VIDYAPEETH

11-YN401MH

- Chemistry (OC)
- Isomerism (समावयवता)

Lecture No.- 03

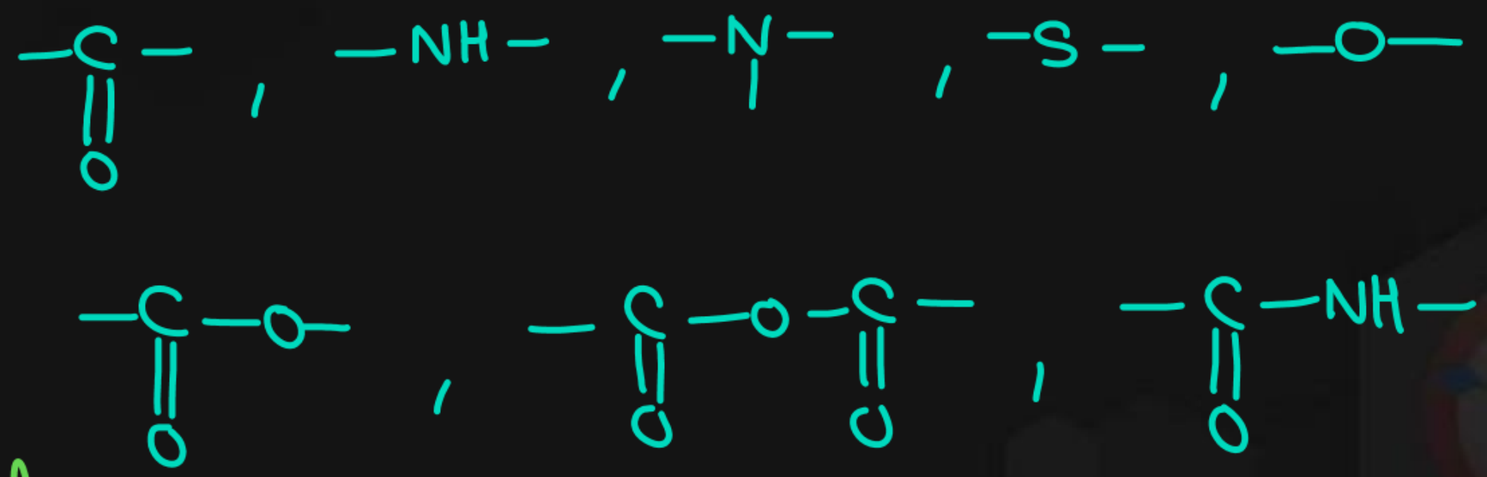
By- Deewan Tiwari Sir

Today's Targets

1. मध्यावयवता, चलावयवता
2. Homework
3.
4.

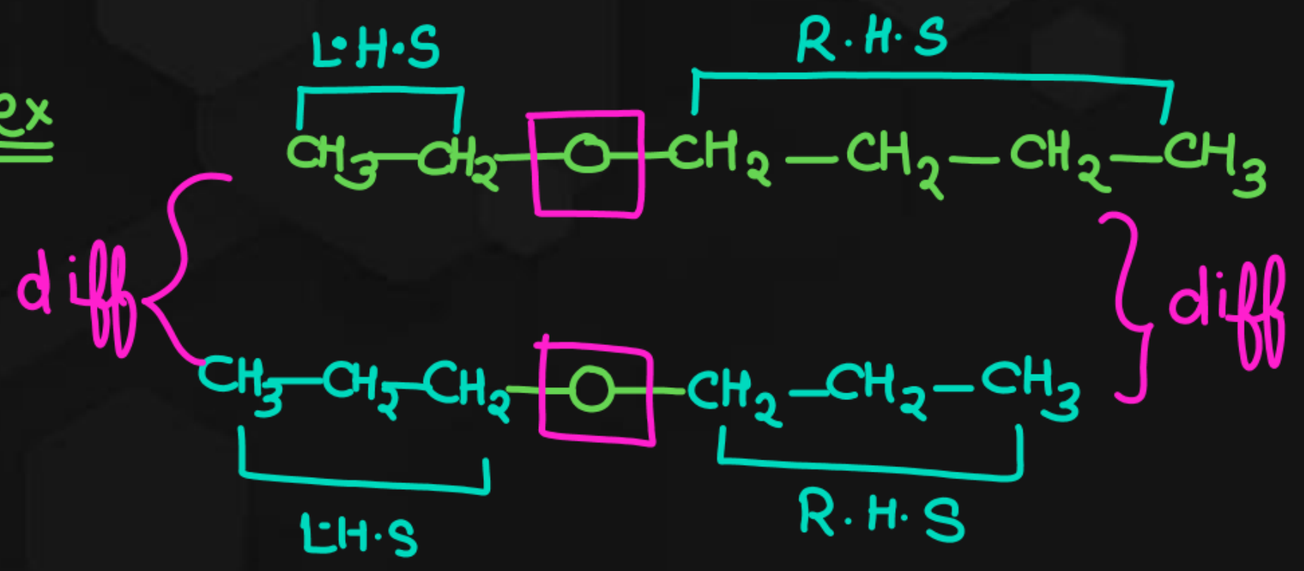
Metamerism [मध्यावयवता]

* M.F = Same
* Polyvalent F.G present.



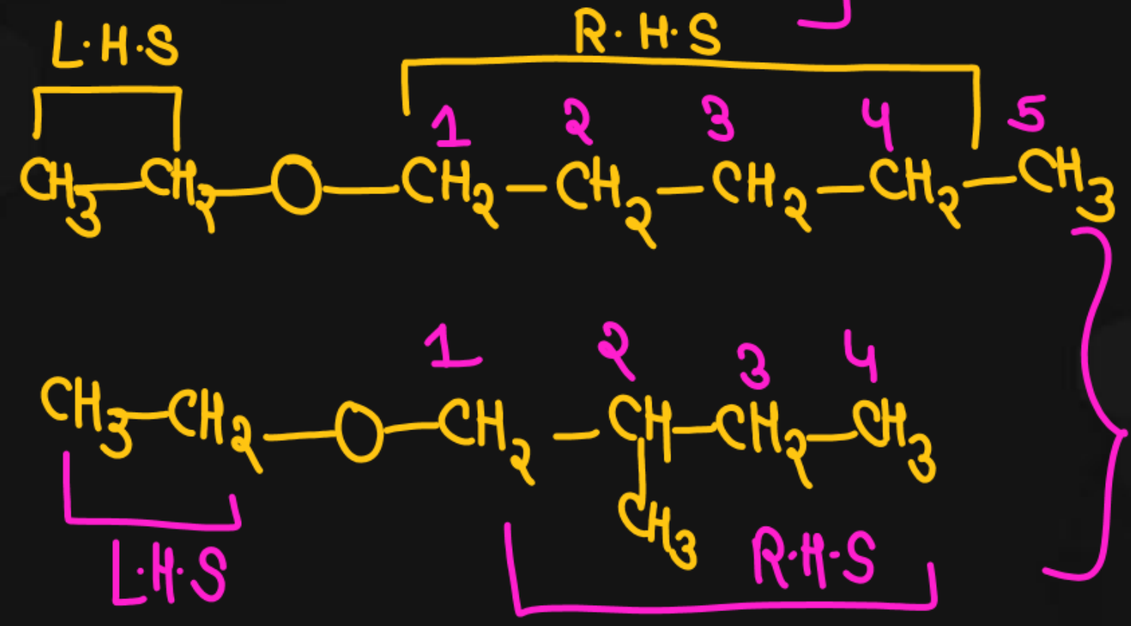
Imp (*) F.G के एक side या दोनों side grp का diff है।

ex



[metamerism show]

ex



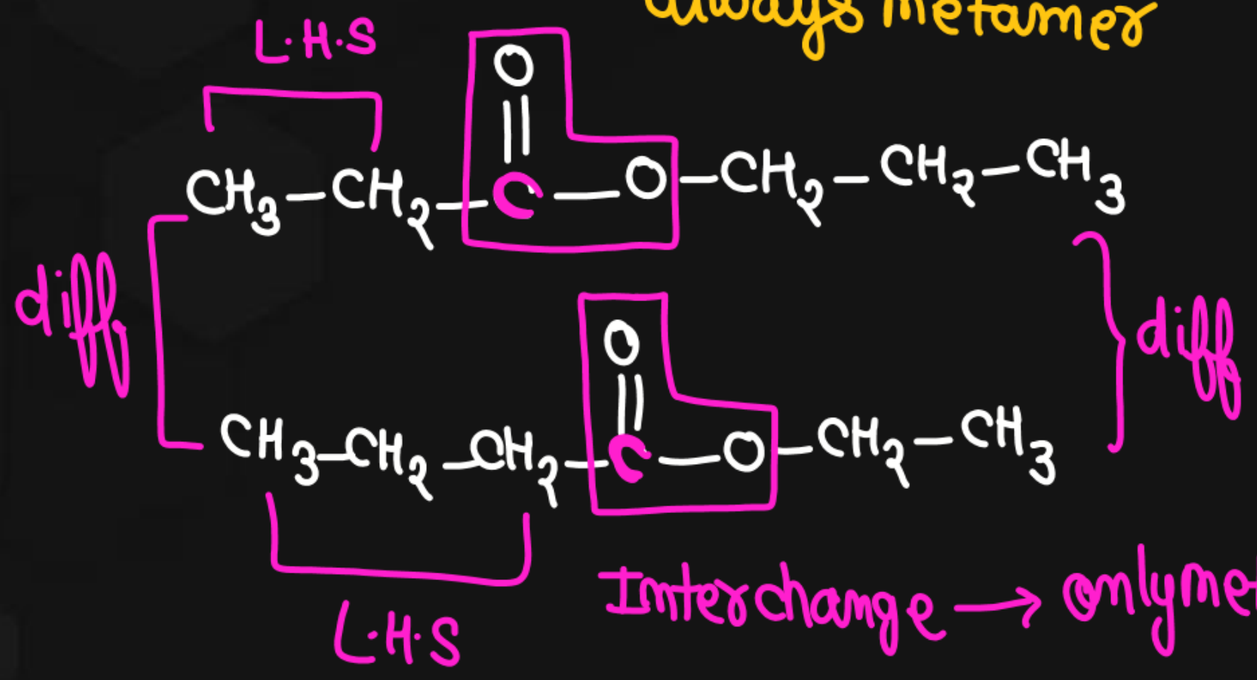
Metamerism as well as chain isomers

Trick

Change

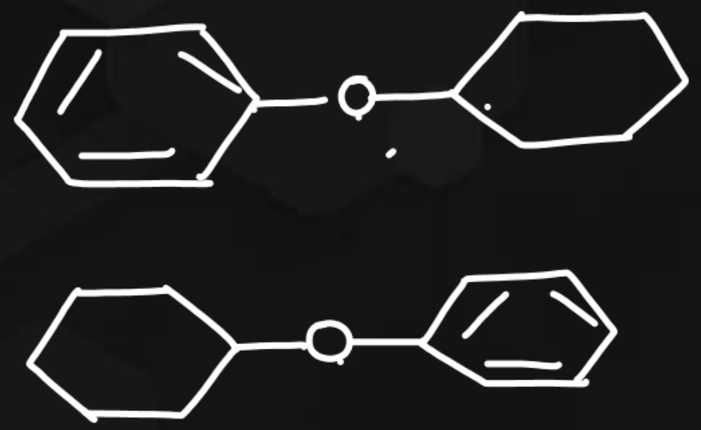
- Interchange → always metamer
- Intrachange → metamer as well as C.I and P.I.

ex



Interchange → only metamer

ex



No interchang
Identicle or Homomer

ex

$CH_3-O-CH_2-CH_3$

$CH_3-CH_2-O-CH_3$

No Interchange
Identicle or Homomer

a, b = metamer
b, c = F.G.I
c, d = F.G.I
a, d = Homomer
b, d = metamer
a, c = F.G.I

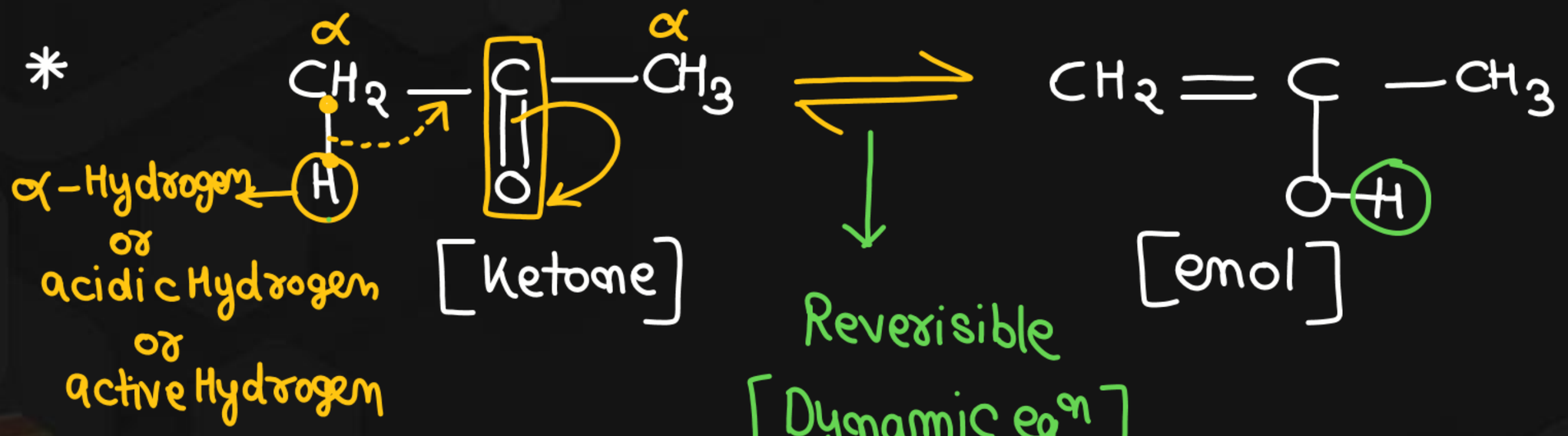
ex

$CH_3-CH_2-CH_2-CH_2-\boxed{NH}-CH_2-CH_3$ [a] , $CH_3-CH_2-CH_2-\boxed{NH}-CH_2-CH_2-CH_3$ [b] 2° amine

