16/09/2020

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COURSE: CHEM 102

Answers to Questions 1

1. $CH_2=C(OH)HCHO$
Functional groups present;
(i) Alkene
(ii) Alkanols
(iii) Alkanals

(ii) $C_6H_5CH(NH_2)COCH_3$
Functional groups present;
(i) Methyl
(ii) Phenyl
(iii) Amine
(iv) Alkanone

(iii) $CH_3C=CHCH(OH)CHO$
Functional groups present;
(i) Methyl
(ii) Alkene
(iii) Alkanols
(iv) Alkanals

Question 2

Q.

Specific rotation = $\frac{\text{Observed rotation}}{\text{Concentration} \times \text{path length of sample cell}}$

$[\alpha]^T_\lambda = \frac{\alpha}{c \cdot l}$ where;

T = temperature ($^\circ C$)

λ = wavelength of light source

α = Observed rotation ($^\circ$)

C = Concentration of mixture (g/cm^3)

l = path length of cell (dm)

$\therefore \alpha = +1.0^\circ$, $C = 0.8556 g/10cm^3$, $l = 1.0 dm$

$\therefore [\alpha]^{20^\circ}_D = \frac{+1.0^\circ}{(0.8556 g/10cm^3) \times 1 dm}$

$= \frac{+1.0^\circ}{(0.0856 g/cm^3) dm}$

$[\alpha]^{20^\circ}_D = 11.68^\circ g^{-1} cm^3 dm^{-1}$

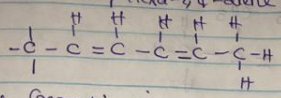
Specific rotation $= 11.68^\circ g^{-1} cm^3 dm^{-1}$

Question 3

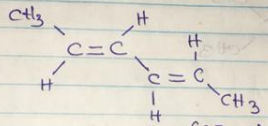
3. Geometric isomers

(i) Hexa-2,4-diene

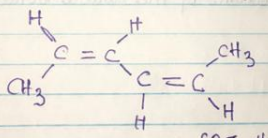
The structure of Hexa-2,4-diene



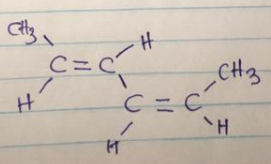
The Geometric isomers are

1. 

(2E,4E)-hexa-2,4-diene

2. 

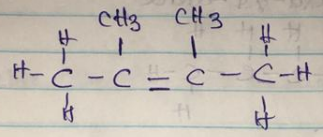
(2Z,4Z)-hexa-2,4-diene

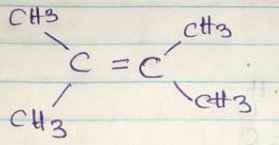
3. 

(2Z, 4E)-hexa-2,4-diene

3(ii) 2,3-dimethylbut-2-ene

The structure of 2,3-dimethylbut-2-ene



$\therefore$ 

$\therefore$ 2,3-dimethylbut-2-ene does not have any geometric isomer because the same compound is combined with the same carbon atom of the double bond.