Nishant Jindal

Relationship b/w Stereoisomers

Enantiomers

Compounds which are

(i) Non Superimposible (NO POS, NO COS NO AAOS)

(ii) & mirror imges of Each other

known as Enantiomers.

Note (i) Enantiomers are always optically

Diastereomers

Compounds which are

(i) Stereoisomer of each other (GI or OI)

(ii) & Non mirror imges of each other.

known as Diastereomers.

(or)

Stereoisomers which are not Enantiomers are known as Diaster

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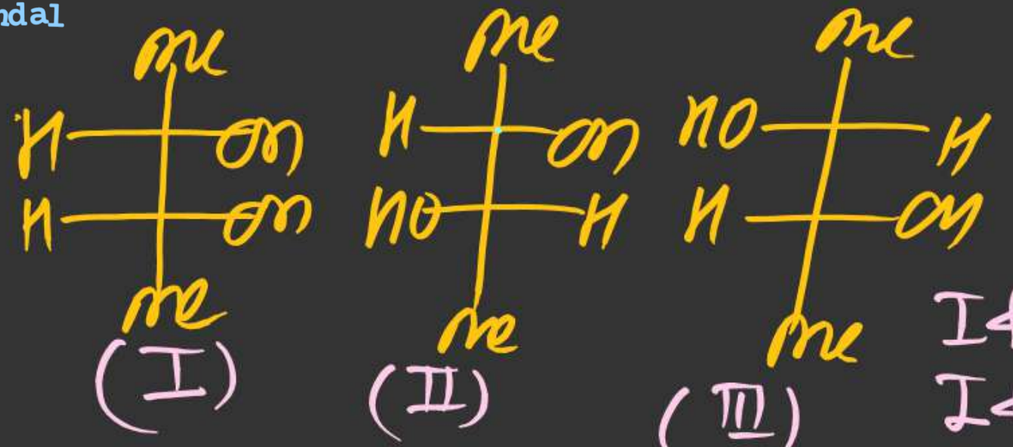
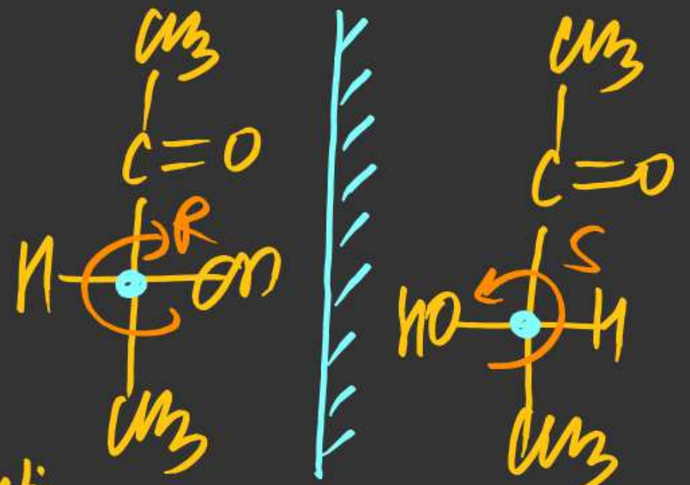
(2)



(I) (II) (III)