$CH_3-CH_2-CH_2-CH_2-CH_2-CH_2-NH_2$ [c] [Pamine] , $CH_3-CH_2-\boxed{NH}-CH_2-CH_2-CH_2-CH_3$ [d]

Tautomerism [चलावयवता] / Desmotropism / Mesotrophy / Pseudomerism

*



* Desmotropism ⇒ Desmo ⇒ double bond
  tropism ⇒ घुमना

* acidic H का एक element से दूसरे element की ओर migration चलावयवता कहलाता है।

Tautomerism

Cationotrophy
अगर migration cation के रूप मे हो।

aninotrophy
अगर migration anion के रूप मे हो।

Diad system

* यदि migration 1st and 2nd के बीच मे हो।

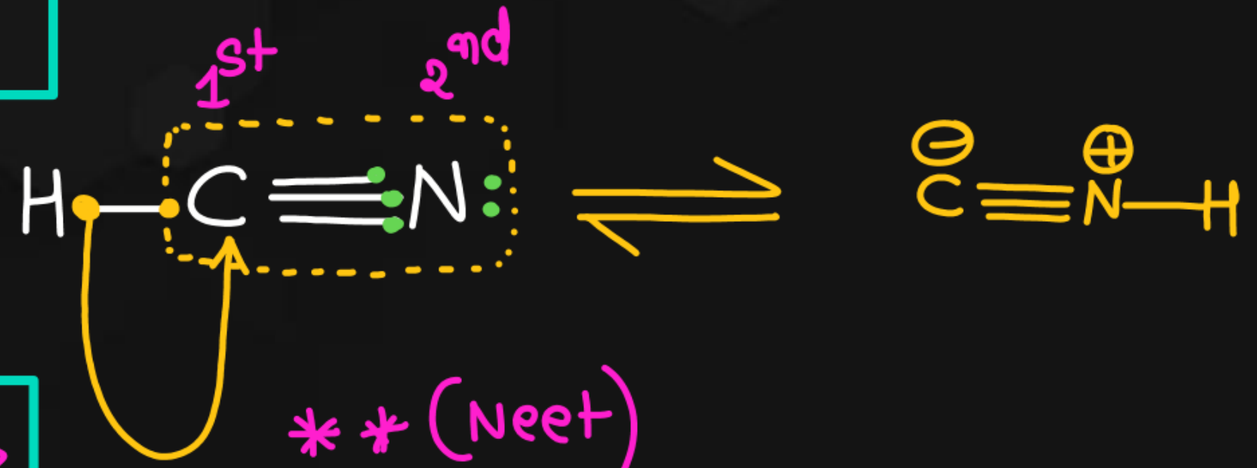
Triad system

यदि migration 1st and 3rd के बीच मे हो।

Space System or Space tautomerism

* यदि migration 1st and 4th या उससे ज्यादा element के बीच हो।

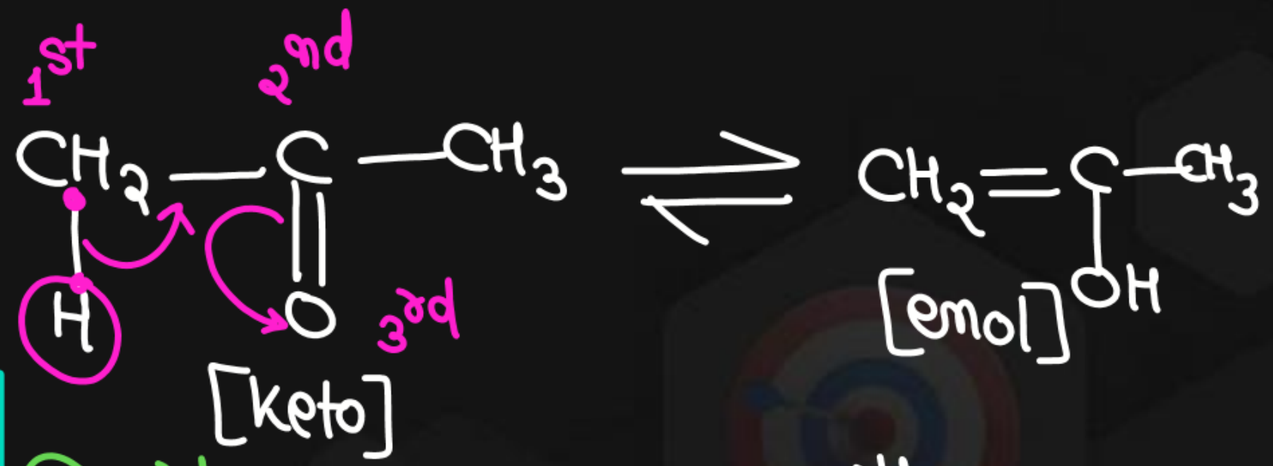
Diad system ⇒

* 

Triad system ⇒

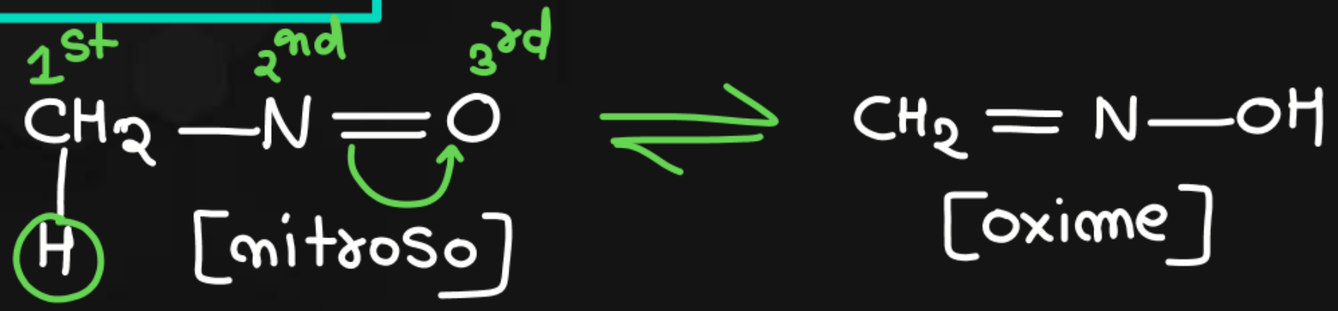
** (Neet)

* **Keto-enol**

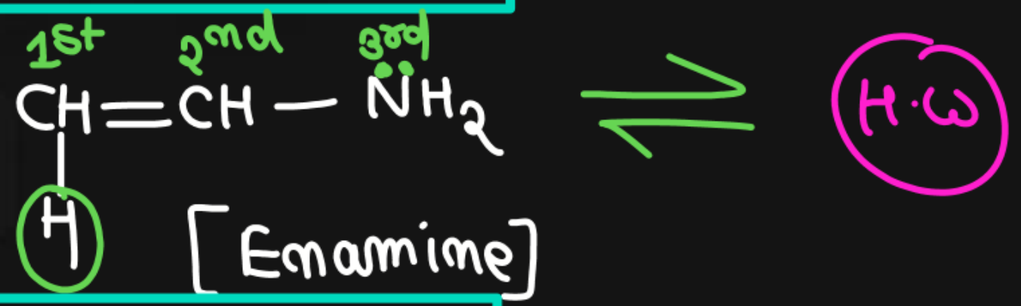


* **nitro-acenitro ⇒**

* Nitroso – oxime



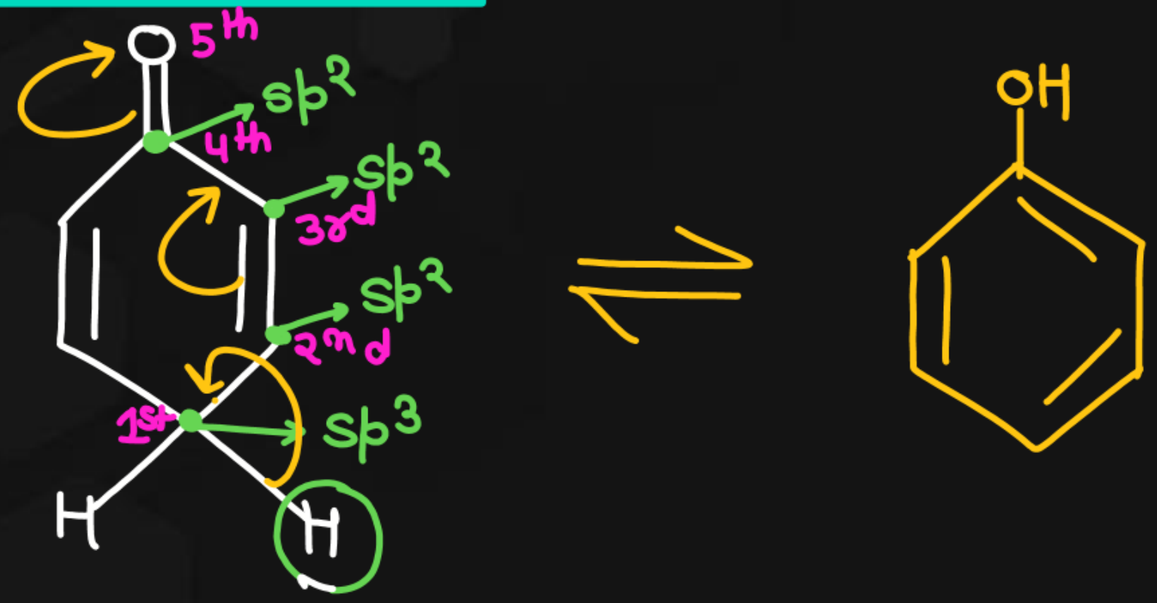
* Enamine – Imine ⇒



* lactum and lactim ⇒

Space tautomerism ⇒

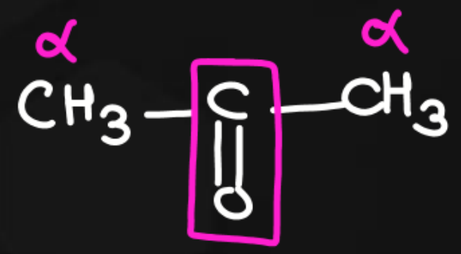
*



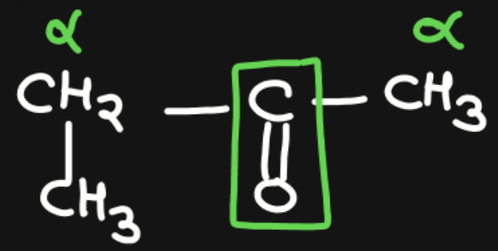
Condition for tautomerism ⇒

* must have at least 1 α H. (sp^3)

