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DEPARTMENT: NURSING

COURSE: CHM102

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1a) Suggest possible formulas for a molecular ion (m/z) of 105.

Ans: step1; the mass of the molecular ion is odd, it contains at least one nitrogen

N=14amu 105-14=91

Step2; determine the number of carbons present

91÷12=7.5 C7NH (find the value of the hydrogen atom)

Step 3: add enough H’s to make up the rest of the mass

C7NH 7H’s gives C7NH7

7×12=84 (2(7.5) +2-7)/2=5

1×14=14

105-(84+14) =7

STEP 4: Add an O atom

C7NH7 which gives C6NOH3

(2(6.5) +2-3)/2=6

b) What are the importance of organic compounds: it is important in different ways namely;

• Food: Its use for the production of food e.g. carbohydrate, protein, fats, vitamin and enzymes.

• Medicine: its use for the production of penicillin, aspirin, iodoform and cocaine.

• Household and other common articles: it is use for the production of soap, cosmetics, perfumes, detergents, paper, rubber, elastic, leather, resins, photographic films and paints.

• Explosives: its use for the production of nitroglycerine, T.N.B, T.N.T, nitrocellulose, etc.

• Insecticides: its use for the production of D.Dt, gammexane, mabthion.

• Clothes: for cotton, silk, wood, nylon, rayon.

c) Differentiate between homocyclic and heterocyclic compound:

Ans: Homocyclic compounds are molecules that are, or contain, ring structures that consist only of carbon atoms within the ring. An example is benzene. While heterocyclic compound or ring structure is a cyclic compound that has atoms of at least two different elements as members of its ring(s).Heterocyclic chemistry is the branch of organic chemistry dealing with the synthesis, properties, and applications of these heterocyclic.

Examples of heterocyclic compounds include all of the nucleic acids, the majority of drugs, most biomass (cellulose and related materials), and many natural and synthetic dyes.

2a) If the distance of the solvent front is 12.2cm, 2.4cm, 5.6cm and 8.9cm at distance of the different bands respectfully. Calculate the retardation factor of the available bands:

Ans: RF=distanced remove by the substance/distance moved by the solvent fronts.

Rfa=2.4/12.2=0.197

Rfb=5.6/12.2=0.46

Rfc=8.9/12.2=0.73

b) Two organic compounds were labelled A and B. A gave positive test result (dark grey precipitate) to tollen test and b decolorizes bromine water. Suggest the family to which this organic compound belongs.

Ans: for tollen----alkanal

Bromine water-----alkene and alkyne.

c) 2, 4—Dnitrophenyl hydrazine test is employed for: Ans: for alkanal and alkanones

d) List seven functional group of organic compounds giving two examples of each group;

1). Alkyl halides e.g.

C2H5Br

CH3C

2). Alkanols e.g.

C2H5OH

C3H7OH

3). Alkanal e.g.

CH3COH

CH3 (COH) CH3.

4). Ketones e.g.

CH3COCH3

CH3COCH2CH3

5). Alkanoic acid e.g.

CH3COOH

CH3CH2COOH

6). Amines e.g.

CH3CONH2

C2H5CH2CONH2

7). Amine e.g.

CH3NH2

C2H5NH2