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19/MHS01/363
MBBS
CHEM 102

ASSIGNMENT

1. Name the functional groups present in each of the following molecules
i) $CH_2=C(CH_3)HCHO$ ii) $C_6H_5CH(NH_2)COCH_3$ iii) $CH_3C=CHCH(OH)CHO$

Answer

Molecules	Functional groups
i. $CH_2=C(CH_3)HCHO$	- Aldehyde (-CHO) - Hydroxyl group (-OH)
ii. $C_6H_5CH(NH_2)COCH_3$	- Carbonyl group (-CO) - Amine ($-NH_2$)
iii. $CH_3C=CHCH(OH)CHO$	- Hydroxyl group (-OH) - Aldehyde (-CHO)

2. A 0.856g sample of pure (2R, 3R)-tartaric acid was diluted to 10cm³ 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

$$[\alpha] = \frac{\alpha}{cl}$$

where $[\alpha]$ = Specific optical rotation
α = observed rotation
c = concentration in g/mL
l = pathlength (in dm)

$\alpha = +1.0°$
$l = 1.0\ dm$
$c = ?$

The concentration is always measured in g/mL. In the question

see were already given the mass in g so convert the volume of water (10cm³) to mL.

1 litre = 1000cm³
1mL = 1cm³

∴ 1cm³ = 1mL
10cm³ = ? ⇒ $\frac{10cm^3 \times 1mL}{1cm^3}$ = 10mL ⇒ C = 10mL

∴ $[\alpha] = \frac{\alpha}{cl} = \frac{1.0}{10 \times 10}$

$[\alpha] = \frac{1}{10}$

$[\alpha] = 0.1°$

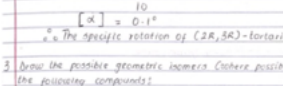
∴ The specific rotation of (2R, 3R)-tartaric acid is 0.1°

3. Draw the possible geometric isomers (where possible) for each of the following compounds:
i) Hexa-2,4-diene ii) 2,5-Dimethylbut-2-ene.

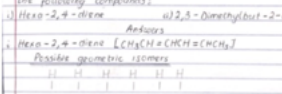
Answers

i. Hexa-2,4-diene $[CH_3CH=CHCH=CHCH_3]$

Possible geometric isomers

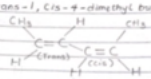


∴ Hexa-2,4-diene

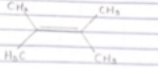


∴ Cis-1, trans-4-dimethylbut-2-ene

iii) Trans-1, cis-4-dimethyl but-2-ene

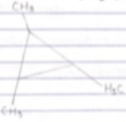


iv) 2, 3 - Dimethylbut - 2 - ene

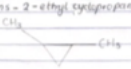


Possible Geometric Isomers

I 1 - cis - 2 - trans - 3 - trimethyl cyclopropane

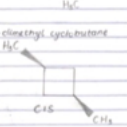


II 1 - methyl - trans - 2 - ethyl cyclopropane

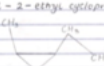


III cis - 1, 2, 3 - trimethyl cyclopropane

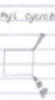
IV Cis-1, 3 - dimethyl cyclobutane



V Cis-1 - methyl - 2 - ethyl cyclopropane



VI Trans - 1, 2 - dimethyl cyclobutane



VII Trans - 1, 3 - dimethyl cyclobutane