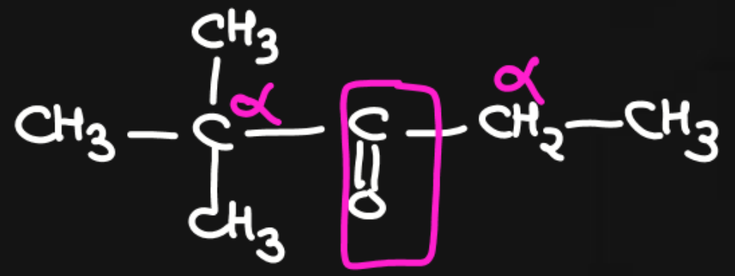
ex



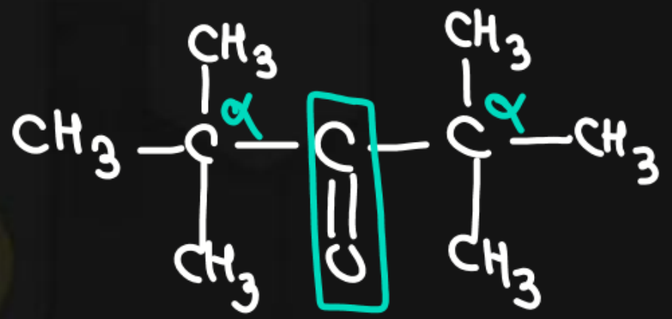
αH = 6 ✓



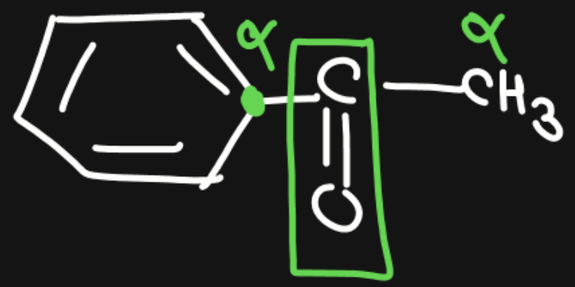
αH = 5 ✓



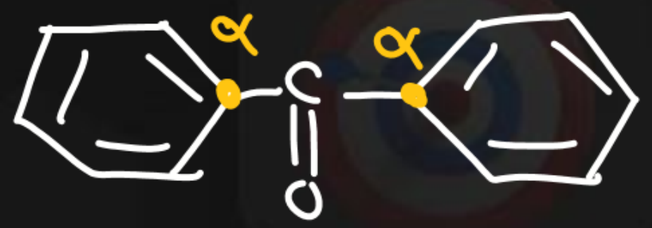
αH = 2 ✓



No αH ✗



αH = 3 ✓



No αH ✗

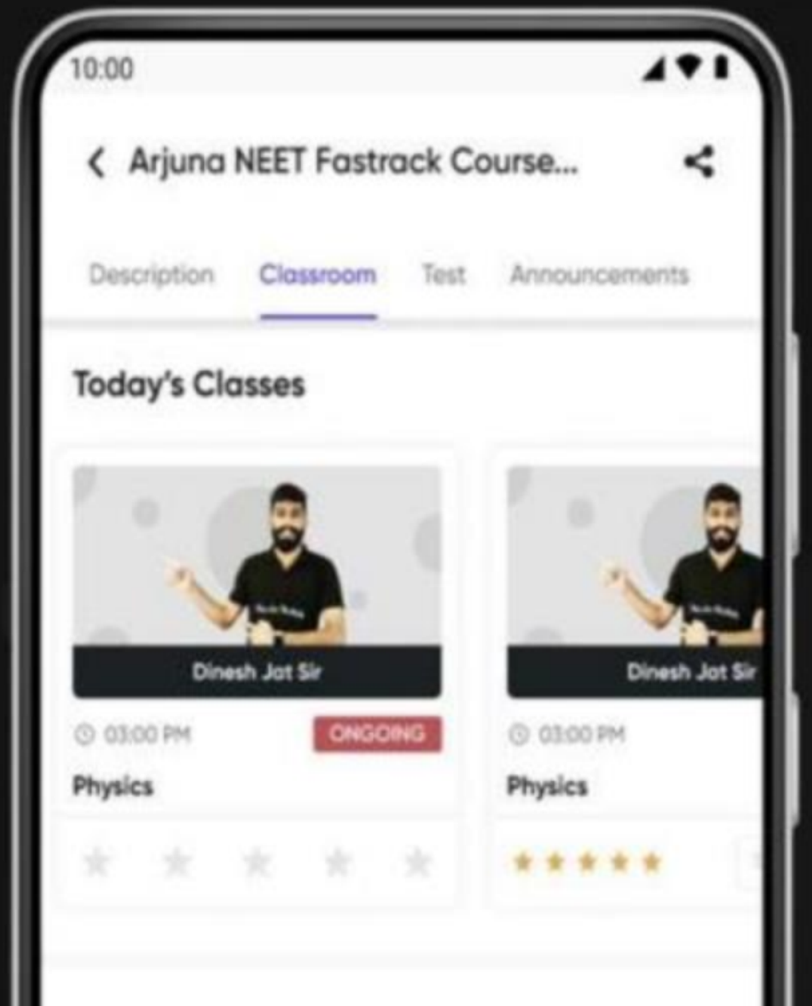
Homework

Revise note

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

11-YN401MH

- Chemistry (OC)
- Isomerism (समावयवता)

Lecture No.- 04

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic चलावयवता

Topic

Topic

Topic

Topics to be Covered

Topic Condition

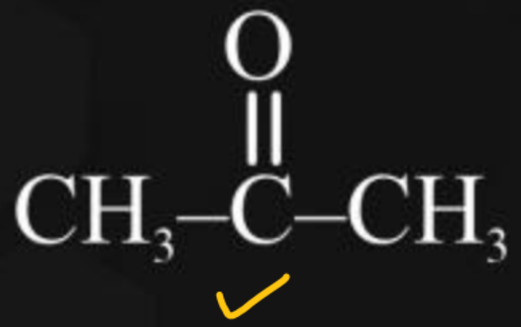
Topic Dpp-01, 02, 03 (Isomerism)

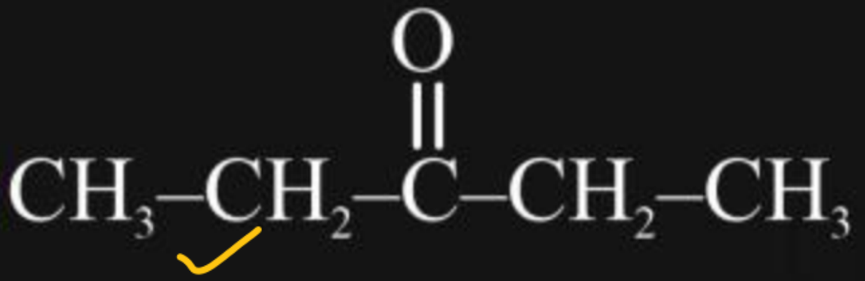
Topic Homework

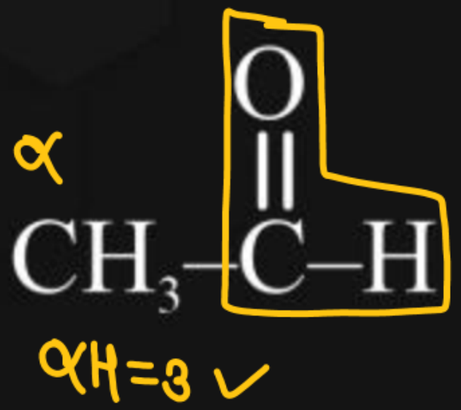
Topic

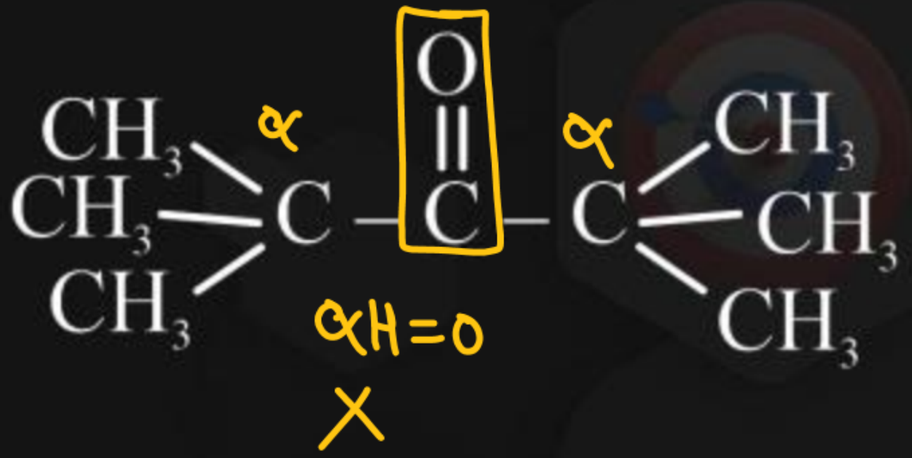
Topic :

#Q. Which of the following can show tautomerism

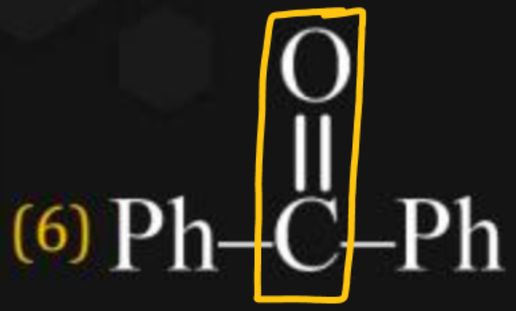
(1) 

(2) 

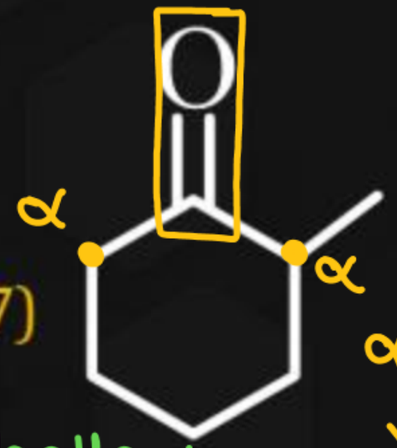
(3) 

(4) 

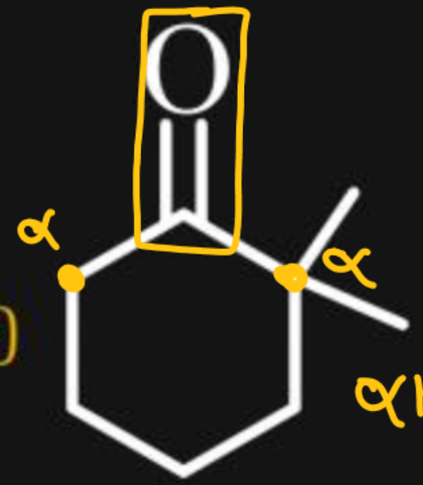
(5)

(6) 

No αH = 0

(7) 

αH = 3

(8) 

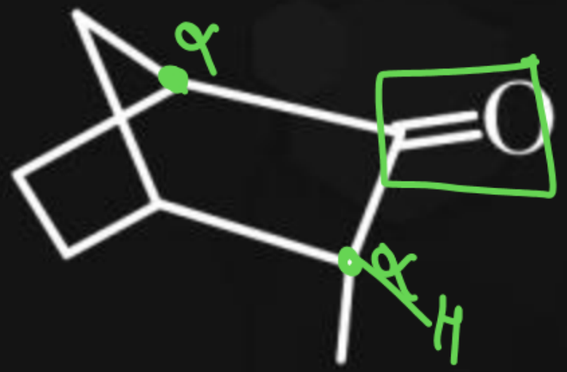
αH = 2

Bridge Head Position पर double bond नहीं आ सकता [त्रिविम बाधा]

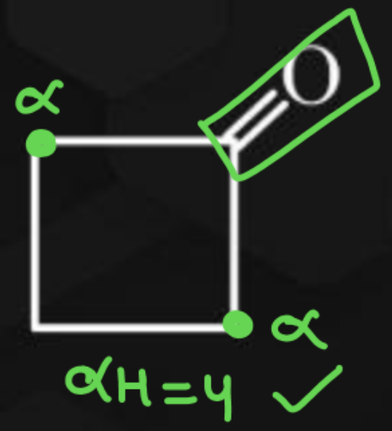
(9)

αH = 1

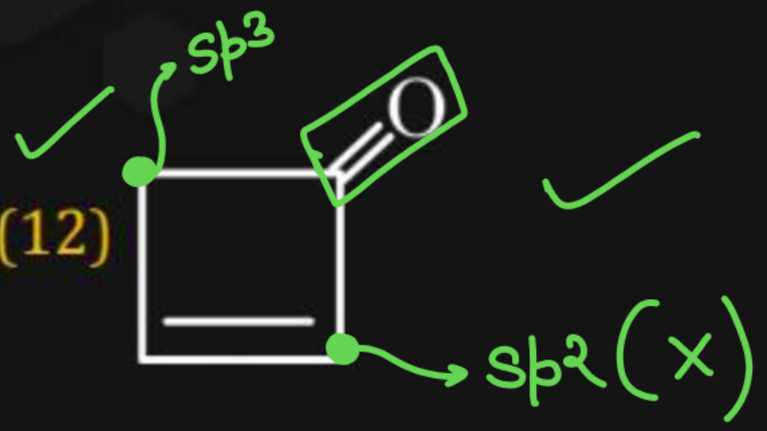
No αH

(10) 

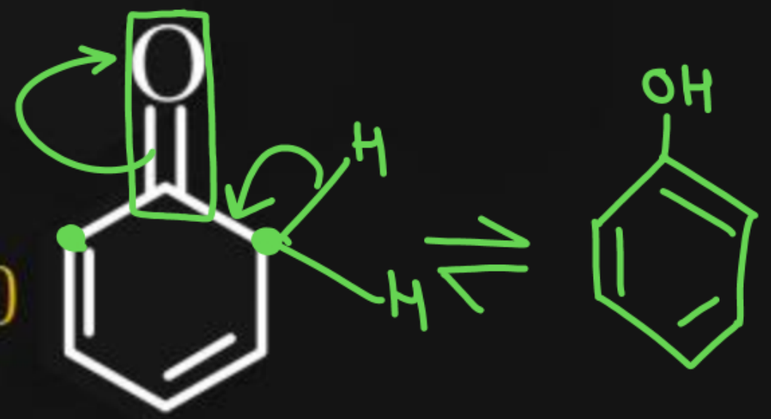
(11)



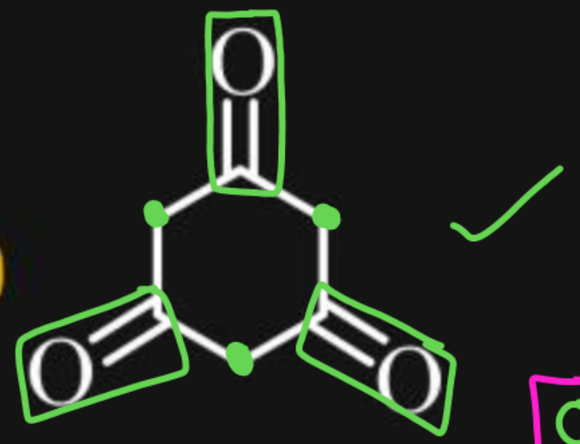
(12)



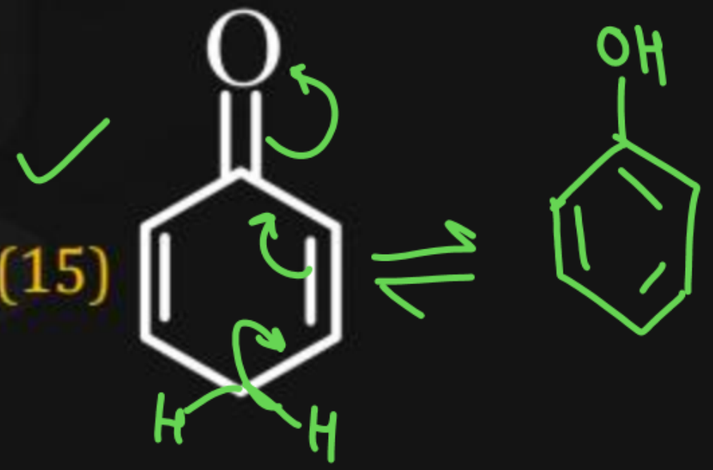
(13)



