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**COURSE: CHEMISTRY 102.**

**MARTRIC NUMBER: 17/MHS01/167.**

**1a.)** First formula;

Subtracting nitrogen, 105 – 14 = 91.

Dividing by 12 to obtain the molar mass of carbon, = 7.58 = 7.

Finding the number of hydrogen atoms = 91 – (12 \* 7) = 7

Therefore first formula = C7H7N.

Second formula;

Subtracting nitrogen and oxygen, 105 – 14 – 16 = 75.

Dividing by 12 to obtain the molar mass of carbon, = 6.25 = 6

Finding the number of hydrogen atoms = 75 – (12 \* 6) = 3.

Therefore second formula = C6H3NO.

Third formula;

Subtracting two nitrogens and one oxygen, 105 – 28 – 16 = 61

Dividing by 12 to obtain the molar mass of carbon, = 5.08 = 5

Finding the number of hydrogen atoms = 61 – (12 \* 5) = 1

Therefore third formula = C5HN2O.

**1bi.)** They could be used as fuel eg methane, either by itself or mixed with other gases.

**ii.)** They could be used for making hydrogen, carbon black, trichloromethane (chloroform), an anaesthetic used in surgical operations and carbon tetrachloride, an important organic solvent.

**iii.)** They could be used for making plastics such as polyethene, polyvinylchloride (PVC), and polystyrene.

**iv.)** They can be used to produce synthetic rubbers.

**v.)** They can be used as petrol additives.

**vi.)** In agriculture, they can be used to hasten the ripening of fruits.

**vii.)** They can be used as solvents eg ethanol to dissolve resins, soaps, dyes etc.

**viii.)** Some could be used as anti-freeze in automobile radiators.

**ix.)** Could be mixed with oxygen to produce a very hot and easily controllable flame used in welding.

**x.)** Used as fuel in lamps such as miners’ lamps.

**xi.)** Serve as the basis of all carbon-based life on earth.

**1c.)**

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| **S/N.** | **HOMOCYCLIC ORGANIC COMPOUNDS.** | **HETEROCYCLIC ORGANIC COMPOUNDS.** |
| **1.** | Can be defined as cyclic compounds having atoms of the same elements as ring members. | Can be defined as cyclic compounds having atoms of different elements as ring members including carbon atoms. |
| **2.** | Rings formed in these organic compounds have only carbon atoms. | Rings formed in these organic compounds have carbon atoms along with other elements. |
| **3.** | Examples include; Phenol, Toluene, Naphthalene, and Anthracine. | Examples include; Piperidine, Pyrrole, Pyridine, and Furan. |

**2a.)** Let us label 8.9cm, 2.4cm and 5.6cm with a, b, and c respectively.

Retardation Factor =

Retardation factor of band a = = 0.73

Therefore it was a good separation.

Retardation factor of band b = = 0.19

Therefore it was a good separation.

Retardation factor of band c = = 0.46

Therefore it was a good separation.

**2b.)** Unsaturated organic compounds/ Phenols.

**2c.)** Ketones and aldehydes.

**2d.)**

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| **S/N.** | **FUNCRIONAL GROUP.** | **EXAMPLES.** |
| **1.** | -OH | **i.)** Methanol (CH3OH).  **ii.)** Propanol (C3H7OH). |
| **2.** | -COOH | **i.)** Propanoic acid (C2H5COOH).  **ii.)** Butanoic acid (C3H7COOH). |
| **3.** | -COOR | **i.)** Ethyl butanoate (CH3(CH2)2COOC2H5).  **ii.)** Methyl ethanoate (CH3COOCH3). |
| **4.** | -CHO | **i.)** Ethanal (CH3CHO).  **ii.)** Pentanal (C4H9CHO). |
| **5.** | -CO- | **i.)** Propan-2-one (CH3COCH3).  **ii.)** Butan-2-one (CH3COC2H5). |
| **6.** | -NH2 | **i.)** Methylamine (CH3NH2).  **ii.)** Ethylamine (C2H5NH2). |
| **7.** | -CONH2 | **i.)** Ethanamide (CH3CONH2).  **ii.)** Butanamide (C2H5CH2CONH2). |