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COLLEGE: MEDICINE AND HEALTH SCIENCES

COURSE: CHEM 102

QUESTION 1

A. Given  $(M/Z) = 105$

Maximum carbon atom =  $105/12 = 8.75 = 9$  approximately

Since the mass per charge ratio is odd it is possible for nitrogen to be present in the compound  $C_xH_yN$  then taking the carbon atoms to be 7

$H = 105 - (8 \times 12)$

$= 9$

Compound 1- $C_7H_9N$

IND -  $(2 \times 7) + 2 - 9 + 1/2 = 5$

Removing 4 atoms of hydrogen add one atom of oxygen

$C_6H_5NO$

IND -  $(2 \times 7) + 2 - 5 + 1/2 = 7$

- B. Organic compounds are important because all living organisms (redundant) contain carbon. The three basic macromolecules of life are Carbohydrates ( $CH_2O$ ), Fats (lipids) ( $CHO$ ) and Proteins ( $CHON$ ). **Organic compounds** are important because they serve as the basis of all carbon-based life on Earth, an element that all living organisms contain. Organic compounds also create energy production in biological life, depletion of the atmosphere and release energy from hydrocarbons. Organic compounds are composed of hydrogen, oxygen and carbon atoms and are found in all life forms.
- C. Homocyclic compounds are molecules that contains ring structures that consist only of carbon atoms within the ring. An example is benzene. Benzene is a homocyclic compound of six carbon atoms bounded together in a hexagonal ring, with one hydrogen atom bounded to each of six carbons. While heterocyclic compounds are rings containing at least one non-carbon atom in the ring. An example is heterocyclic amines which are six-member rings of five carbon and one nitrogen atom.

QUESTION 2

Ai) Distance moved by substance/Distance moved by solvent points =  $2.4/12.2 = 0.20$

ii) Distance moved by substance/Distance moved by solvent points =  $5.6/12.2 = 0.5$

iii) Distance moved by substance/Distance moved by solvent points =  $8.9/12.2 = 0.7$

B) Compound A belongs to aldehydes functional group while compound B belongs to alkene (an unsaturated hydrocarbon) functional group.

C) It is the chemical compound  $C_6H_3(NO_2)_2NHNH_2$ . It is a substituted hydrazine and is often used to qualitatively test for carbonyl groups associated with aldehydes and ketones.

- D) 1. Alkanoic acid( $RCOOH$ )-Ethanoic acid, Propanoic acid
2. Aldehydes/ alkanals( $RCOH$ )-methanal, propanal
3. Alkanols/ alcohols ( $ROH$ )- ethanol, Propanol
4. Esters ( $RCOOR$ )- methyl butanoate, propyl methanoate
5. Ketones ( $-C=O$ ) - acetone, Butanone
6. Amines ( $RCONH_2$ )- Dimethylamine, Diphenylamine
7. Amides ( $NH_2$ )- Acetamide, Hexanamide