(14)



(15)



(16)

(17)

(18) $CH_3-\overset{\overset{O}{\|}}{C}-\ddot{\underline{O}}CH_3$

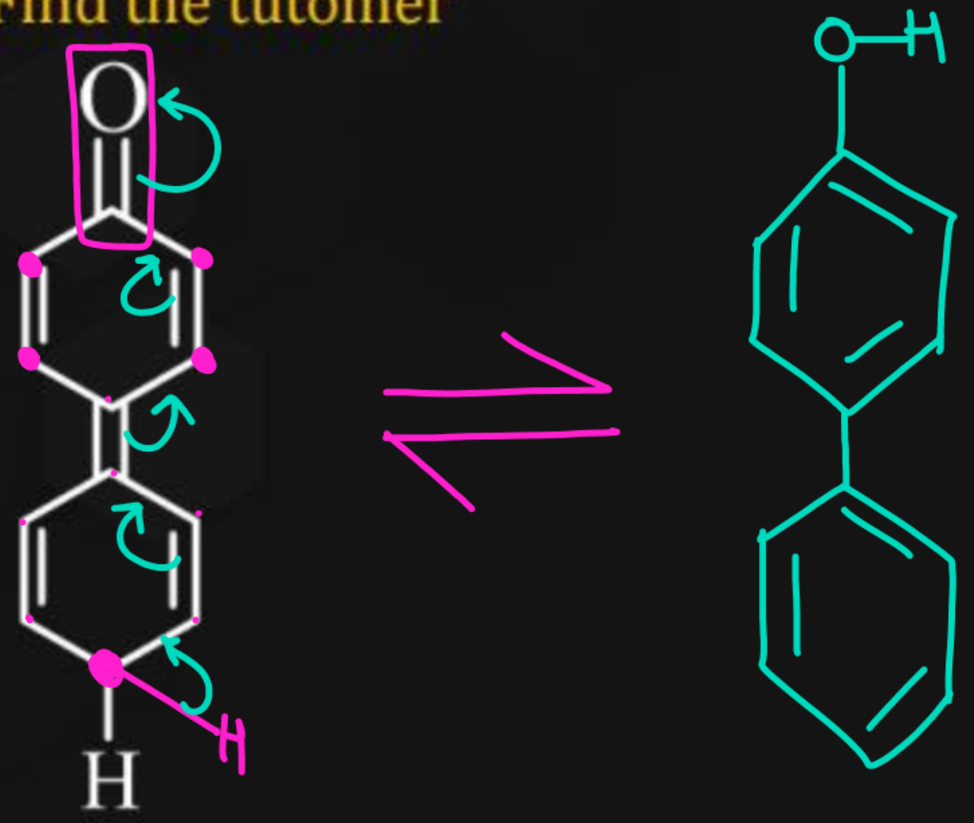
[ester नहीं दर्शाता है। चलातथवता]

(13) $\overset{\alpha}{CH_3}-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-\overset{\alpha}{CH_3}$

(14) $\overset{\alpha}{CH_3}-\overset{\overset{O}{\|}}{C}-\overset{\alpha}{CH_2}-\overset{\overset{O}{\|}}{C}-\overset{\alpha}{CH_3}$

Topic :

#Q.1 Find the tutomer

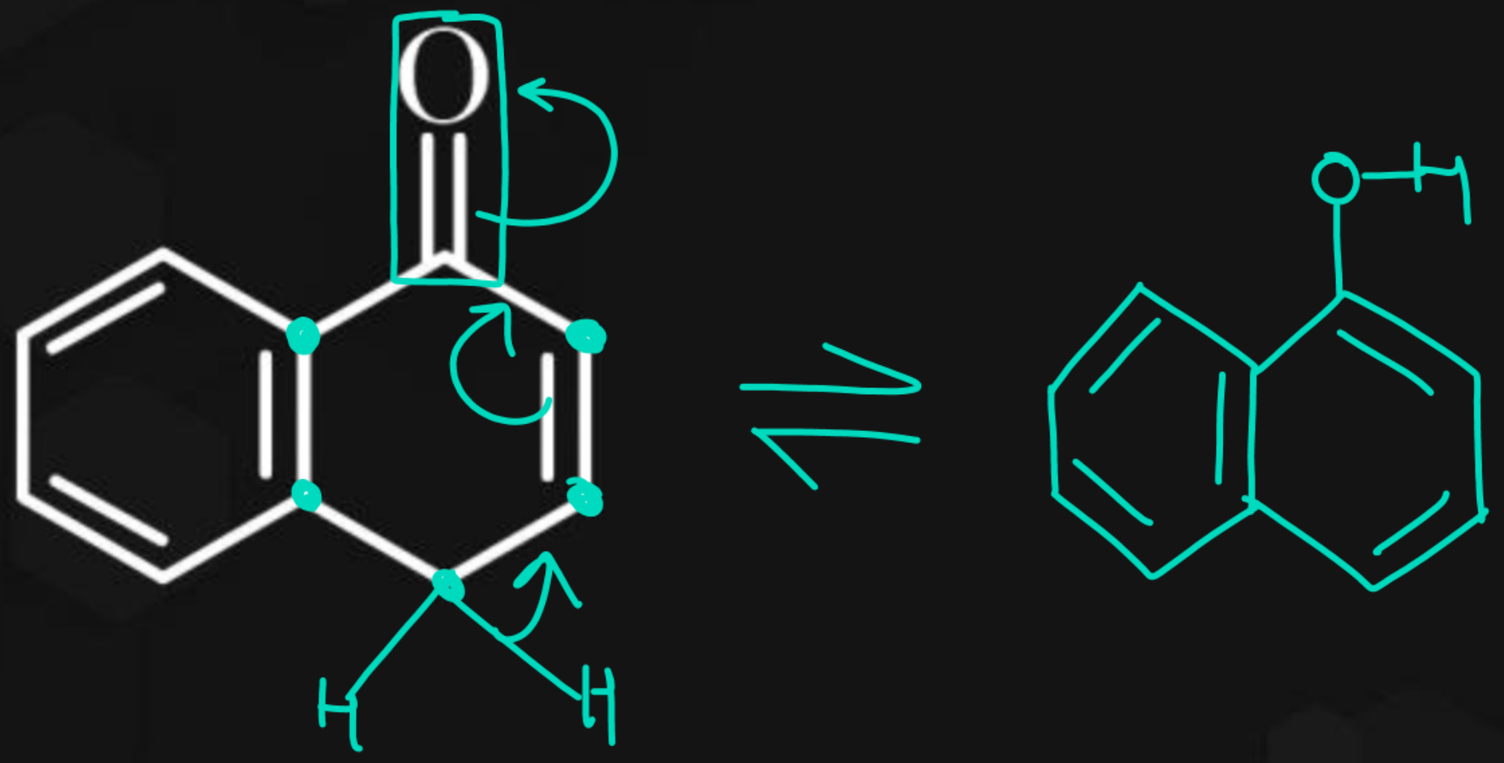


Tautomerism

* (1) Keto-enol
  (2) Condition
  (3) Space tautomerism

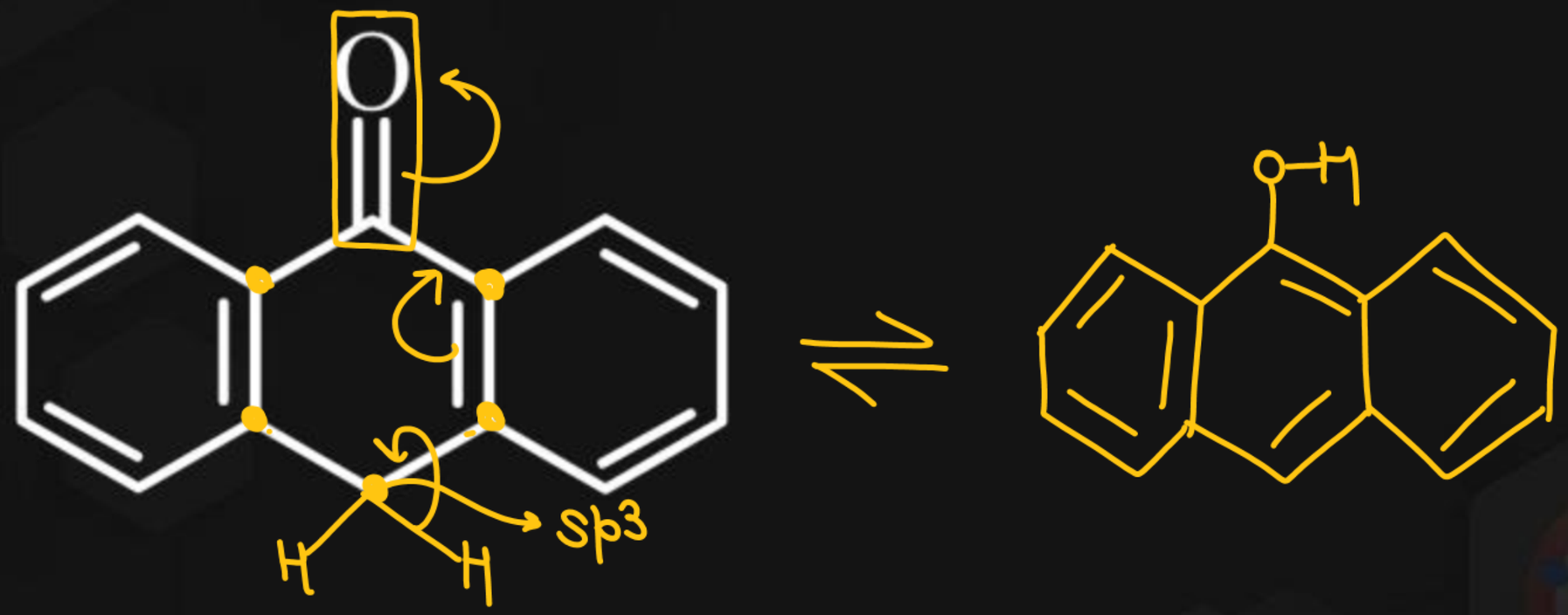
Topic :

#Q.2



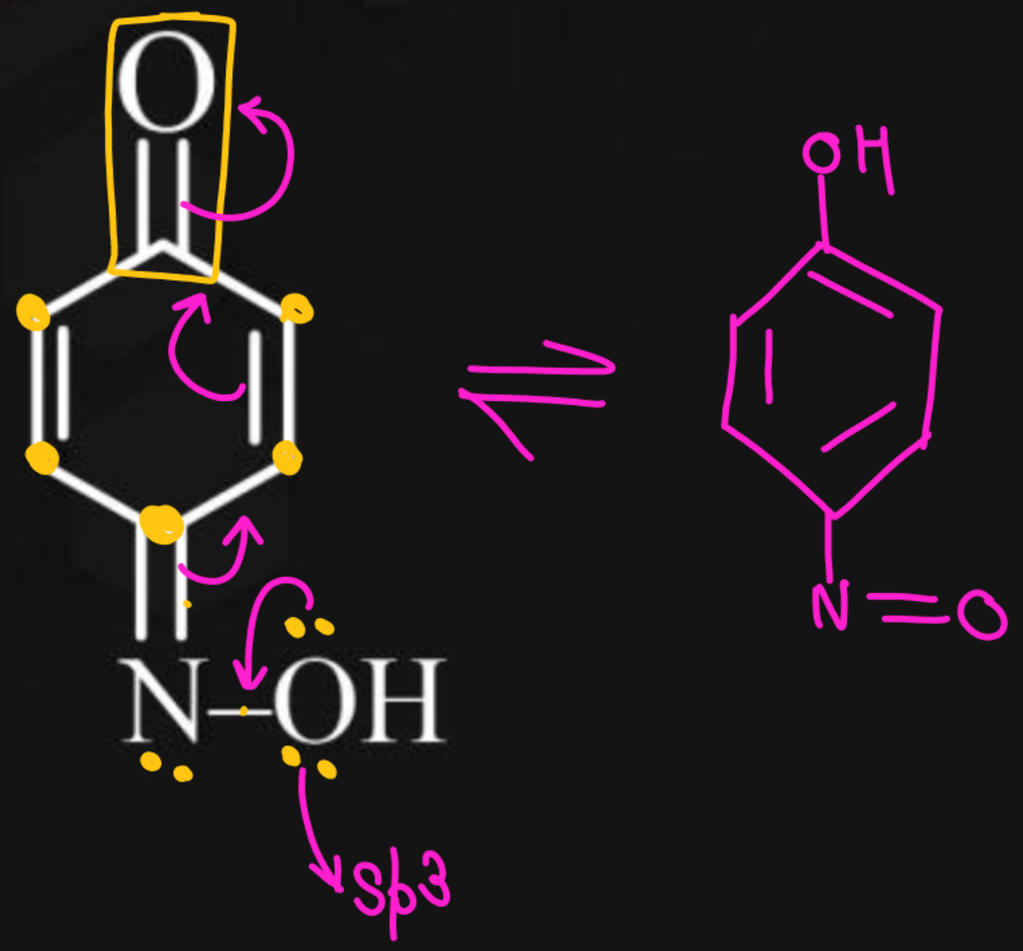
Topic :

