

Assignment

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

- i) $\text{CH}_3 - (\text{OH}) - \text{HC}(\text{HO})$ ii) $\text{C}_2\text{H}_5 (\text{H}(\text{NH}_2) \text{COCH}_3$ iii) $\text{H}_2\text{C} = (\text{H}(\text{CHOH}))\text{CHO}$

Answer

molecules	Functional groups
i) $\text{CH}_3 - (\text{OH}) - \text{HC}(\text{HO})$	- Aldehyde (-CHO) - Hydroxyl group (-OH)
ii) $\text{C}_2\text{H}_5 (\text{H}(\text{NH}_2) \text{COCH}_3$	- Carbonyl group (-C=O) - Amine (-NH ₂)
iii) $\text{H}_2\text{C} = (\text{H}(\text{CHOH}))\text{CHO}$	- Hydroxyl group (-OH) - Aldehyde (-CHO)

2) A 0.850g sample of pure (2R, 3R)-tartaric acid was diluted to 10cm³ with water and placed in a 1.0dm³ polarimeter tube. The observed reaction rotation at 20°C was +1.0°. Calculate the specific reaction of (2R, 3R)-tartaric acid

soln

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

l

where $[\alpha]$ = specific optical reaction

α = observed reaction

c = concentration in g/dm³

l = path length (in dm)

$$\alpha = +1.0^\circ$$

$$l = 1.0 \text{ dm}$$

$$c = ?$$

The concentration is always measured in g/dm³. In the question

$$1 \text{ cm}^3 = 1 \text{ mL}$$

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

$$[\alpha] = \frac{\alpha}{c \cdot l} = \frac{1.0}{10 \times 1.0}$$

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

$$[\alpha] = 0.1^\circ$$

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:

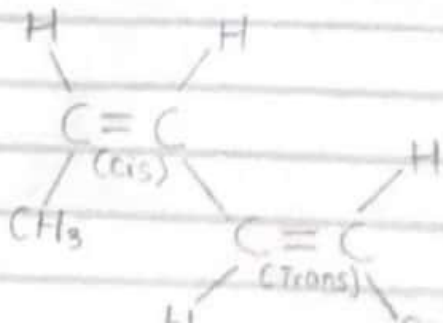
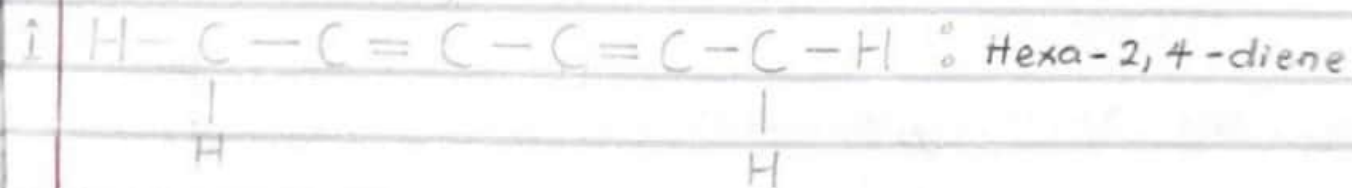
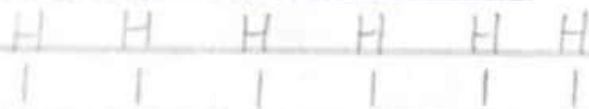
i) Hexa-2,4-diene

ii) 2,3-Dimethylbut-2-ene

Answers

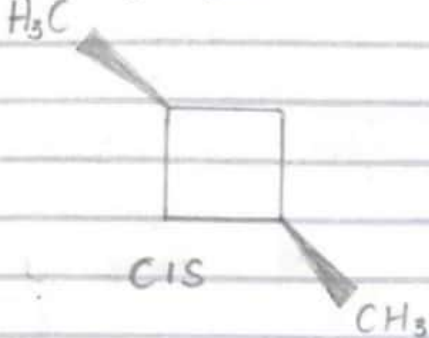
i) Hexa-2,4-diene $[\text{CH}_3\text{CH}=\text{CHCH}=\text{CHCH}_3]$

Possible geometric isomers



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

IV Cis-1,3-dimethyl cyclobutane



V Cis-1-methyl-2-ethyl cyclopropane