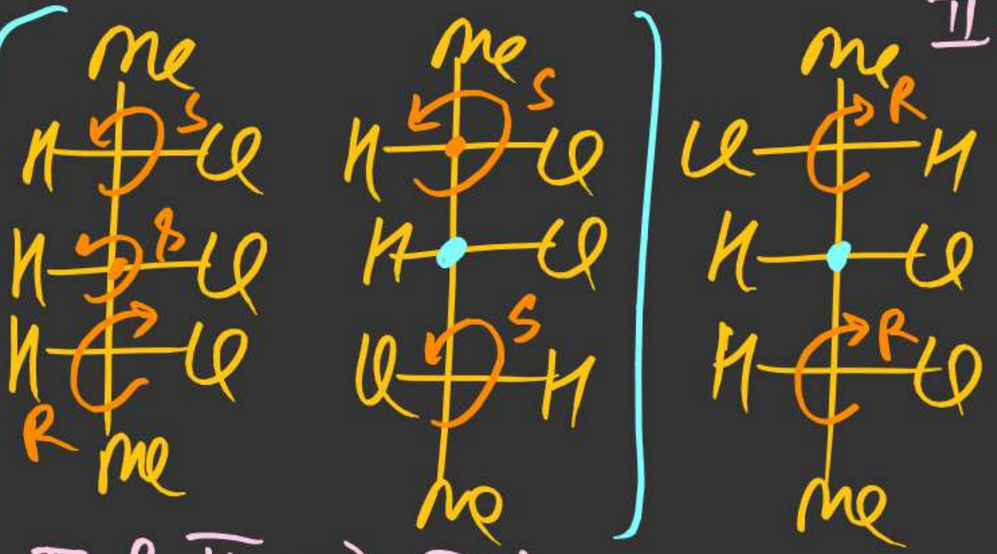
I & II ⇒ Dia
I & III ⇒ Dia
II & III ⇒ Enantiom

(4)



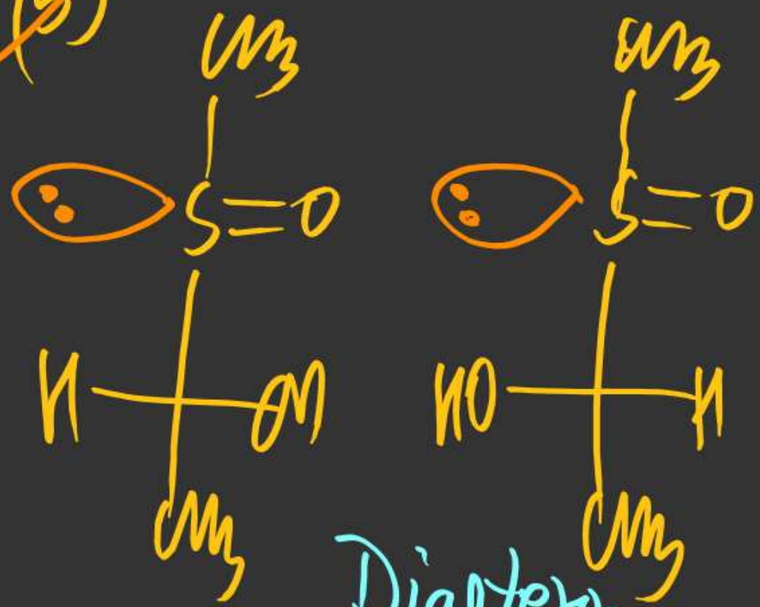
(Enantiomers)

(3)



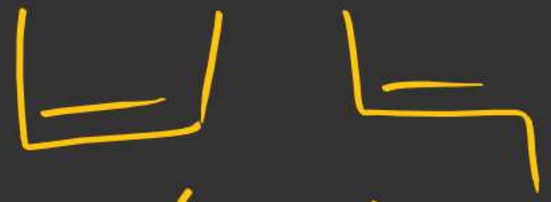
I & II ⇒ Dia
I & III ⇒ Dia
II & III ⇒ Enantiom

(5)



Diastereomers

(6)

