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19/MHS01/378

Assignment

i) Name the functional groups present in each of the following molecules

i) $CH_2=C(OH)HCHO$ ii) $C_2H_5CH(NH_2)OCH_3$ iii) $CH_3C=CHCH(OH)CHO$

Answer

molecules	Functional groups
i) $CH_2=C(OH)HCHO$	- Aldehyde $(-CHO)$ - Hydroxyl groups $(-OH)$
ii) $C_2H_5CH(NH_2)OCH_3$	- carbonyl group $(-C(O)$ - Amine $(-NH_2$
iii) $CH_3C=CHCH(OH)CHO$	- Hydroxyl group $(-OH)$ - Aldehyde $-(CHO)$

ii) A 0.850g sample of pure (2R, 3R)-tartaric acid was diluted to $100cm^3$ with water and placed in a $1.0dm^3$ polarimeter ~~tube~~ tube. The observed ~~reaction~~ rotation at 20°C was +1.0°. Calculate the specific reaction of (2R, 3R)-tartaric acid

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

where $[\alpha]$ = Specific optical reaction

α = observed reaction

c = concentration in g/dm^3

l = path length (in dm)

$\alpha = +1.0°$

$l = 1.0dm$

$c = ?$

The concentration is always measured in g/m³s. In the question

$1\,cm^3 = 1mL$

$10\,cm^3 = ?$ $\Rightarrow \frac{10\,cm^3 \times 1mL}{1\,cm^3} = 10mL \Rightarrow C = 10mL$

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

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

$[\alpha] = 0.1°$

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

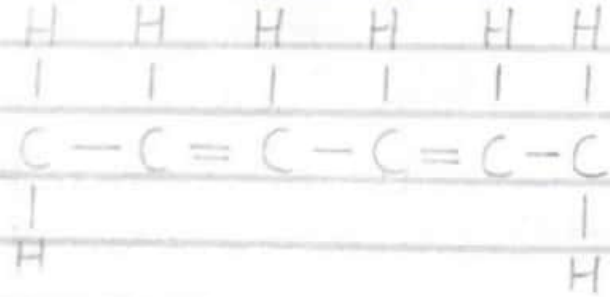
3 Draw the possible geometric isomers (where possible) for each of the following compounds:

i) Hexa-2,4-diene ii) 2,3-Dimethylbut-2-ene.

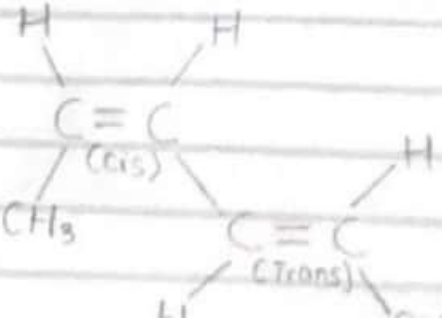
Answers

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

Possible geometric isomers

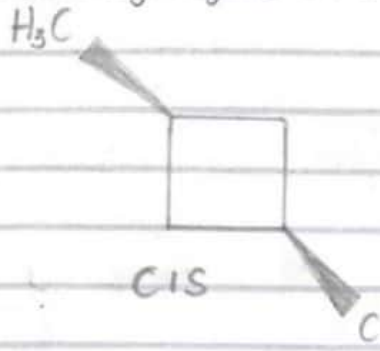


i ∴ Hexa-2,4-diene

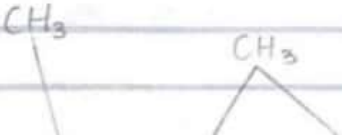


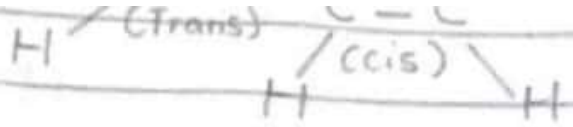
II ∴ Cis-1, trans-4-dimethyl but-2-ene

IV Cis-1,3-dimethyl cyclobutane

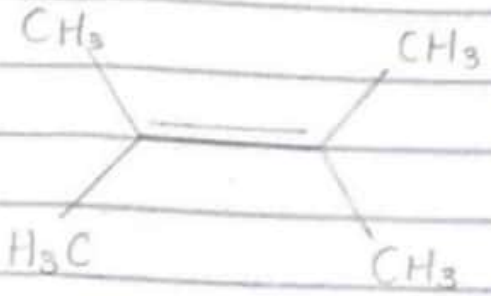


V Cis-1-methyl-2-ethyl cyclopropane



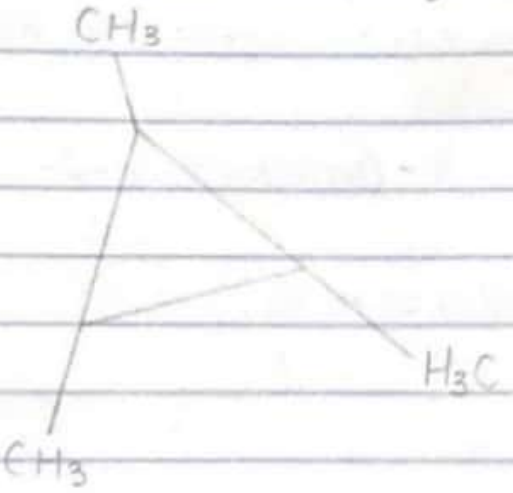


2, 3 - Dimethyl but - 2 - ene

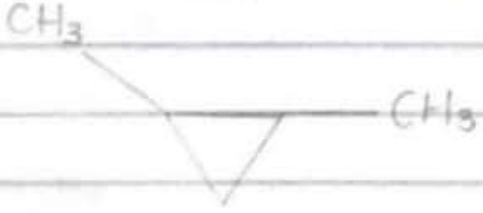


Possible Geometric Isomers

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



1 - methyl - trans - 2 - ethyl cyclopropane



cis - 1, 2, 3 - trimethyl cyclopropane