#Q.3



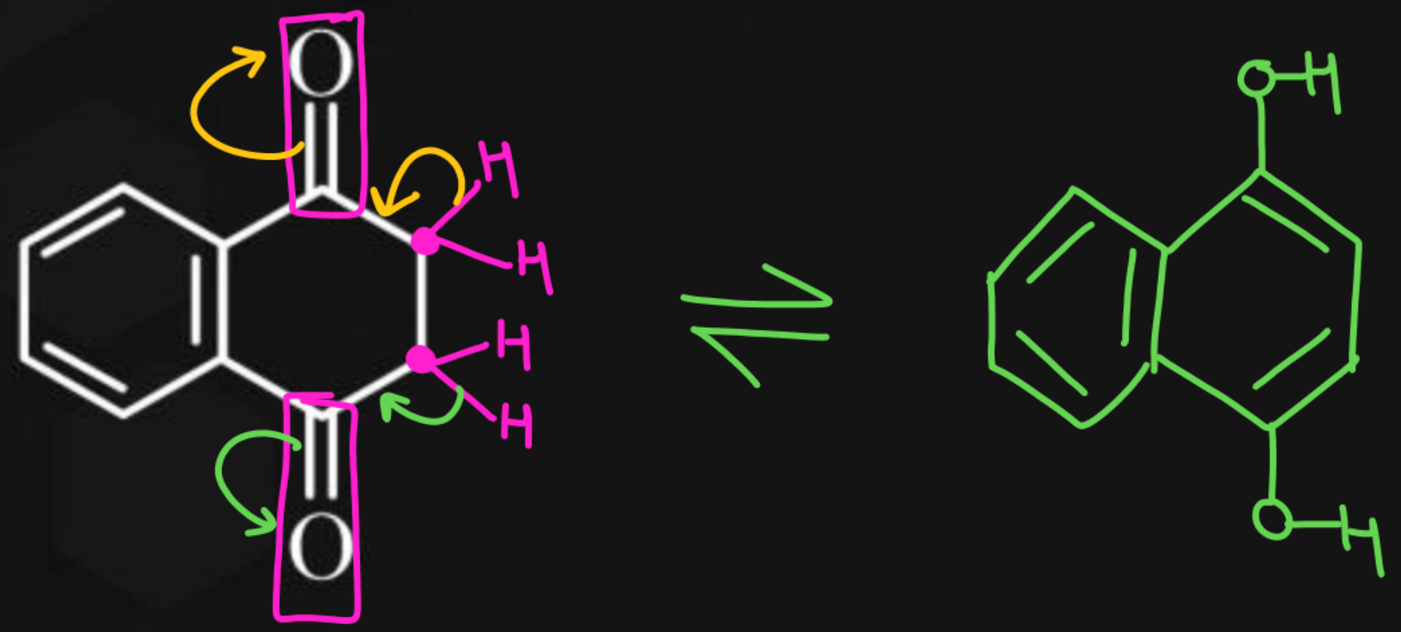
Topic :

#Q.4



Topic :

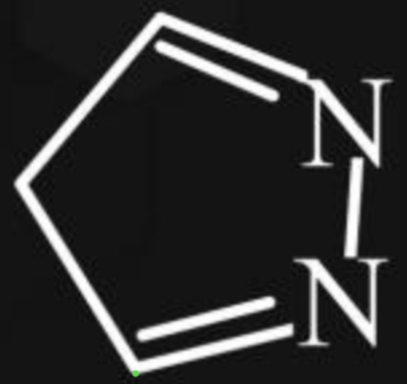
#Q.5



Topic :

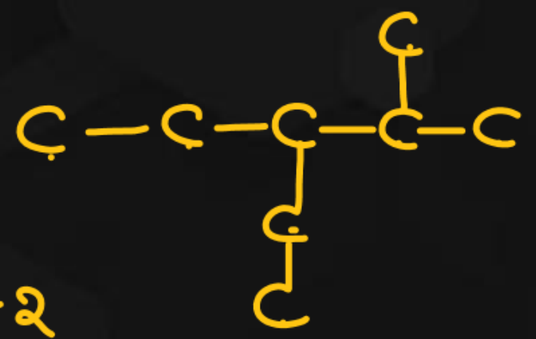
#Q.6

7.



Dpp-01

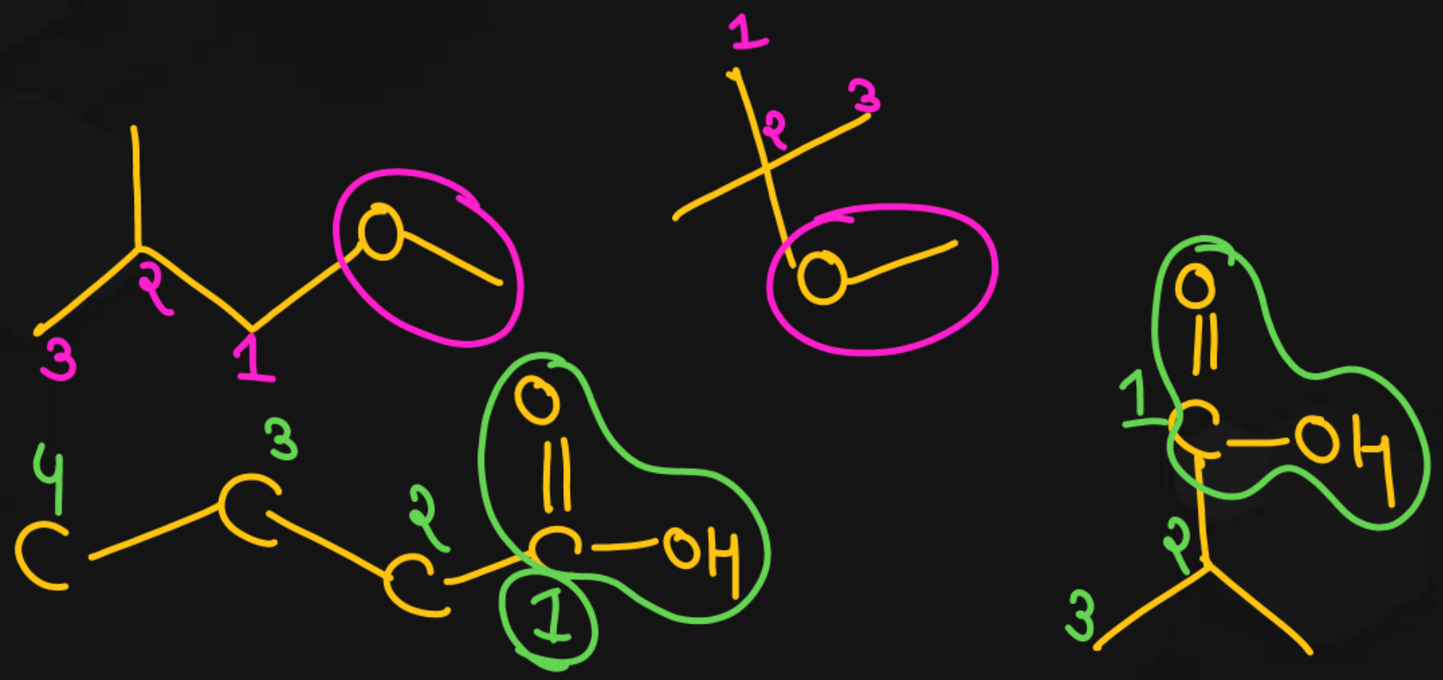
Q.1



C_nH_{2n+2}

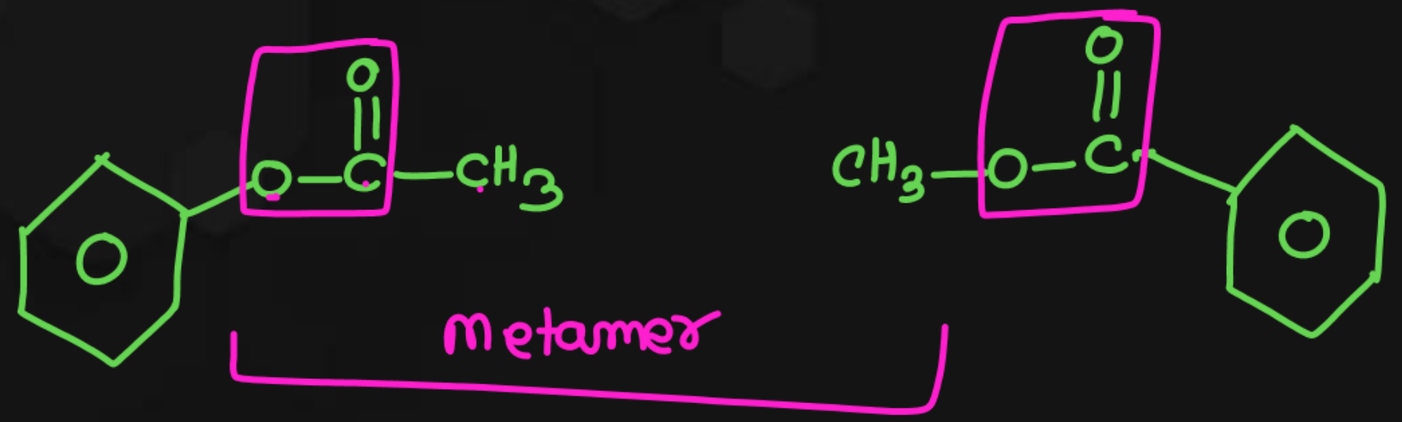
$\boxed{C_8H_{18}}$

Q.2

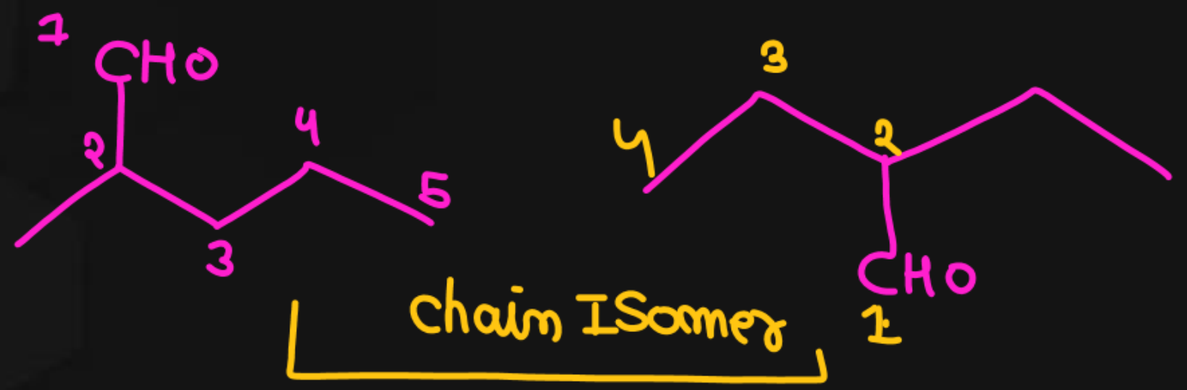


10

(1)


O
O–C–CH3
CH3–O–C
Metamer

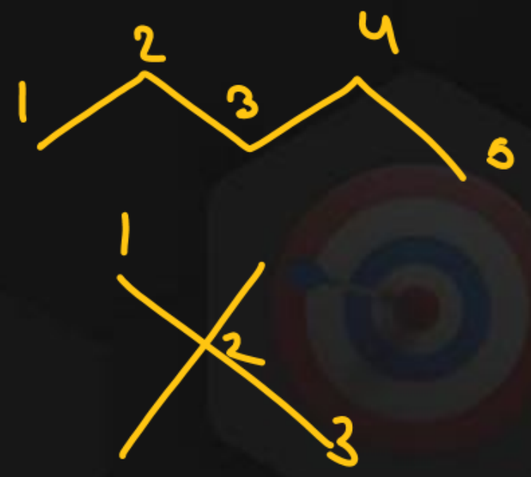
(2)


1 CHO
2
3
4
5
3
4
2
CHO
1
Chain Isomer

(3)

O
1
2
3
4
5
4
5
3
2
1
O

(4)


1
2
3
4
5
6
1
2
3

2 mins Summary

Homework

Revise notes

Next Class Target

Topic G.I समावयवता

Topic

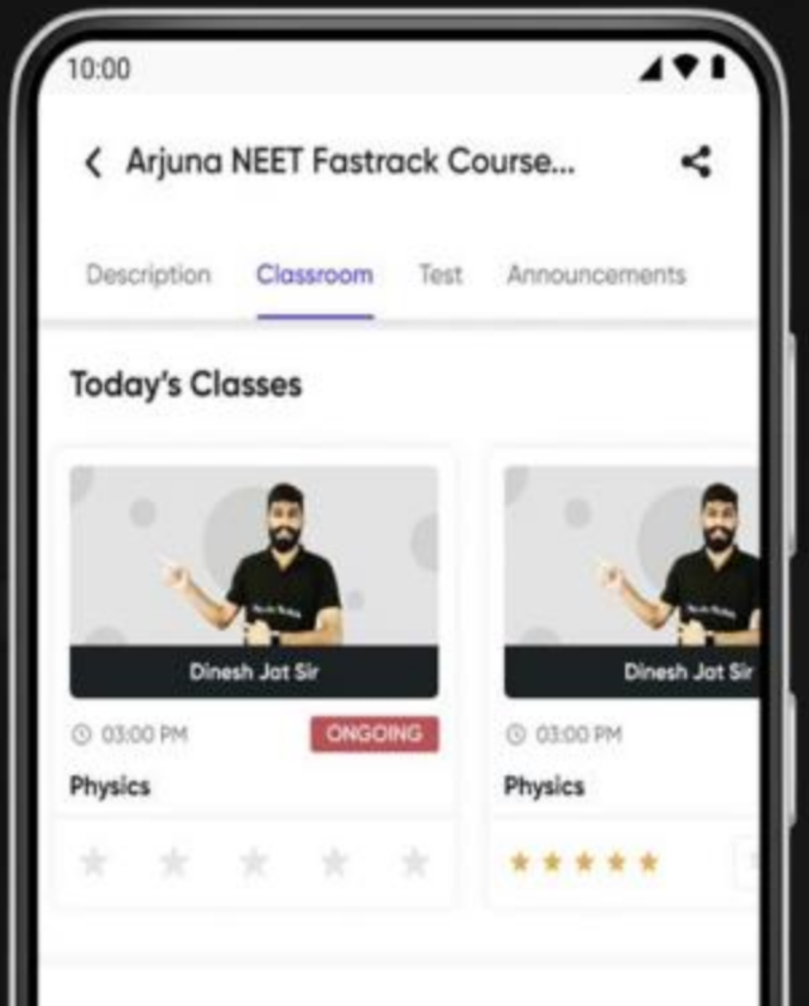
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

