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MAT NO: 19/MH501/274

DEPT: MEDICINE AND SURGERY

CHEM102 ASSIGNMENT

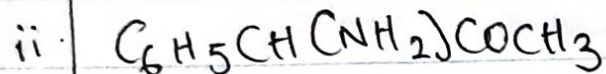
1. Name the functional groups present in each of the following molecules



a) Hydroxyl (OH)

b) Alkene (Double bond chain)

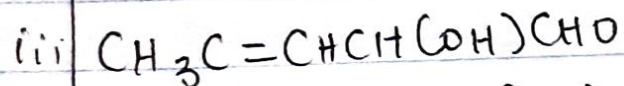
c) Alkanal ($\text{C}=\overset{\text{O}}{\text{H}}$)



a) Amine group (NH_2)

b) Phenyl group (C_6H_5) with double bonds

c) Alkanone / Ketone ($\text{C}=\overset{\text{O}}{\text{R}}$)



a) Hydroxyl group (OH)

b) Alkene ($\text{C}=\text{C}$)

c) Alkanal ($\text{C}=\overset{\text{O}}{\text{H}}$)

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

Solution

Recall;

$$[\alpha]_D^{20} = \frac{\alpha}{l \times c}$$

where; l = length of sample tube

α = Observed rotation

From the formula $c = \frac{m}{v}$, $m = 0.856g$
 $v = 10 \text{ cm}^3$

where, c = concentration (g l⁻³)

m = mass of the solute dissolved (g)

v = total volume of the solution (cm³)

$$c = \frac{0.856g}{10 \text{ cm}^3}$$

$$c = 0.0856 \text{ g cm}^{-3}$$

$$S_D = \frac{(1.0)}{1.0 \times 0.0856}$$

$$S_D = 11.68^\circ$$

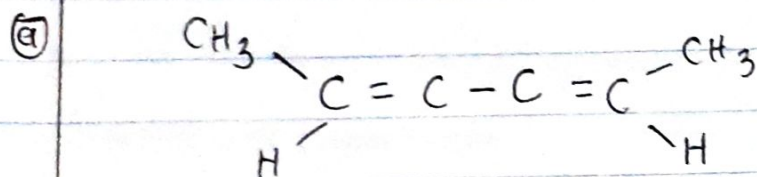
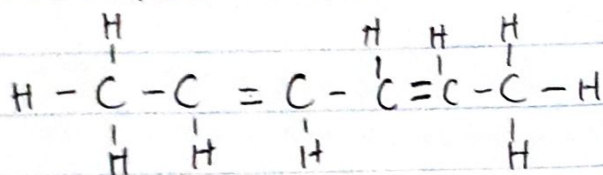
3 Draw the possible geometric isomers (where possible) for each of the following compounds;

i) Hexa-2,4-diene

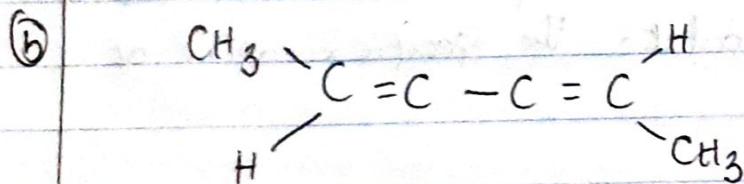
ii) 2,3-dimethylbut-2-ene

Solution

i) Structure of Hex-2,4-diene; (C_6H_{10})

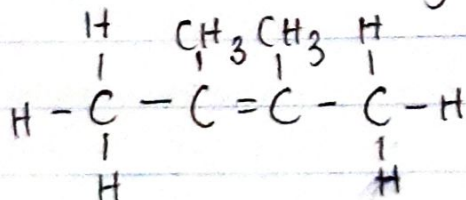


Cis



Trans.

ii) Structure of 2,3-Dimethylbut-2-ene (C_6H_{12})



2,3 dimethylbut-2-ene has no geometric isomer (cis or trans) because it has two identical groups attached to the same carbon of the double bond.