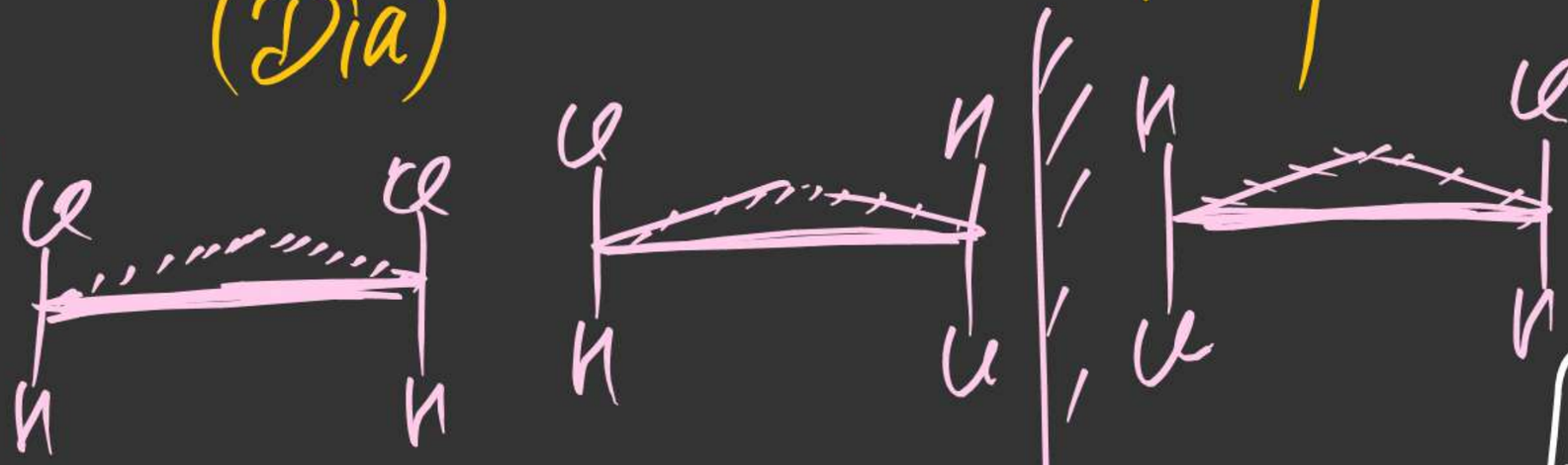


(Dia)

Stereoisomers | yes / No

Mirror image

(7)

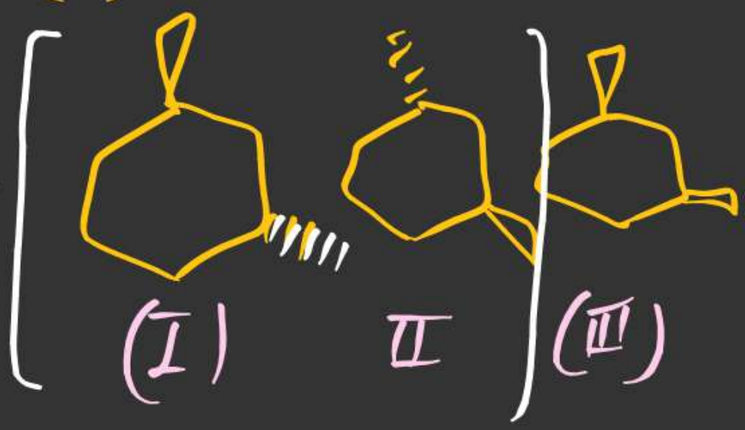


I & II ⇒ Dia

I & III ⇒ Dia

II & III ⇒ Enantiomers

(8)



I & II ⇒ Enantiomers

I & III ⇒ Dia

II & III ⇒ Dia

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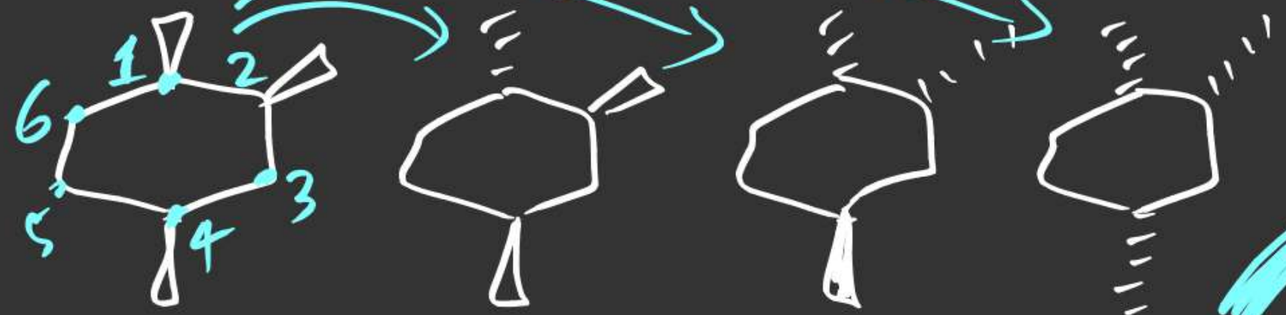
(9)



