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MATRIC N0: 19/ENG05/016
DEPARTMENT: MECHATRONICS ENGINEERING.
COURSE: CHM 102

COVID-19 HOLIDAY ASSIGNMENT

Question 1

Name the functional groups present in each of the following molecules
(i) $CH_2 = C(OH)HCHO$
(ii) $C_6H_5CH(NH_2)COCH_3$
(iii) $CH_3C = CHCH(OH)CHO$

SOLUTION

S/NO	Organic Compound	Functional Groups
(i)	$CH_2 = C(OH)HCHO$	Aldehyde or Alkanal(Carbonyl)group; Alkanol(Hydroxyl)group; Alkene(double bond) group.
(ii)	$C_6H_5CH(NH_2)COCH_3$	Ketone or Alkanone(Carbonyl)group; Amine group
(iii)	$CH_3C = CHCH(OH)CHO$	Aldehyde or Alkanal(Carbonyl)group; Alkanol(Hydroxyl)group; Alkene(double bond) group.

Question 2

A 0.856 g sample of pure (2R, 3R)-tartaric acid was diluted 10 cm^3 with water and placed in a 1.0 dm polarimeter tube. The observed rotation at 20^0C was $+1.0^0$. Calculate the specific rotation of (2R, 3R)-tartaric acid.

SOLUTION

Using,

Specific Rotation = $[\alpha]_\lambda^T = \frac{\alpha}{c \times l}$

Where c = concentration (g/ml) = 0.0856 g/ml
l = path length (dm) = 1.0 dm
$[\propto]$ = specific rotation (^{0}) = ?
$\propto$ = observed rotation (^{0}) = 1.0^0
T = temperature = 20^0C
λ = wavelength of light

Concentration of pure (2R, 3R)- tartaric acid is;
10 ml of solution contains 0.856 g of tartaric acid
Then 1 ml of solution would contain;

$$= \frac{1\,ml \times 0.856\,g}{10\,ml}$$

$= 0.0856\ g\ ml^{-1}$

$$[\alpha]_{\lambda}^{20} = \frac{1.0}{0.0856 \times 1.0}$$

$$= \frac{1.0}{0.0856}$$

$= +11.68^{0}$

Question 3

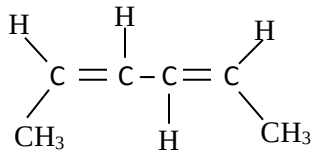
Draw the possible geometric isomers (where possible) for each of the following compounds:

(i) Hexa – 2, 4 – diene

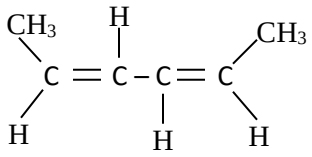
(ii) 2, 3 – dimethylbut – 2 – ene

SOLUTION

(i) Hexa – 2, 4 – diene



(a)



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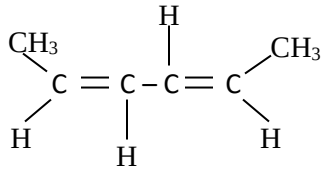

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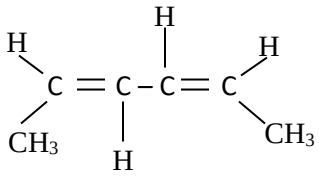
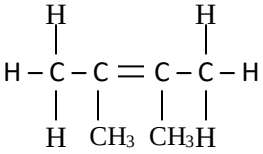
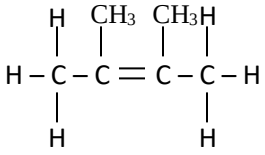


(d)

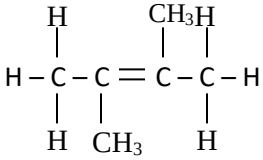
(ii) 2, 3 – dimethylbut – 2 – ene



(a)



(b)



(c)