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DEPARTMENT: MEDICINE AND SURGERY(MBBS)

MATRIC. NO: 19/MHS01/147

COLLEGE: MEDICINE AND HEALTH SCIENCES

CHEM 102 Assignment

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

i $CH_2=C(OH)HCHO$

hydroxyl functional group, carbonyl functional Group (C=O) but for aldehyde ($R-\underset{H}{C}=O$) 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 ($R-\underset{R'}{C}=O$), 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 ($R-\underset{H}{C}=O$) 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 1.0 dm polarimeter tube. The observed rotation at 20°C was +1.0°. Calculate the specific rotation of (2R, 3R)-tartaric acid.

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

observed rotation = +1.0°

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

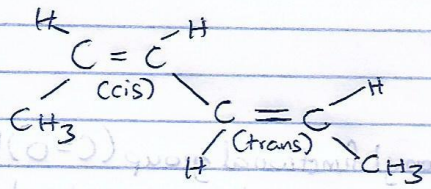
path length of sample cell = 1.0 dm

$$\text{specific rotation} = \left(\frac{+1.0^\circ}{0.0856 \times 1.0}\right) {}^\circ g^{-1} cm^3 dm^{-1}$$
$$= 11.68^\circ g^{-1} cm^3 dm^{-1}$$

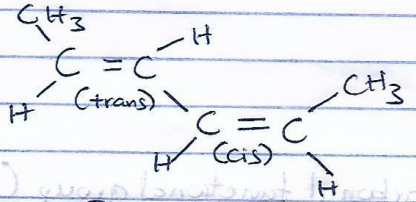
3 Draw the possible geometric isomers (where possible) for each of the following compounds:

i Hexa-2,4-diene

a

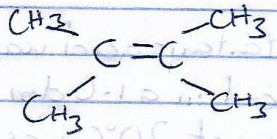


b



(a) and (b) are actually the same molecule flipped 180°

ii 2,3-Dimethylbut-2-ene



It does not have geometrical isomers because there are two identical groups attached to the same carbon of the double bond.