I & IV ⇒ Enantiomer

Rest all ⇒ Diastereomer / mirror image

(10)

(COS prompt) identical

(11)

Sn absent Sn absent Sn absent

I & II ⇒ Enantiomer

I & III ⇒ Enantiomer

II & III ⇒ identical

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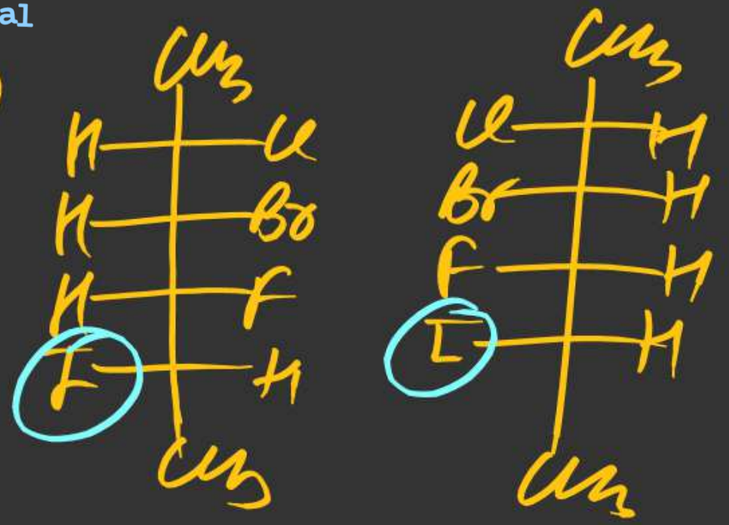
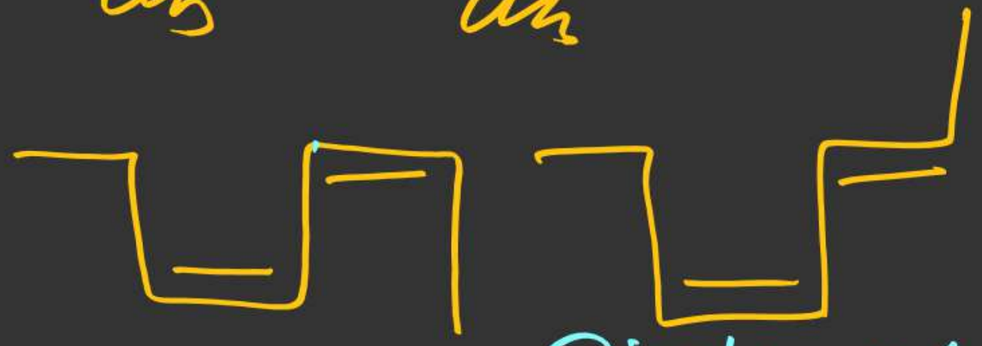
(12)



Diastereomers

(13)

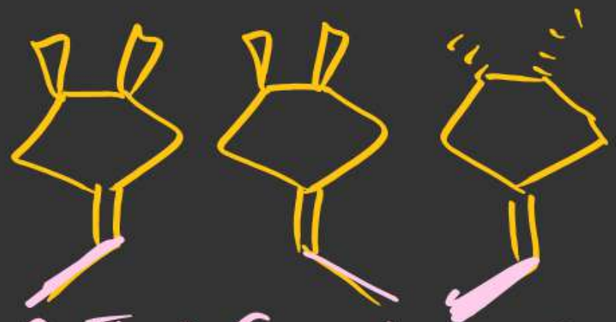


Diastereomers

(14)

(Enantiomers)

(15)



