CHM 102

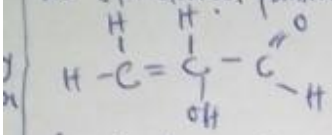
Solution

(1)

(i)

$CH_2=C(OH)HCHO$

The structural formular;



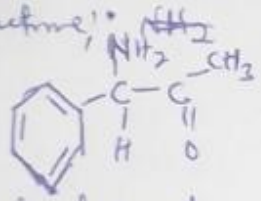
functional present are;

- Double bond chain = (Alkene)
- OH (hydroxyl gmp)
- $\overset{=O}{C}_{H}$ (alkanal)

(ii)

$C_6H_5CH(NH_2)COCH_3$

Structure;



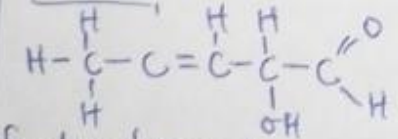
functional present

- phenyl gmp (C_6H_5) with double bonds.
- Amine.
- Alkanone/ketone $\left(\overset{=O}{C}-R\right)$

(iii)

$CH_3C=CHCH(OH)CHO$

Structure;



functional present

- Alkene (C=C)
- Hydroxyl gmp (OH)
- Alkanal $\left(\overset{=O}{C}-H\right)$

(2)

Recall;

$$[\alpha]^T_\lambda = \frac{\alpha}{l \times c}$$

where

l = length of sample tube

$C = \frac{\text{mass}}{\text{volume}}$ (g/dm) or (g/mol)

α = observed rotation

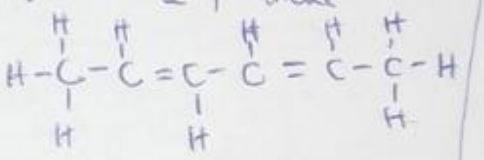
$$S_r = \frac{1.0}{1.0 \times \left(\frac{0.856}{14}\right)}$$

$$S_r = \frac{1}{0.0856} = 11.68$$

(3)

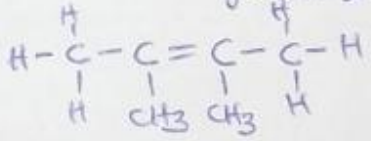
(i)

Hexa-2-4 diene.

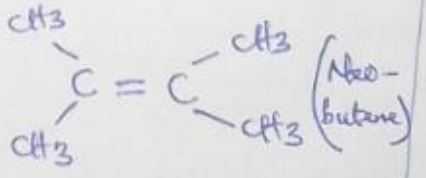


(ii)

2,3-Dimethylbut-2-ene.



OR



1 (i) (a) Formyl group (Aldehyde) group (CHO)

(b) Hydroxyl group (OH)

(c) Alkene group (double bond).

(ii) (a) ~~Aldehyde group~~ ~~CHO~~ Keto group (Carbonyl group) $C=O$

(b) Amino group (NH_2)

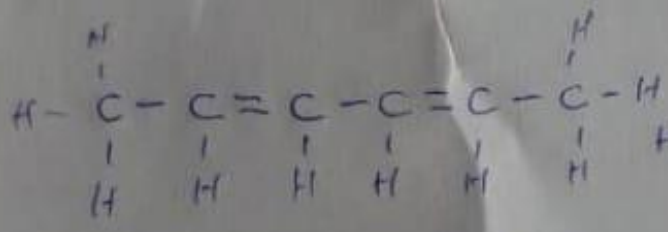
(c) Aromatic group (phenyl group).

(iii) (a) Aldehyde group

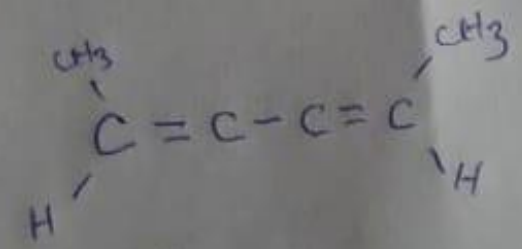
(b) Hydroxyl group

(c) double bond (Alkene group)

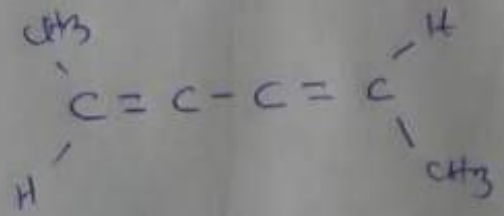
3 (i)



Hexa-2,4-diene

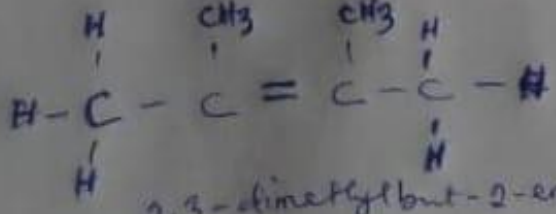


Cis-

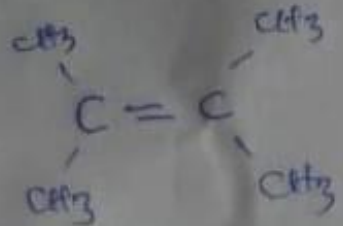


trans-

ii



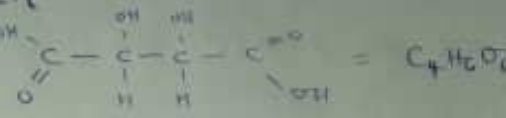
2,3-dimethylbut-2-ene



No geometric isomer

Concentration ($mol\,dm^{-3}$) = $\frac{\text{Conc. } (g\,dm^{-3})}{\text{molar mass } (g\,mol)}$

$$[\alpha]_\lambda^T = \frac{\alpha}{c \cdot l}$$

Tartaric acid =  = $C_4H_6O_6$

molar mass = 150 $g\,mol^{-1}$

0.856 g —— 10 cm^3

x g —— 1000 cm^3

$\frac{0.856 \times 1000}{10}$ = 85.6 $g\,dm^{-3}$

Concentration in $g\,cm^{-3}$ = $\frac{\text{concentration } (g\,dm^{-3})}{1000}$

= $\frac{85.6}{1000}$ = 0.0856 $g\,cm^{-3}$

$$[\alpha]_\lambda^T = \frac{\alpha}{c \cdot l} = \frac{+1.0}{0.0856 \times 1} = 11.68^\circ$$

Use this pls ↓

$[\alpha]_\lambda = \frac{\alpha}{c \cdot l}$; $\alpha = +1.0^\circ$, $c = \frac{0.856}{10} = 0.0856\ g/cm^3$

= $\frac{+1.0}{0.0856} = 11.68^\circ$