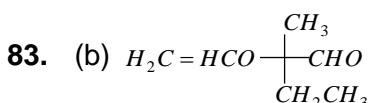


Structural and stereo isomerism

81. (a) Central carbon atom

82. (b) 3



84. (d) Restricted rotation is essential condition for geometrical isomerism.

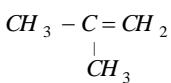
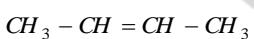
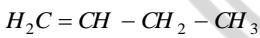
85. (d) Diastereoisomers

86. (b) Chain

87. (d) Glyceraldehyde



89. (b) Three isomeric structures are possible for C_4H_8



90. (c) Glucose has 4 chiral centres.

Number of optical isomers = $2^n = 2^4 = 16$

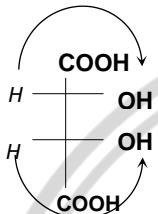
91. (b) A compound becomes **chiral** if a carbon has **four different groups** attached (a stereocenter).



- **C1 and C7:** $-\text{CH}_3$ groups \rightarrow only 3 bonds to different atoms \rightarrow **cannot be chiral**
- **C2, C3, C4, C5, C6:** each has $-\text{CH}_2-$ on both sides initially \rightarrow **not chiral**
- To make it chiral, you need **introduce a group (e.g., $-\text{OH}$, $-\text{Cl}$) on a carbon where all four substituents become different.**

92. (a) Enantiomers have same chemical properties but different physical properties.

93. (a) Meso isomer have two achiral carbon with opposite spin so it becomes optically inactive



Meso tartaric acid

94. (b) 5

Reason (short & work-friendly): $\text{C}_7\text{H}_8\text{O}$ must retain the benzene core ($\text{DBE} = 4$), so the constitutional isomers are benzene derivatives. The five distinct structural isomers are:

The five (named)

o-Cresol (2-methylphenol)

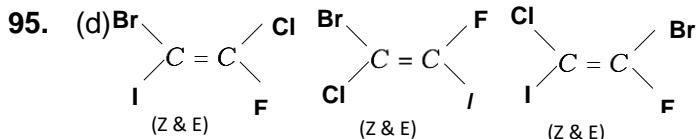
m-Cresol (3-methylphenol)

p-Cresol (4-methylphenol)

Benzyl alcohol ($\text{C}_6\text{H}_5\text{CH}_2\text{OH}$)

Anisole (methoxybenzene, $\text{C}_6\text{H}_5\text{OCH}_3$)

(These five are the commonly listed constitutional isomers of $\text{C}_7\text{H}_8\text{O}$.)



96. (b) Due to formation of the plane of symmetry by the syn addition of hydrogen in the triple bond, the compound formed is optically inactive.

97. The number of structural isomers of C_7H_{16} = 9.

List (for confirmation):

1. n-Heptane
 2. 2-Methylhexane
 3. 3-Methylhexane
 4. 2,2-Dimethylpentane
 5. 2,3-Dimethylpentane
 6. 2,4-Dimethylpentane
 7. 3,3-Dimethylpentane
 8. 3-Ethylpentane
 9. 2-Ethylpentane
- (9 total)

98. (a) $CH_3-CHCl-COOH$

Focus on middle carbon:



Attached to: $-H$, $-Cl$, $-CH_3$, $-COOH$

All four groups are different → this carbon is chiral.

99. (c) Both are included in stereoisomerism

100. (b) Plane polarised light

