**17/MHS01/069**

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***QUESTION 1***

1. The molecular mass is 105 ;

 Assuming 1 nitrogen atom is present, subtracting 14 from 105 leaves 91 as the mass for the carbon and hydrogen atoms, 91 divided by 12 gives 7 with a remainder of 7

The first 7 is the number of carbon atoms while the remainder gives the number of Hydrogen atoms

Therefore, C₇H₇N will be given as a possible molecular formula.

Assuming oxygen is present with the nitrogen, we add the masses of the nitrogen and the oxygen and subtract from 105 leaving us with 75, and dividing by 12 we have 6 remainder 3

Another possible formula will therefore be $C\_{6}H\_{3}ON$

Assuming 2 Nitrogen atoms are present, we subtract 28 from 105 leaving us with 77. Dividing by 12 and we have 6 remainder 5

Another possible formula can be $C\_{6}H\_{5}N\_{2}$

1. **Food:** Food materials are solely made of carbon compounds, via 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 advise the use of vitamins (FOLIC acid in pregnancy), fat (minimize in heart diseases) and protein (a rich diet for body building). Among beverages, alcohol is an organic substance.

2. **Cleansing agents:** In industries and labs, organic solvents are widely used to clear off 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.

3. **Sources of Fuels:** Organic compounds comes in forms such as coal, wood, natural gas, petrol, etc. that are efficient sources of fuels for different situations.

4. **Medicine**: Medicine is the prime of organic compounds. Though not all but many medicines are made of organic substances. Like antibiotics, anticancer drugs, painkillers, anti-depressant, anaesthetics etc.

5. **Sterilizing agents**: Most of the sterilizing agents and disinfectants like phenol, formaldehyde etc. are carbon compounds. Due to their properties like solubility, pH they can kill microbes and even human body cells. These kill the bacteriaand other microbes due to either dissolving the microbe cell wall or damaging the protein layer etc. Their efficiency is enhanced by making small tweaks in their chemistry. Besides these solvents there are gases like ethylene oxide which are used for sterilization of drugs and manufactured substances.

6. **Valuables**: Diamonds, graphite, petroleum, interestingly these carbon compounds are found to be highly valuable, durable and and diamond is the hardest in the world. Diamond and graphite are both pure carbon compound without any other elements inside. They are both highly used and expensive. Their properties are studied in organic chemistry. Petroleum is another most valued resources on the earth for fuel needs in the world. These petroleum products are further diversified for various uses. And petroleum is one of the factors which influence the world economy.

1. Homocyclic compounds are also known as carbocyclic compounds or isocyclic compounds because their rings are formed with only one type of atoms other than hydrogen atoms, mainly carbon. Homocyclic compounds can be further be classified into alicyclic compounds and arenas or aromatic compounds while heterocyclic compounds are the cyclic compounds in which the rings contain at least two different types of atoms (including carbon atoms and hydrogen atoms). The atoms other than the carbon and hydrogen atoms present in the ring are known as heteroatoms.

An example of a homocyclic compound is benzene and an example of a heterocyclic compound is phosphonitrilic chloride.

 ***QUESTION 2***

1. Solvent front = 12.2cm

Band A = 2.4 cm

Band B = 5.6 cm

Band C = 8.9 cm

R*F* = (band x) cm/ (solvent front) cm

R*F* of band A= 2.4cm/12.2cm = 0.196

R*F* of band B= 5.6cm/12.2cm = 0.45

R*F* ofband C=8.9cm/12.2cm =0.72

1. Substance A which gave a positive result by producing a dark grey precipitate to Tollens test is an aldehyde while substance B that decolourized bromine water is an unsaturated compound, either an alkene or alkyne.
2. It is employed for aldehydes and ketones.

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| Functional groups  | Examples |
| 1. Alkane
 | Methane and ethane  |
| 1. Alkene
 | Ethane and but-1-ene  |
| 1. Alkyne
 | Ethyne and prop-1-ene |
| 1. Alkanol
 | Ethanol and pentanol  |
| 1. Alkanone
 | Ethanone and propanone |
| 1. Aldehyde
 | Ethanal and propanal  |
| 1. Carboxylic acid
 | Ethanoic acid and propanoic acid  |

1.