11-YN401MH

- Chemistry (OC)
- Isomerism (समावयवता)

Lecture No.- 05

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic चलातयवता

Topic

Topic

Topic

Topics to be Covered

Topic ज्यामिति समावयवता

Topic

Topic

Topic

Configurational isomerism
[अभिविन्यासी समावयवता]

- optical isomerism [प्रकाशिक समावयवता] * m.F = Same
  - Mirror Image or Enatiomers (प्रतिबिम्ब) or Enatiomorph or Intvertopod
  - Non-mirror Image → Diastereomer (तिरबिम्ब)
- ज्यामिति समावयवता [geomatricle isomerism]
  - * cis-Trans
  - * E-Z
  - * Syn-Anti

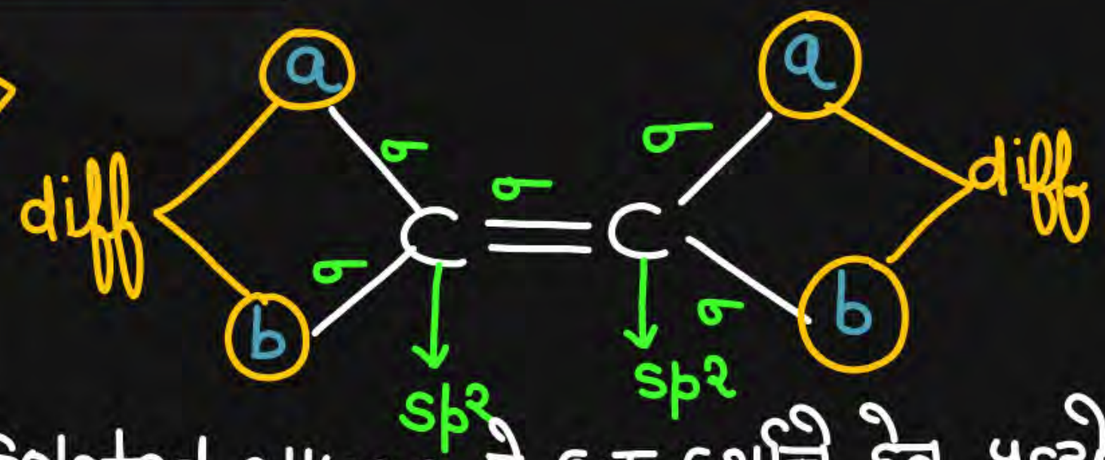
ज्यामिति समावयवता

* Restricted Rotation [प्रतिबंधित घूर्णन]
* atoms के बीच की distance Same ना हो [$l_1 \neq l_2$]

- double bond
  - alkene [C=C]
    - Isolated alkene
    - Conjugated alkene
    - Cummilative alkene or allens
  - Azo [-N=N-]
  - oxime [C=N-OH]
- Ring
  - Monocyclic
  - Bicyclic
- Steric hindrence

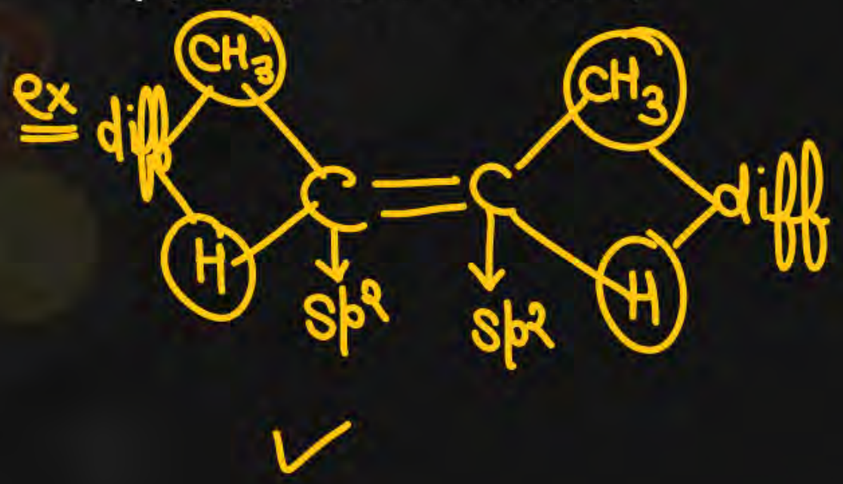
Isolated alkene ⇒

Condition ⇒

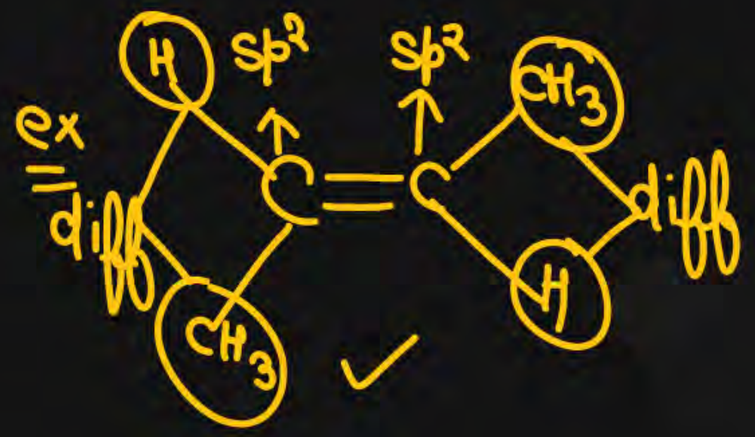


किसी भी Isolated alkene मे G.I दर्शाने हेतु प्रत्येक sp^2-carbon पर diff grp attached होने चाहिए।

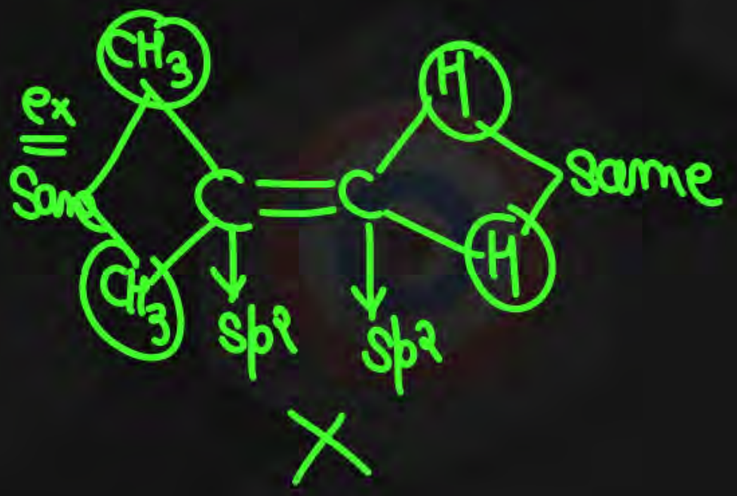
ex ⇒



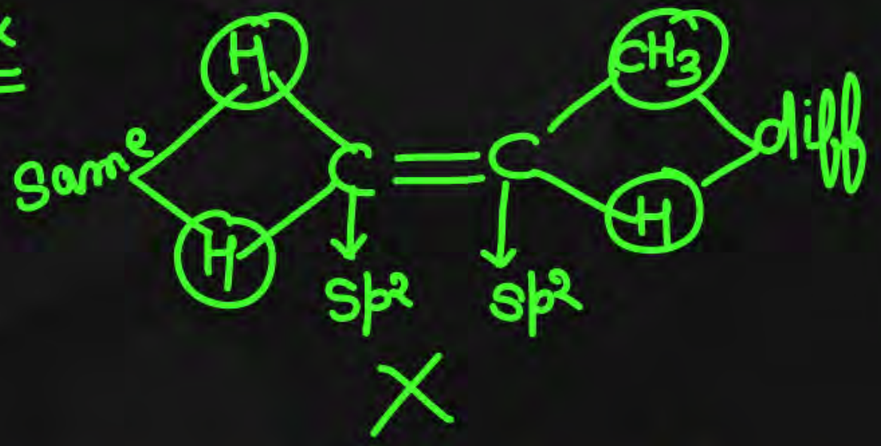
ex ⇒



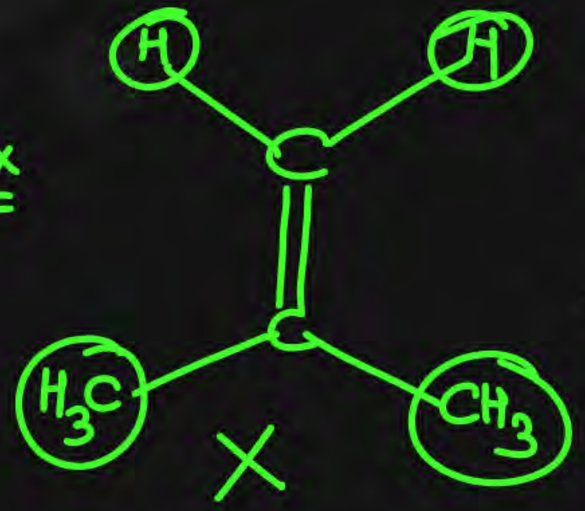
ex ⇒



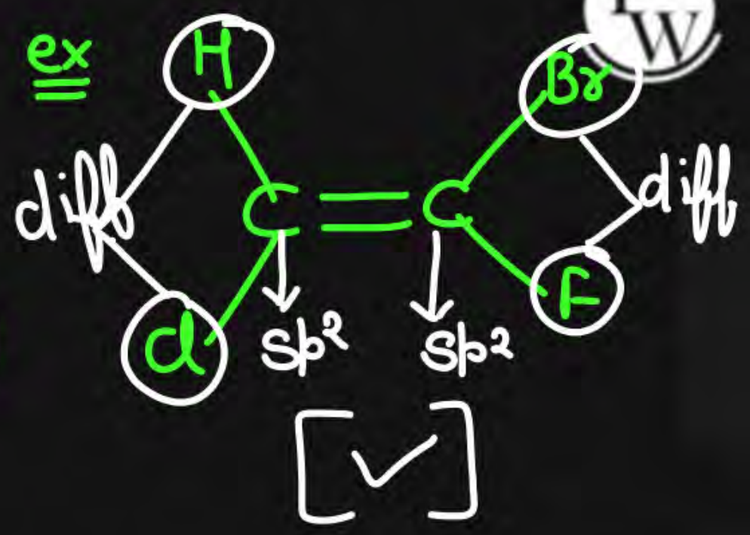
ex



ex

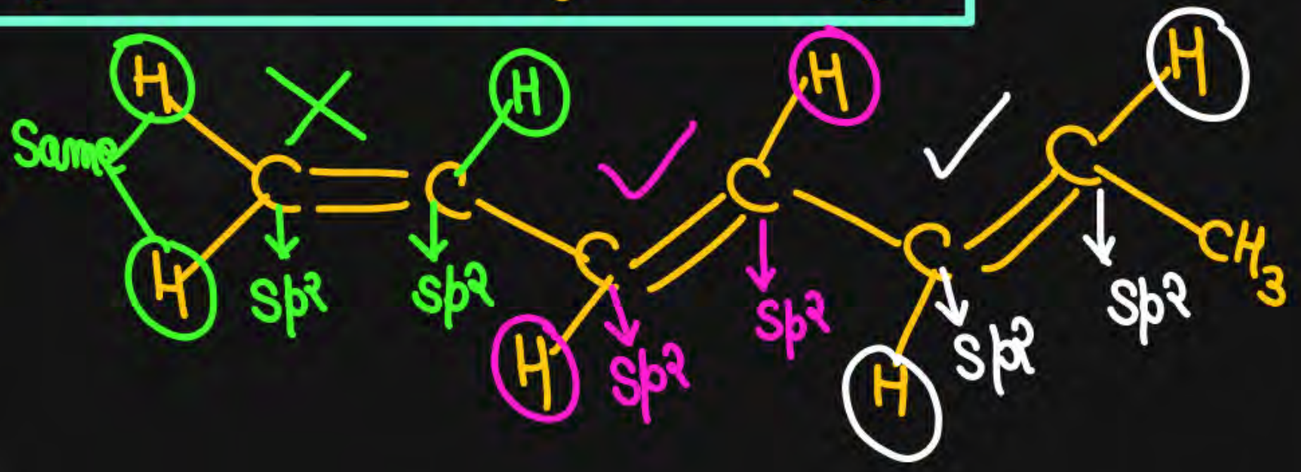


ex



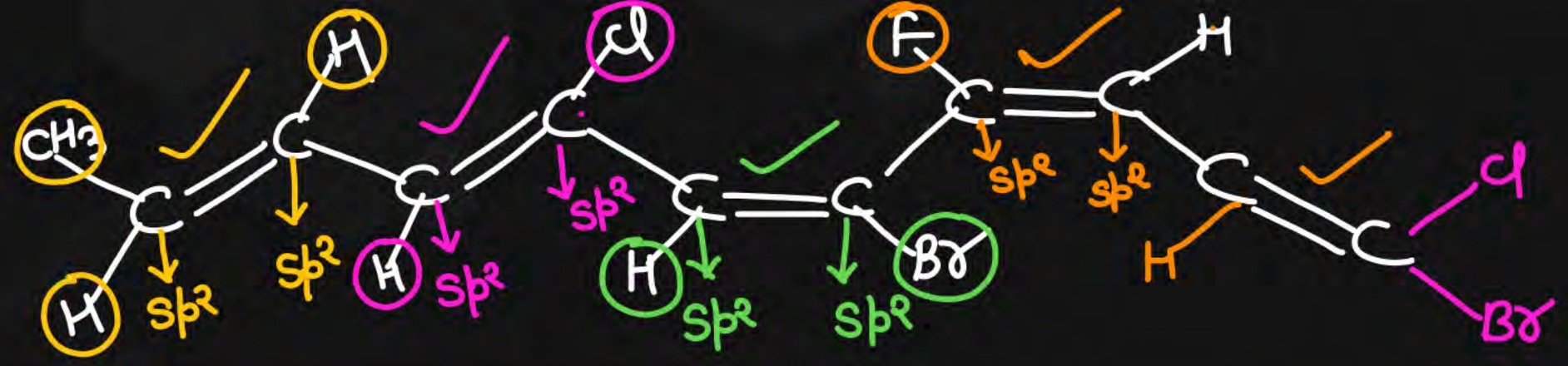
Conjugated alkene [संयुग्मी alkene]

