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**College:** Medicine and Health Sciences

**Department:** Medicine and Surgery
**Course Title:** General Chemistry II
**Course Code:** CHM 102

1) a. Possible formulas for a molecular ion (m/z) of 105 are

* C7H5O
* C6HO2
* C7H7N
* C6H5C=O
* C6H5-CH2CH2
* C6H3NO
* C6H9N2

b) i. Medicine: Medicine is the prime store of organic compounds. Though not all but many medicines are made of organic substances. Like antibiotics, anticancer drugs, painkillers, anti-depressant, anesthetics e.t.c.

ii). Food: Food materials are solely made of carbon compounds viz. 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).Among beverages alcohol is an organic substance

iii). Cleansing agents:In industries and labs, organic solvents are 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.

iv). 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 bacteria and 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 the chemistry.

c).

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| **Homocyclic compounds** | **Heterocyclic compounds** |
| 1. Homocyclic compounds are cyclic compounds having atoms of the same element as ring members. | Heterocyclic compounds are cyclic compounds having atoms of different elements as ring members including carbon atoms. |
| 2. Contain atoms of the same element bonded to each other forming a ring. | Contain atoms of at least two different elements bonded to each other forming a ring. |
| 3. Rings contain atoms of the same element. | Rings contain atoms of the different elements. |
| 4. Examples include benzene, cyclohexane, toluene, cyclohexanol, etc. | Examples include pyran, azocine, thiocane, etc. |

2a. Retardation factor = $\frac{distance moved by substace}{distance moved by solvent front}$

Rf1 = $\frac{2.4}{12.2}$ = 0.197

Rf2 = $\frac{5.6}{12.2}$ =0.459

Rf3 = $\frac{8.9}{12.2}$ =0.730

b). A- belongs to aldehyde

 B- belongs to alkene

c). 2, 4-Dinitrophenylhydrazine test is employed for aldehydes and ketones.

d).

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| Functional groups | Examples |
| 1. Alkanes | Methane(CH4), octane(C8H18) |
| 2. Alkenes | Ethene(C2H4), butene(C4H8) |
| 3. Alkynes | Butyne(C4H6), ethyne(C2H2) |
| 4. Ketone | **2-propanone (C3H6O), 2-hexanone (C6H12O)** |
| 5. Aldehyde | **ethanal (C2H4O), hexanal (C6H12O)** |
| 6. Ester | **ethyl ethanoate (C4H8O2), methyl butanoate (C5H10O2)** |
| 7. Carboxylic acid | **propanoic acid (C3H6O2), nonanoic acid (C9H18O2)** |