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19/MHS01/108
MBBS
CHEM 102

ASSIGNMENT ON STEREOCHEMISTRY AND FUNCTIONAL GROUP.

1) Name the functional groups present in each of the following molecules.

i) $CH_2=C(OH)HCHO$ – aldehyde, alkene

hydroxyl functional group, carbonyl functional group (C=O) but for aldehyde $\left(\begin{matrix}R\\H\end{matrix}\!\!>\!C=O\right)$ and carbon-carbon double bonds (for alkenes).

ii) $C_6H_5CH(NH_2)COCH_3$

amine functional group, carbonyl functional group (C=O) but for ketone $\left(\begin{matrix}R\\R'\end{matrix}\!\!>\!C=O\right)$, carbon-carbon single bond (for alkanes)

iii) $CH_3C=CHCH(OH)CHO$

hydroxyl functional group, carbonyl functional group (C=O) but the one for aldehyde $\left(\begin{matrix}R\\H\end{matrix}\!\!>\!C=O\right)$ and carbon-carbon double bond (for alkenes)

2) A 0.856g sample of pure (2R, 3R)-tartaric acid was diluted to $10cm^3$ with water and placed in a 1.0dm polarimeter tube, the observed rotation at 20°c was +1.0°. Calculate the specific rotation of (2R, 3R)-tartaric acid

SOLUTION

$$\text{Specific rotation} = \frac{\text{observed rotation (degrees)}}{\text{concentration g/cm}^3 \times \text{path length of sample cell in dm}}$$

observed rotation = +1.0°

$$\text{conc. in g/cm}^3 = \frac{\text{mass (g)}}{\text{volume (cm}^3)} = \frac{0.856g}{10cm^3} = 0.0856 g/cm^3$$

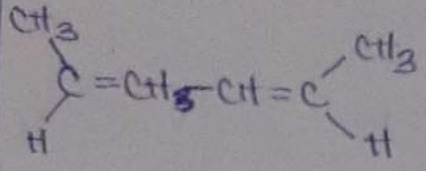
path length of sample cell = 1.0dm

$$\text{specific rotation} = \left(\frac{+1.0^\circ}{0.0856 \times 1.0}\right)^\circ g^{-1}cm^3dm^{-1}$$

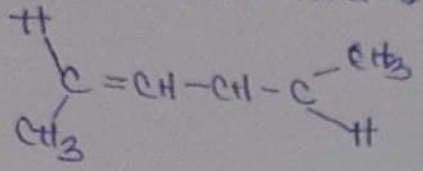
$$= 11.68^\circ g^{-1}cm^3dm^{-1}$$

3) Draw the possible geometric isomers (where possible) for each of the following compounds.

i) Hexa-2,4-diene

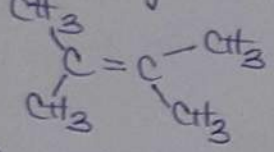


cis-Hexa-2,4-diene



Trans-Hexa-2,4-diene

ii) 2,3-Dimethylbut-2-ene



Geometric isomers is not possible for 2,3-Dimethylbut-2-ene