ex



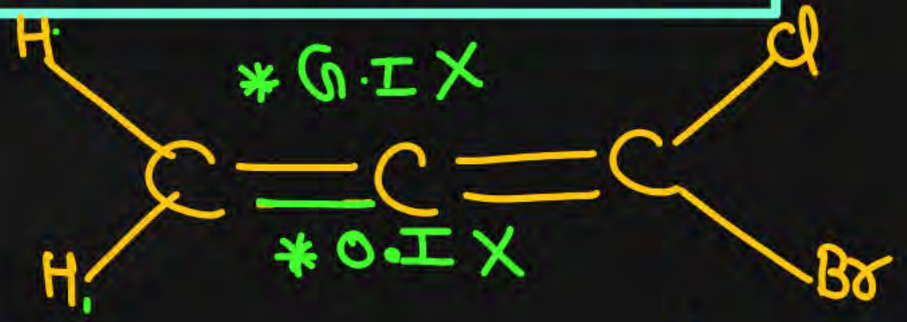
Condition ⇒ प्रत्येक alkene को Check करो and हर alkene की nature अलग-अलग होगी।

ex

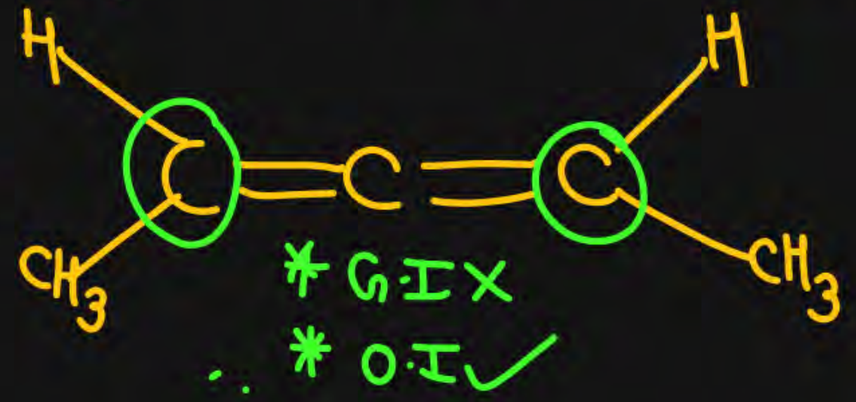


cummilative alkene [allens] =>

ex

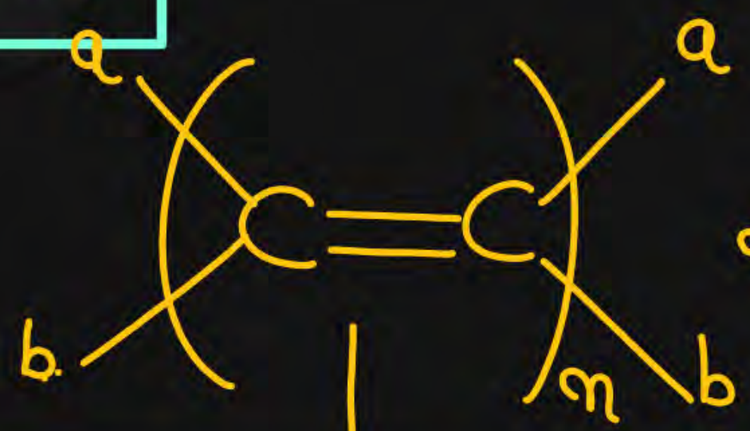


ex



ex

DT funda ⇒



n = number of double bond

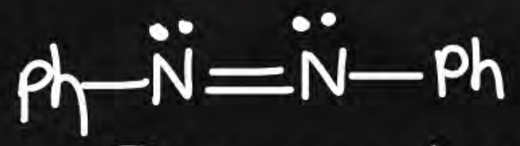
n = odd (1, 3, 5, 7 - - -)

* Molecule planar
* G.I may be possible
  Terminal grp should be different.
* O.I ✗

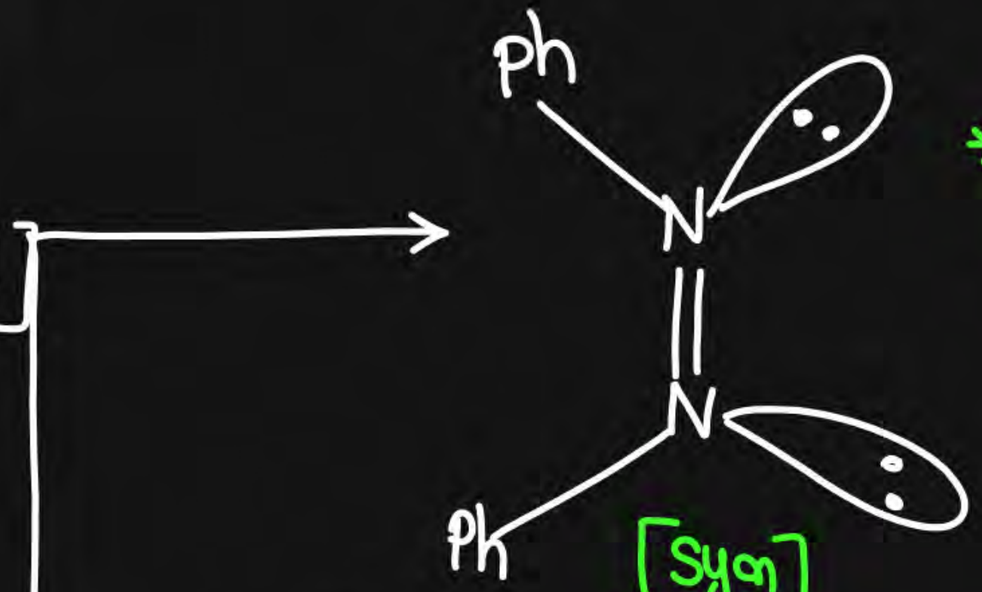
n = even (2, 4, 6, 8 - - -)

* Molecule non-planar
* G.I ✗
* O.I possible if Terminal grp should be diff.

Azo Compound ⇒

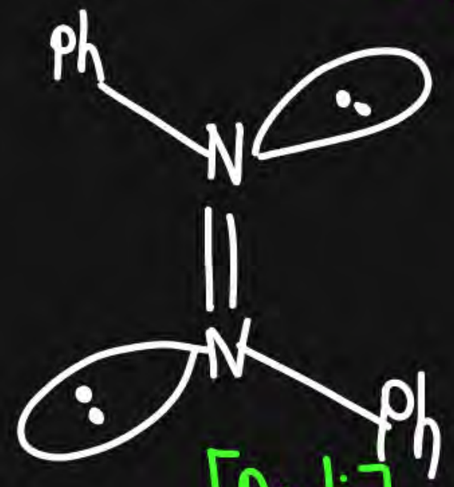


[Azo Compound]



[Syn]

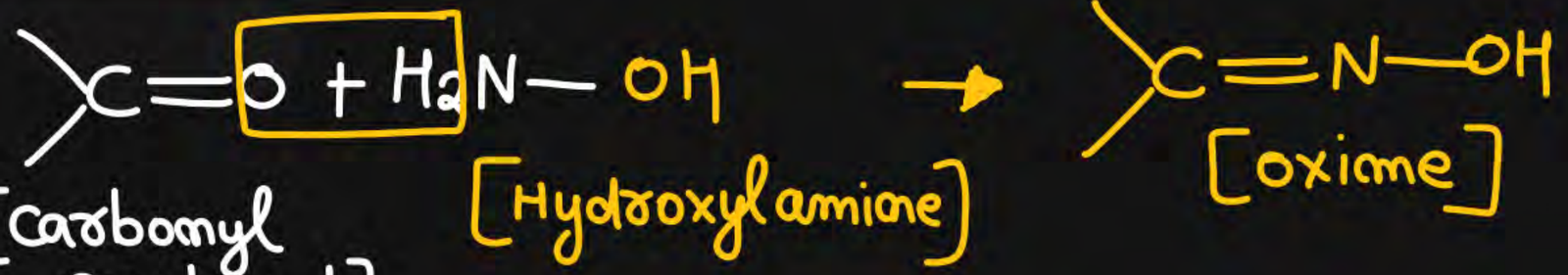
* if l.p present at same direction known as syn isomer



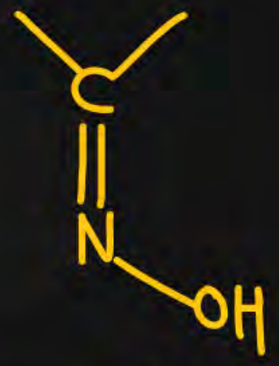
[Anti]

if l.p present at opposite direction known as Anti isomer.

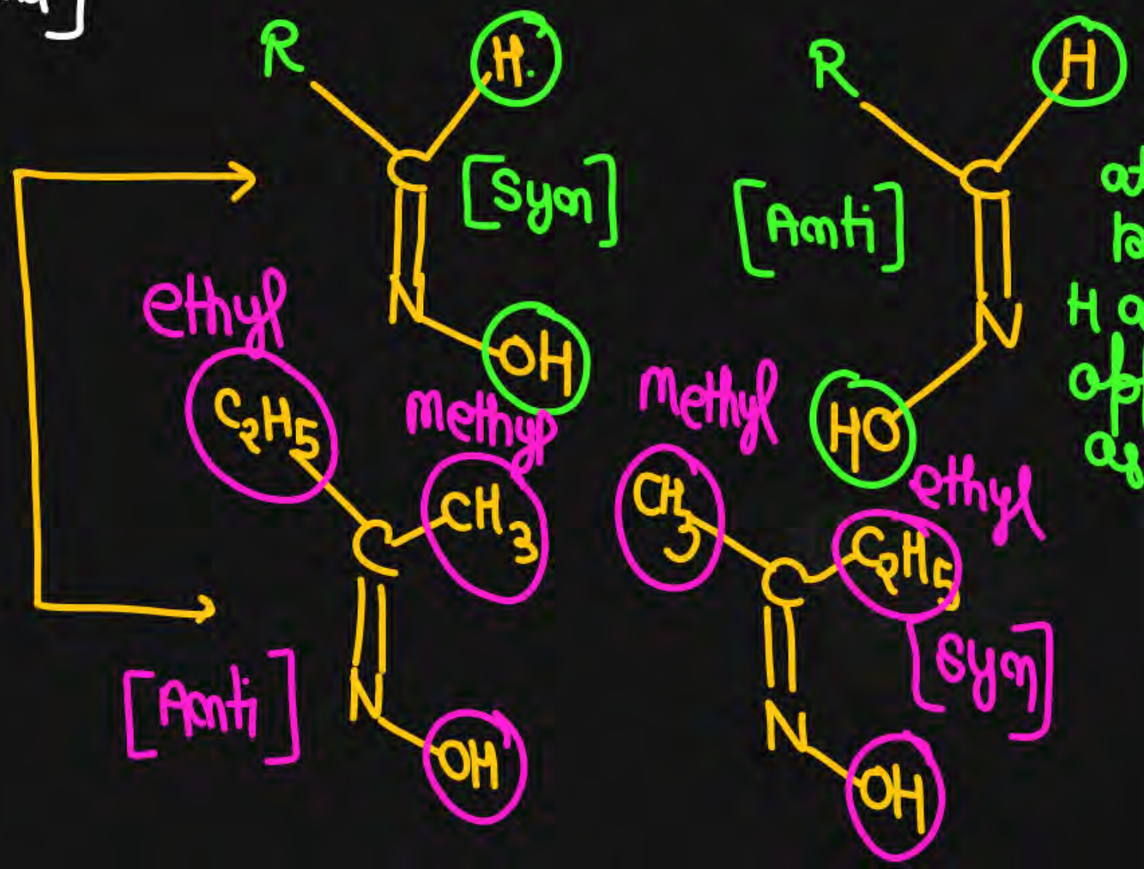
Oxime compound ⇒

** 

[Carbonyl compound] [Hydroxylamine] [oxime]

** 

[oxime]



if H and OH present at same direction then known as syn and if H and OH present at opposite direction known as Anti isomer.