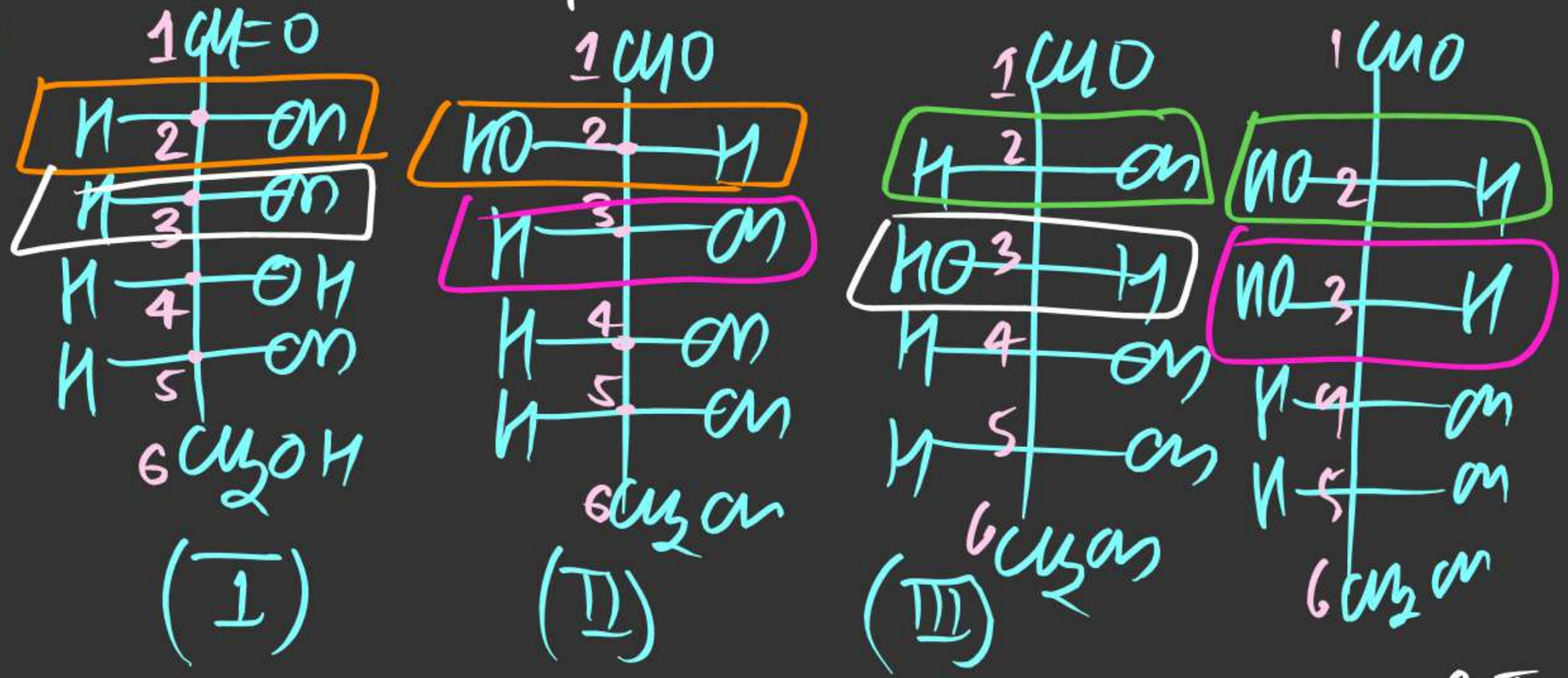
I & II ⇒ Enantiomers
I & III ⇒ ″
II & III ⇒ identical

(16)

(Enantiomers)

(#) **Epimers:-** Diastereomers which contain difference only at single chiral centre.

(17)



Note: All Epimers are diastereomers But converse is not true.

