

## CHM 102 ASSIGNMENT

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DEPT: PETROLEUM ENGINEERING

MATRIC NO: 19/ENG07/018

### ASSINGMENT

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

i.  $\text{CH}_2=\text{C}(\text{OH})\text{HCHO}$ : Hydroxyl group or alkanol (OH) and aldehyde, alkanal (CHO) and alkene(double bond)

ii.  $\text{C}_6\text{H}_5\text{CH}(\text{NH}_2)\text{COCH}_3$ : Amine( $\text{NH}_2$ ) and ketones( $\text{C}=\text{O}$ )

iii.  $\text{CH}_3\text{C}=\text{CHCH}(\text{OH})\text{CHO}$ : Hydroxyl group or alkanol (OH), aldehyde or alkanal (CHO) and alkene(double bond)

2. A 0.856g sample of pure (2R,3R) – tartaric acid was diluted to 10cm<sup>3</sup> with water and placed in a 1.0 dm polarimetre tube the observed rotation at 20°C was +1.0° calculate the specific rotation of (2R,3R) tartaric acid.

i. Specific rotation is given by  $[\alpha]$  in  $\text{g}^{-1} \text{cm}^3 \text{dm}^{-1}$

ii.  $\alpha$  = observed rotation in degree

iii.  $c$  = concentration of optically active solute in  $\text{gcm}^{-3}$

iv.  $L$  = path length in dm

Recall that,

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

$c = 0.0856 \text{gcm}^{-3}$ ,

$L = 1.0 \text{ dm}$ ,

$\alpha = 1.0^\circ$ ,

$T = 20^{\circ}\text{C}$ , wavelength = 589nm

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$[\alpha] = \text{specific rotation in } \text{g}^{-1} \text{cm}^3 \text{dm}^{-1}$

$\alpha = \text{Observed rotation in degree}$

$C = \text{concentration of optically active solute in g/cm}^3$

$L = \text{path length in dm}$

Recall that

$T = \text{Temperature}$

$\lambda = \text{Wave length used} = 589\text{nm}$

N.B. The most common wavelength used is 589nm

$$0.8569 \text{ — } 100\text{cm}^3$$

$$\propto 9 \text{ — } 1000\text{cm}^3$$

$$\frac{0.8569 \times 1000}{10} = 85.69\text{cm}^3$$

$$\text{concentration in g/cm}^3 = \frac{\text{concentration (g/cm}^3\text{)}}{1000}$$

$$C = \frac{85.6}{1000} = 0.08569\text{g/cm}^3$$

$$[\alpha]_{589}^{20} = \frac{\alpha}{C \cdot L}$$

$$[\alpha] = \frac{+1^{\circ}}{0.08569 \times 1} = 11.68^{\circ} \text{g}^{-1} \text{cm}^3 \text{dm}^{-1}$$



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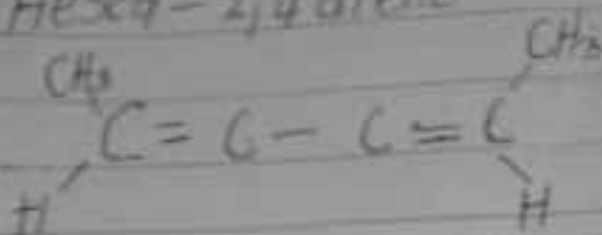
3. draw the possible geometric isomers (where possible) for each of the following compounds

i. Hexa-2,4 diene

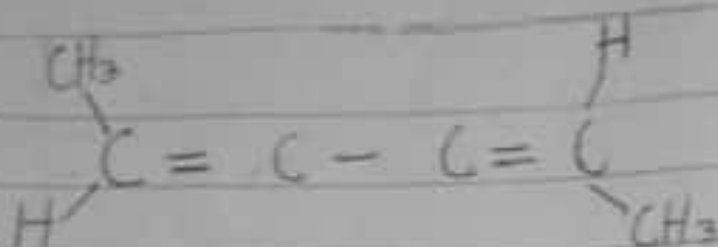
ii. 2,3 di methyl but 2-ene

3

i. Hexa-2,4 diene

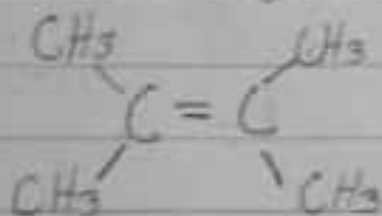


Cis-Hexa-2,4 diene



Trans-Hexa-2,4 diene

ii 2,3 - dimethyl but-2-ene



There is no geometric isomer



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