## Structural and stereo isomerism

**1.** (a) n-Butane ($CH_3–CH_2–CH_2–CH_3$)

Positions for chlorination:

- **1-chlorobutane**
- **2-chlorobutane**

→ **Exactly 2 isomers**

**2.** (a) $C-\underset{\underset{C}{|}}{C}-C-C-C$ and $\underset{\underset{C}{|}}{C}-\underset{\underset{C}{|}}{C}-C$

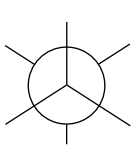
**3.** **(b)** $(CH_3)_3C-OH$

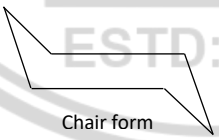
**4.** **(c)** Molecular formula

**5.** (b) $CH_3-\underset{\underset{Cl}{|}}{\overset{\overset{H}{|}}{\overset{*}{C}}}-COOH$

In this structure chiral carbon atom is present since it is optical active.

**6.** (b) In ethane staggard form and in cyclohexane chair form is more stable.






**7.** (d) $CH_3-CH_2-\underset{\underset{H}{|}}{\overset{\overset{NH_2}{|}}{C^*}}-CH_3$

Chiral centre is present. Hence, it exists as optical isomers or enantiomorphs.

**8.** (c) In $C_6H_5CH_2CH_3$ chiral centre is absent.

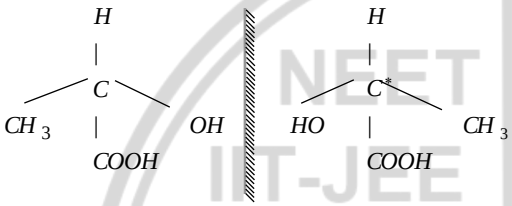
**9.** (c) $C_2H_2Br_2$ has three isomers.

(1) $H-\underset{\underset{Br}{|}}{C}=\underset{\underset{Br}{|}}{C}-H$ (*cis*) 1,2-dibromoethene

(2) $\overset{\overset{Br}{|}}{CH}=\underset{\underset{Br}{|}}{CH}$ (Trans) 1, 2-dibromoethene

(3) $CH_2=C\begin{matrix}Br\\Br\end{matrix}$ 1,1–dibromoethene

**10.** (c) Lactic acid shows optical isomerism



**11.** (b) $CH_3-\underset{\underset{Cl}{|}}{\overset{\overset{H}{|}}{C^*}}-CH_2-CH_3$ 2-Chlorobutane

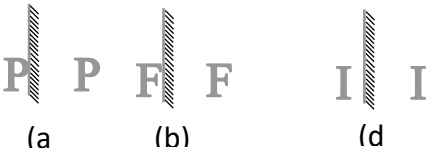
because they contain chiral carbon atom.

**12.** (a)

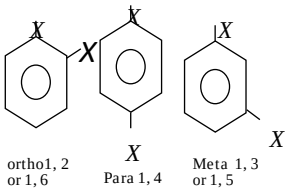
**13.** (a) $CH_3-\underset{\underset{Cl}{|}}{\overset{\overset{H}{|}}{C^*}}-CH_2-CH_3$

In other compounds chiral carbon is absent.

**14.** (c) Ball is achiral where other objects are chiral because objects and their mirror images are non-super imposable



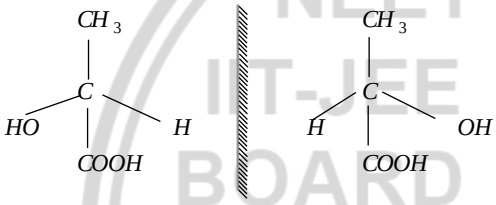
**15.** (c)




**16.** **(a)**

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

Only one chiral centre. Hence two optical isomers are possible.



No. of optical isomer = $2^n$ (where $n$ = no. of chiral carbon) = $2^1$ = 2.

**18.** (b) $H - \underset{H}{\overset{H}{C}} - \underset{H}{\overset{Cl}{C}} - Cl$

**19.** (a) $\underset{n-\text{butane}}{CH_3 - CH_2 - CH_2 - CH_3}$ and $\underset{\text{Iso-butane}}{CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_3}$

**20.** (d) $CH_3 - \underset{\underset{OH}{|}}{\overset{\overset{H}{|}}{C^*}} - CH_2 - CH_3$ Chiral structure is that in which one carbon atom is attached to 4 different atoms or groups.