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COLLEGE: SCIENCES

DEPARTMENT: BIOCHEMISTRY

COURSE CODE: CHM 1O2

COURSE TITLE: GENERAL CHEMISTRY II

ANSWERS TO THE ASSIGNMENT

1. The possible formulas for a molecular ion (m/z) of 105 is stated as follows

Step 1 – If the mass of the molecular ion is odd it contains at least one N.

N = 14 amu

105 – 14 = 91

Step 2 – Determine max # C’s

91/12 = 7.5

C7NH?

Step 3 – Add enough H’s to make up the rest of the mass

C7NH?

7 x 12 = 84

1 x 14 = 14

105 – (84 + 14) = 7 7 H’s gives C7NH7.

 (2(7.5) + 2 – 7)/2 = 5

 

Step 4 – Add an O atom

C7NH7 ⇒ C6NOH3

(2(6.5) + 2 – 3)/2 = 6



1.B THE FOLLOWING LIST CLEARLY ILLUSTRATES THE IMPORTANCE OF ORGANIC COMPOUNDS :

i. Food : Carbohydrate, proteins, fats, vitamins, enzymes etc.

ii.Clothes :- Cotton, silk, wool, nylon, rayon, Dacron etc.

iii. Fuels:- Coal, wood, natural gas, petrol etc.

iv. Medicines :- Penicillin, streptomycin, chloromycetin, sulphadiazine, morphine, aspirin, iodoform,cocaine etc.

v. Explosives :- Nitroglycerine, nitrocellulose, T.N.B, T.N.T, etc.

vi.Dyes :- Indigo, malachite green, alizarin, etc.

vii. Insecticides :- D.D.T, gammexane, malathan etc.

viii. Household and other common articles :- Soaps, cosmetics, perfumes, detergents, paper, rubber, plastics, leather, resins, inks, paints, vanishes, photographic films etc.

C.

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| Homocyclic compounds | Heterocyclic compounds |
| 1. Ring contains only one type of atoms.
 |  Ring contains at least two different types of atoms including carbon. |
| 1. Have 100% carbon atoms in their rings.
 | They have mainly carbon, in addition heteroatoms such as nitrogen, oxygen and sulphur are found in their ring. |
| 1. They are alicyclic homocyclic and aromatic homocyclic
 | They are alicyclic heterocyclic and aromatic heterocyclic. |
| 1. Examples are; phenol, toluene, naphthalene, and anthracene
 | Examples are; tetrahydrofuran, piperidine,pyridine,furan,and pyrrole |

2. $ retardation factor \left(RF\right)=\frac{distance moved by substance}{distance moved by solvent front}$

 RF$=\frac{x cm}{ycm}$

Solvent front= 12.2cm

1. For 2.4cm

Rf= $\frac{2.4cm}{12.2cm}$ = 0.196

1. For 5.6 cm

Rf = $\frac{5.6cm }{12.2c,}$ =0.459

1. $rf=\frac{8.9cm}{12.2cm}$ = 0.729

B. A is an aldehyde or ketone

 B is an alkene

C.2,4 Dinitrophenyl hydrazine ( red to orange solid, a substituted hydrazine) test is often employed to qualitatively test of carbonyl groups associated with aldehydes and ketones

D.

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| Functional group. | Examples. |
| 1. Alchohols –OH
 |  Ethanol (CH3CH2OH)Propanol( C3H7-OH) |
| 1. Alkyl Halides( -F,-Cl,-Br)
 | Bromoethane ( C2H5Br)Chloroethane (CH3CH2CL) |
| 1. Carboxylic acids –COOH
 | Ethanoic acid ( C2H5COOH)Petanoic acid (C5H11COOH) |
| 1. Alkane -
 | Methane (CH4)Ethane(C2H6) |
| 1. Alkene =
 | Ethene(C2H4)Butene(C4H8) |
| 1. –NH2
 | Methylamine (CH3NH2)Ethylamine(c2h5NH2) |
| 1. Ethers –O-
 | Dimethyl ether (CH3OCH3)Diethyl ether (H3CH2COCH2CH3) |