I & II ⇒ Diastereomers / C_2-Epimers

I & III ⇒ Diastereomers / C_3-Epimers

II & III ⇒ Diastereomers

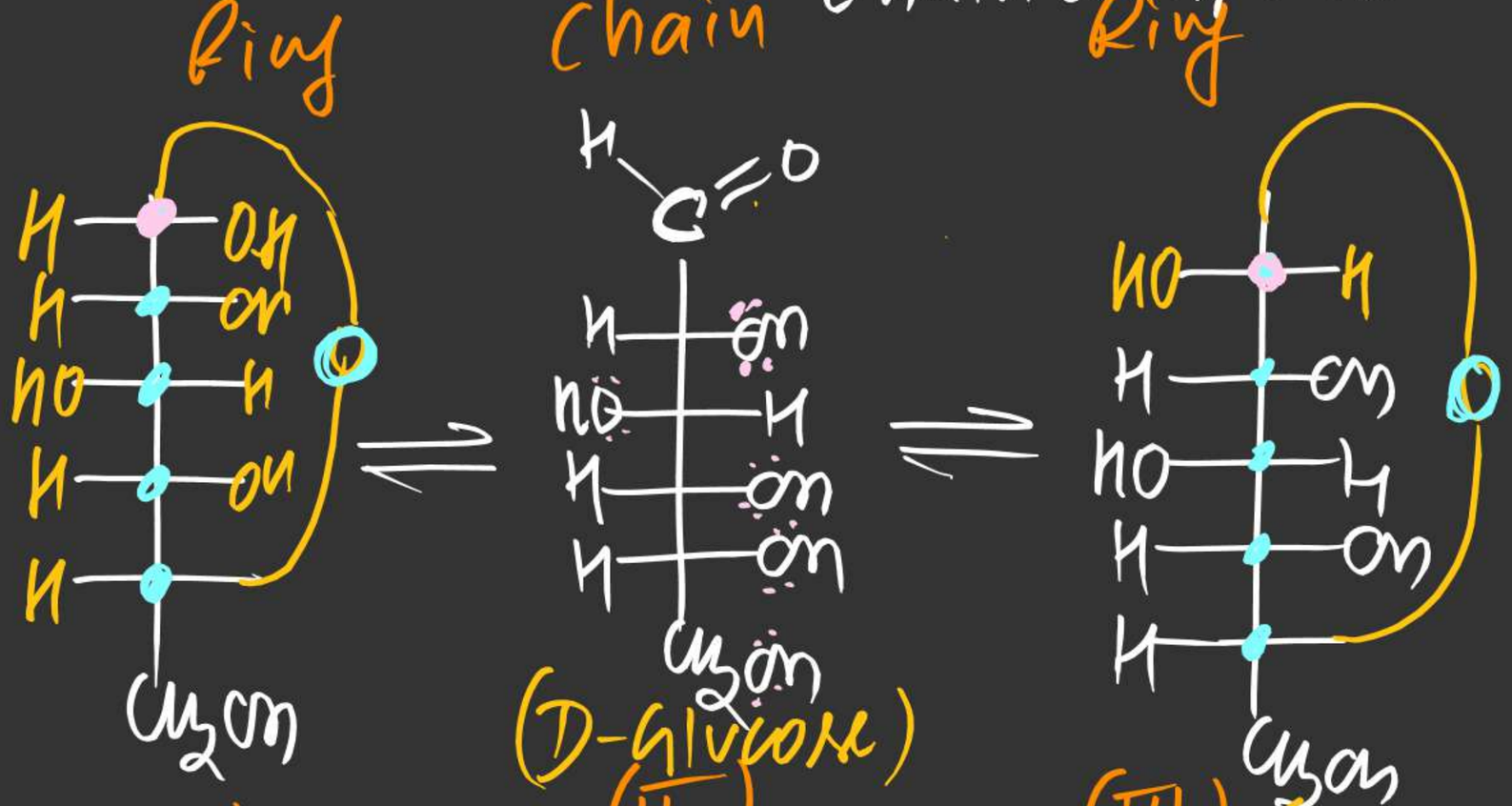
I & IV ⇒ Diasters

II & IV ⇒ Diast / C_3-Epimers

III & IV ⇒ Dia / C_2-Epimers

(#) **Anomers**:- Epimers which are obtained from same open chain compound.

