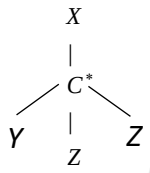
Structural and stereo isomerism

21. (b) $\underset{1-\text{butane}}{CH_3-CH_2-CH=CH_2}$ & $\underset{2-\text{butane}}{CH_3-CH=CH-CH_3}$

22. (a) $\underset{\substack{(\text{Cis})\\ 2\text{-butene}}}{\begin{matrix} HC & = & CH \\ | & & | \\ CH_3 & & CH_3 \end{matrix}}$ and $\underset{\substack{(\text{Trans})\\ 2\text{-butene}}}{\begin{matrix} HC & = & CH \\ | & & | \\ CH_3 & & CH_3 \end{matrix}}$

23. (a) Four groups linked to carbon atom are different



24. **(a)** $\begin{matrix} H \\ H_3C \end{matrix}\!\!>\!C=C\!<\!\begin{matrix} H \\ CH_3 \end{matrix}$

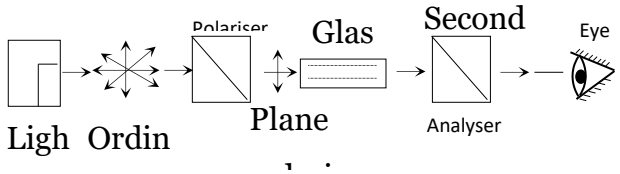
25. (d) Five isomers of C_4H_8

1. $\underset{\text{Isobutene}}{CH_3-\overset{\overset{CH_3}{|}}{C}=CH_2}$ 2. $\underset{1-\text{butene}}{CH_3CH_2-CH=CH_2}$

3. $\underset{\text{Cyclobutane}}{\begin{matrix} H_2C & - & CH_2 \\ | & & | \\ H_2C & - & CH_2 \end{matrix}}$ 4. $\underset{\text{Trans-2-butene}}{\begin{matrix} CH_3 & & H \\ & C=C & \\ H & & CH_3 \end{matrix}}$

5. $\underset{\text{cis-2-butene}}{\begin{matrix} CH_3 & & CH_3 \\ & C=C & \\ H & & CH_3 \end{matrix}}$ 6. $\underset{\text{Methylcyclopropane}}{\begin{matrix} & CH_3 & \\ & \diagup\diagdown & \\ CH_2 & & CH_2 \end{matrix}}$

26. (b) Polarimeter is an instrument used for measuring the optical rotation. It consists of two Nicol prisms, one called the polarizer (near the light source) and the other called the analyser (near the eye). In between the polarizer and analyser, a glass tube containing the solution of an optically active compound is placed.



Rav diagram of

27. (d) $\underset{\text{n-butane}}{CH_3-CH_2-CH_2-CH_3}$ and $\underset{\text{Iso-butane}}{CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3}$

28. (c) Metamerism is a special types of isomerism shown by secondary amines, ethers and ketones.

29. (c) $\underset{\text{Pentan-1-ol}}{CH_3-CH_2-CH_2-CH_2-CH_2-OH}$

$\underset{\text{3-Methylbutan-1-ol}}{CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-CH_2-OH}$

$\underset{\text{2-Methyl butan-1-ol}}{CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-OH}$

$\underset{\text{2,2-Dimethyl propan-1-ol}}{CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}-CH_2-OH}$

30. (d) Position isomers :

$\underset{\text{Butan-1-ol}}{CH_3-CH_2-CH_2-CH_2-OH}$ and

$\underset{\text{Butan-2-ol}}{CH_3-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3}$

Functional isomers:

$\underset{\text{Butanol}}{CH_3CH_2CH_2-CH_2-OH}$ and $\underset{\text{Diethylether}}{C_2H_5-O-C_2H_5}$

Metamers: $\underset{\text{Diethylether}}{C_2H_5-O-C_2H_5}$ and $\underset{\text{Methyl propyl ether}}{CH_3-O-C_3H_7}$

31. (a) 1. $\underset{\text{Butan-1-ol}}{CH_3-CH_2-CH_2-CH_2-OH}$

2. $\underset{\text{Butan-2-ol}}{CH_3-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3}$

3. $\underset{\text{2 methyl propan-1-ol}}{CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-OH}$

4. $\underset{\text{2-Methyl propan-2-ol}}{CH_3-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3}$

32. (d) $C_4H_{10}O$ have six isomers are possible

1. $\underset{\text{Butan-1-ol}}{CH_3CH_2CH_2CH_2-OH}$

2. $\underset{\text{Butan-2-ol}}{CH_3-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3}$

3. $\underset{\text{2-Methyl propan-1-ol}}{CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-OH}$

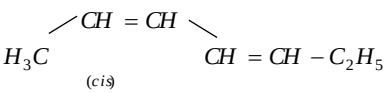
4. $\underset{\text{2–Methyl-propan-2-ol}}{CH_3-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3}$

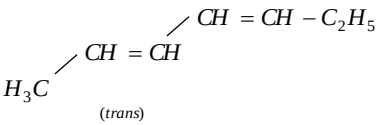
5. $\underset{\text{Methylpropyl ether}}{CH_3-O-C_3H_7}$

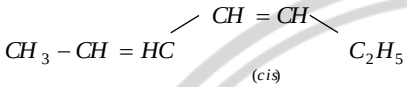
6. $\underset{\text{Diethylether}}{C_2H_5-O-C_2H_5}$

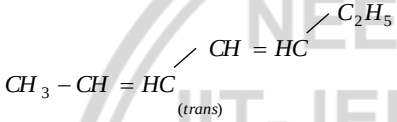
33. (b) $\underset{(cis)}{\overset{Cl}{\diagdown}CH=CH\overset{Cl}{\diagup}}$ $\underset{(trans)}{\overset{Cl}{\diagup}CH=CH\overset{Cl}{\diagdown}}$

34. (a) $\overset{1}{CH_3}-\overset{2}{CH}=\overset{3}{CH}-\overset{4}{CH}=\overset{5}{CH}-\overset{6,7}{C_2H_5}$

1. 

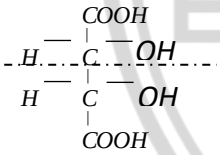
2. 

3. 

4. 

35. **(c)** Polarization

36. (a) Molecular symmetry

 Plane of Symmetry

Mesotartaric acid is optically inactive due to internal compensation *i.e.* the effect one half of the molecule is neutralized by other.

37. (b) $CH_3-\overset{H}{\underset{OH}{\overset{|}{\underset{|}{C^*}}}}-COOH$ * chiral centre is present.

38. (b) $COOH-\overset{CH_3}{\underset{OH}{\overset{|}{\underset{|}{C^*}}}}-CH_2-CH_3$

One chiral centre. Therefore two forms are possible.

39. (c) Optical isomerism and geometrical isomerism.

40. (d) (a) $CH_3CH_2CH_2COOH\ (C_4H_8O_2)$

(b) $CH_3CH_2-COOCH_3\ (C_4H_8O_2)$

Diethyl ether $C_2H_5-O-C_2H_5$ is position isomer and not stereoisomer.