a) RF = distance moved by substances ÷ distance moved by solvent front.

Distance of solvent font = 12.2cm

1. RF = 2.4cm ÷ 12.2cm = 0.197
2. RF = 5.6cm ÷ 12.2cm = 0.459
3. RF = 8.9cm ÷ 12.2cm = 0.730
4. Organic compound “A” belongs to the family of Aldehydes, while Organic compound “B” belongs to the family of Alkenes.
5. 2, 4-Dinitrophenylhydrazine test is employed for Ketones and Aldehydes.
6. Some functional groups and examples include:

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| S/N | FUNCTIONAL GROUP | EXAMPLES |
| 1. | ­­­­­­­­­-RX | Chloroethane, iodoethane |
| 2. | -RH | Ethane, propane |
| 3. | -RNH2 | Amino acid, trimethylamine |
| 4. | -ROH | Methanol, butan-2-ol |
| 5. | -RCOOH | Butyric acid, benzoic acid |
| 6. | -ROR’ | Diethyl ether, alkoxy alkanes |
| 7. | -RCOOR’ | Ethyl butyrate, methyl ethanoate |