(18)



I & II ⇒ Ring chain Tau
II & III ⇒ Ring chain Tau
I & III ⇒ Dia/Epimers
Anomers

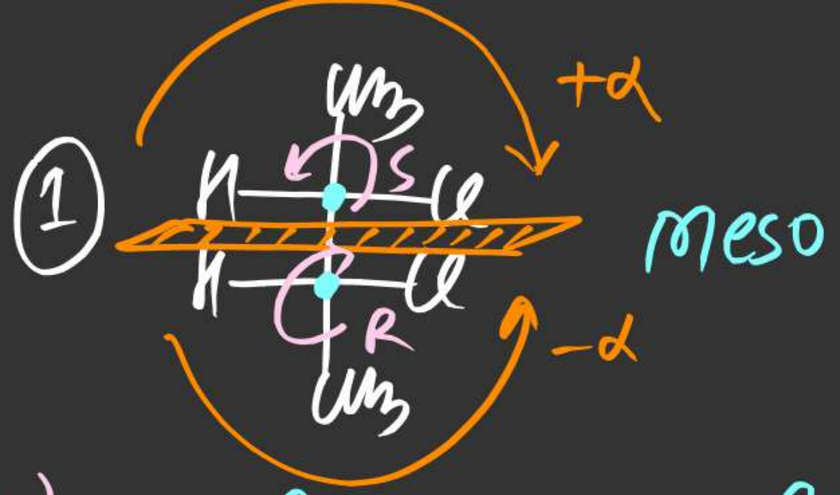
Note (1) All anomers are Epimers But converse is not true.

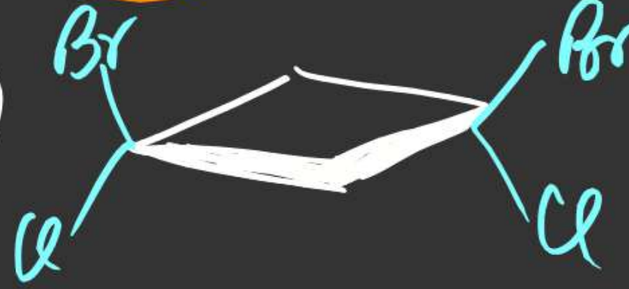
(#) Meso Compound:-

Compounds having

(i) at least Two chiral centre

(ii) at least any one from (POS/COS/Sn) must be present are known as meso Compound.





Not meso due to absence of chiral centre.

Note:- (i) meso Compound will show optical isomerism

(ii) _____ is optically inactive optical isomer. $\alpha_{obs} = (+\alpha) + (-\alpha) = 0$

(iii) meso compound's optical inactivity is due to internal Compensation of angle of Rotation.

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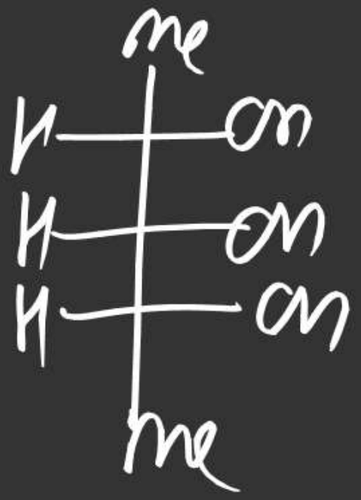
(3)

(4)

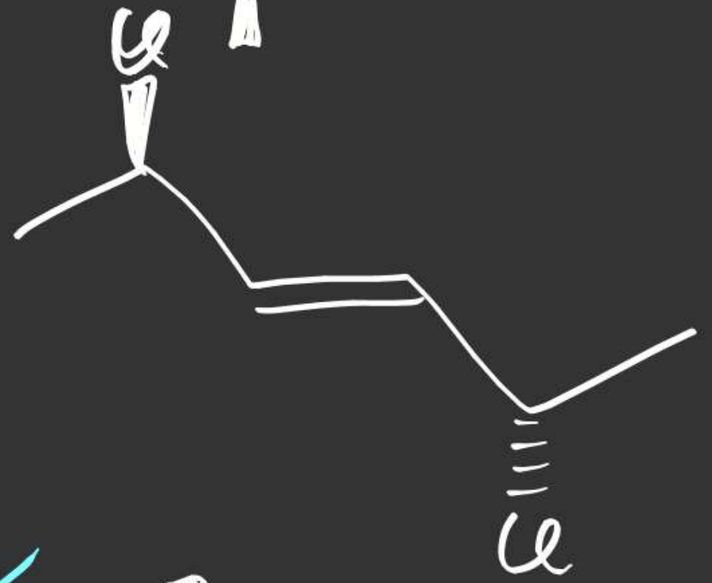
(5)



(6)

(7)

(8)

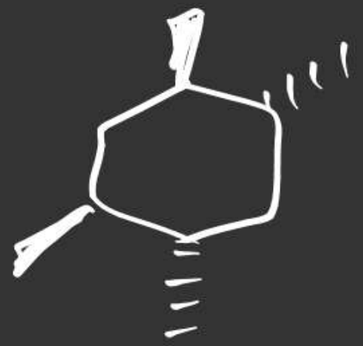


(9)

CC = 4
COS ⇒ Product

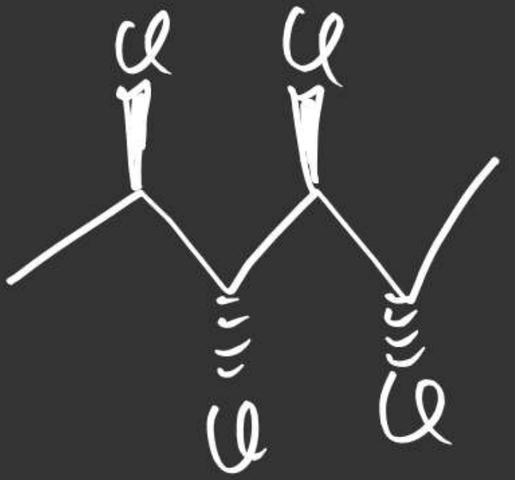
meso

(10)



(11)

(12)



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100% ⟶ 20°

30% ⟶ $\frac{20 \times 30}{100} = 6$ (a)

Ex-1 :

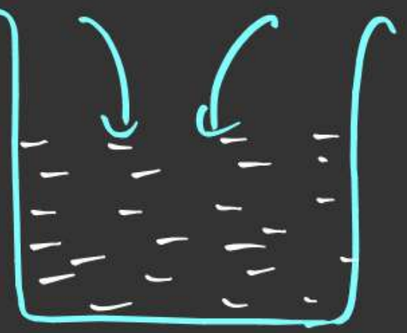
d/(+)-2-Butanol

(100% d) $[\alpha]_{obs} = +20°$ (b)

20% d ⟶ $\alpha_{obs} = 4°$

(c)

50% (+) & 50% (−)



20% + (40%)

60% (+) & 40% (−)

35% (+) & 65% (−)

(Enantiomeric) Excess

Optical purity	Optically Impurity	$(\alpha_{obs})_{mix}$
0%	100%	0°
20%	80% ✓	4° ✓
30%	70%	−6°

(#) Enantiomeric Excess / optical Purity :-

% Excess of Enantiomer in any Enantiomeric mixture.

$$ee = \frac{|d-l|}{d+l} \times 100 = \frac{|w_d - w_l|}{w_d + w_l} \times 100$$

$$= \frac{|m_d - m_l|}{m_d + m_l} \times 100 = |X_d - X_l| \times 100$$

$$= \frac{|n_d - n_l|}{n_d + n_l} \times 100 = \frac{(\alpha_{obs})_{mix}}{\alpha_{pure}} \times 100$$

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% d	% l	OP = EE	Impure part	(Alloy) mix
100%				+ Od
90%				
80%				
70%				
60%				
50%				
40%				
30%				
20%				
10%				
0%		72% (d%l)		
			36% (l%d)	

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