* if H is not present then check alphabatical grp.

(a) if alphabatical Prior grp and OH present at same side → Syn

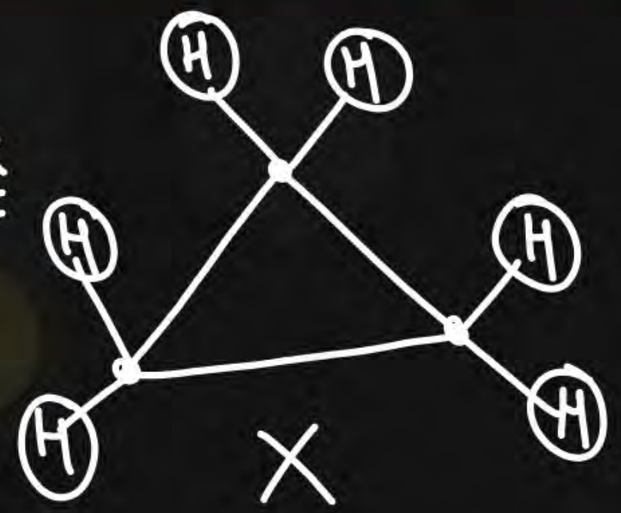
(b) if ——||——||—— ——||—— opposite side ⇒ Anti

[Cycloalkane]

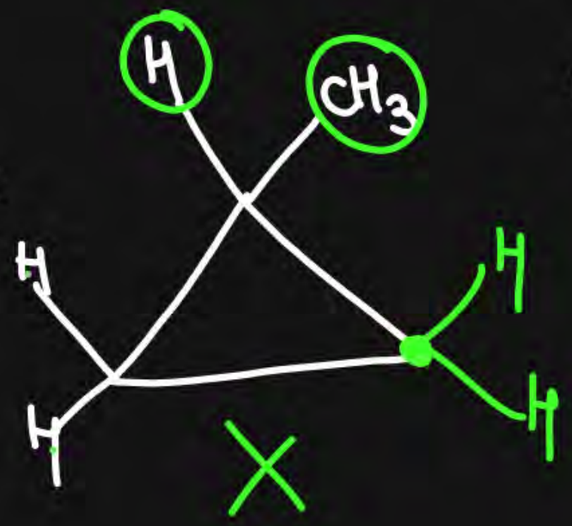
Monocyclic system ⇒

Condition for G.I ⇒ कम से कम 2 sp^3 carbon Ring मे present होने चाहिए जिस पर 2 diff grp जुड़े हो।

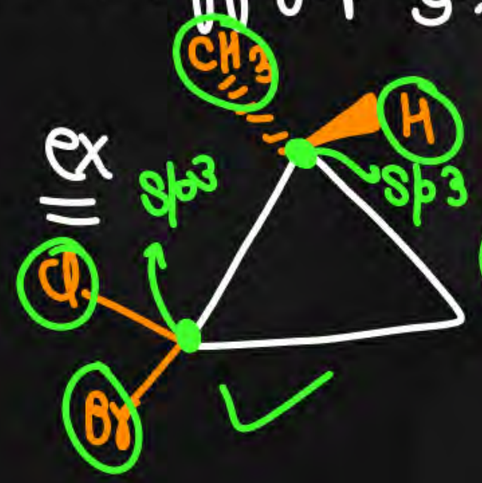
ex =



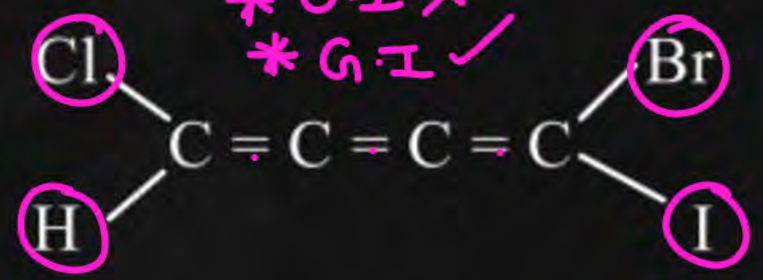
ex =



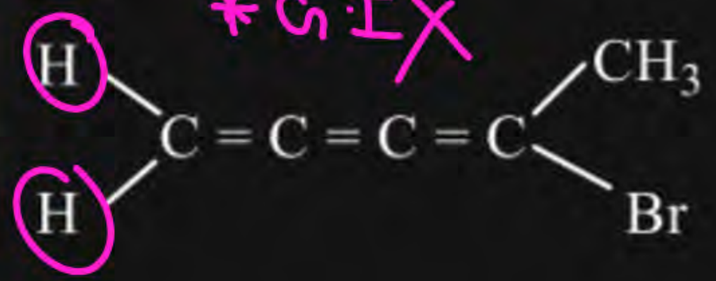
ex =



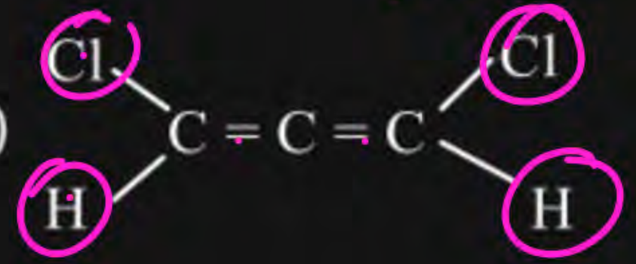
ex =

(21) 

* O.I ✗
* G.I ✓

(22) 

* O.I ✗
* G.I ✗

(23) 

* G.I ✗
* O.I ✓

(24)

Homework

Revise notes

Next Class Target

Topic Bicyclic system

Topic Biphenyl and Triphenyl

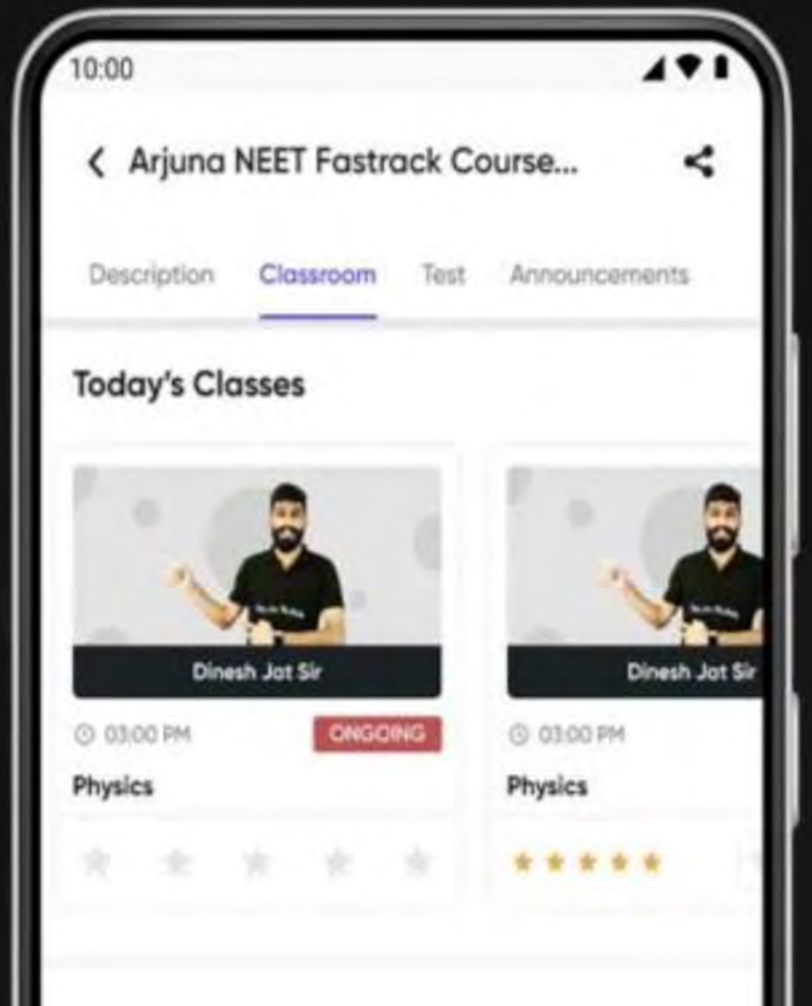
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

11-YN401MH

- Chemistry (OC)
- Isomerism (समावयवता)

Lecture No.- 6

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic

Introduction

Topic

Topic

Topic

Topics to be Covered

Topic व्याप्ति समावयवी की शर्त

Topic

Topic

Topic

Cycloalkene ⇒

Condition ⇒ alkene केवल 8 C की Ring या उससे ज्यादा carbon की Ring मे ही exist होगी। (G.I ✓)

ex

✗

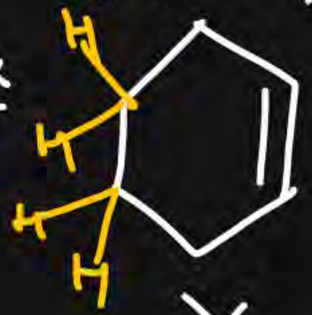
ex

✗

ex

✗

ex

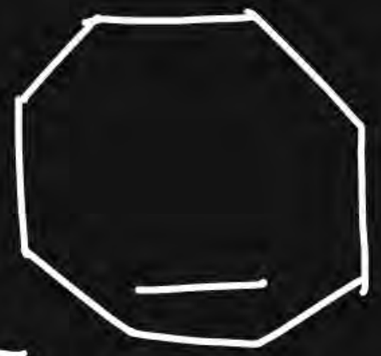


✗

ex

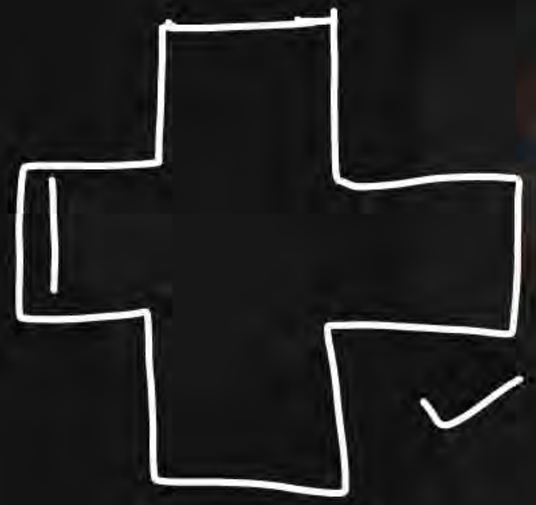
✗

ex



✓

ex



✓

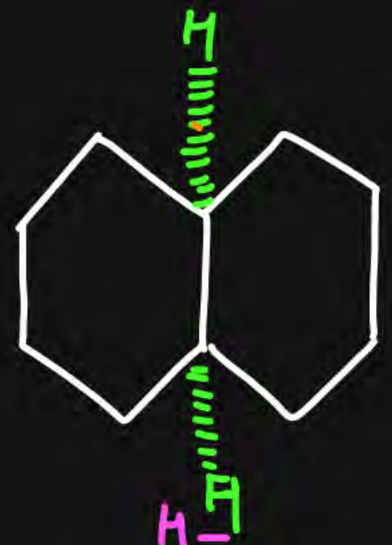
* पहला Trans double bond 8-member की Ring मे दिखाई देता है। इसलिए G.I 8 membered या उससे अधिक member वाली Ring G.I दिखाती है।

Bicyclic system ⇒

* Decaline

cis ⇒

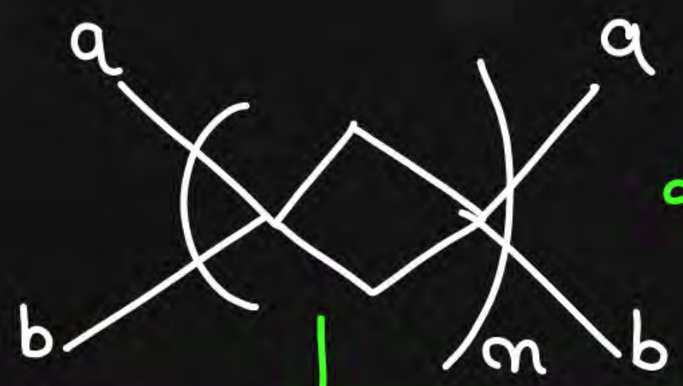
or



Trans ⇒

or

Spiro Compound ⇒



n = number of spiro Ring

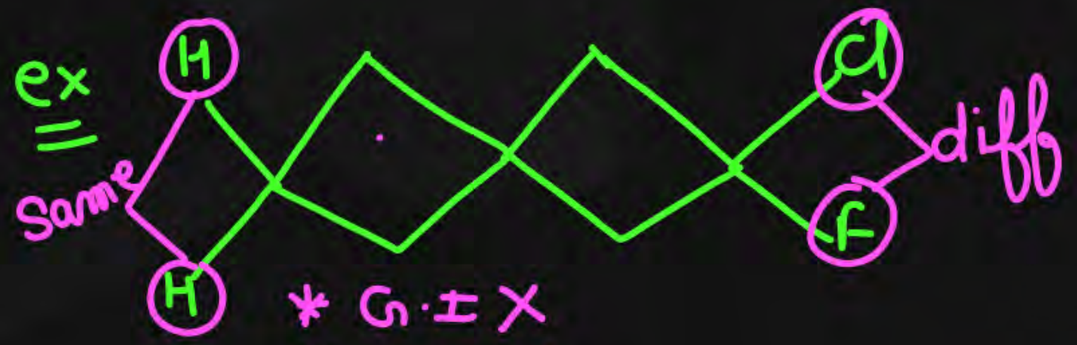
n = odd (1, 3, 5, 7 - -)

* planar
* O.I ✗
* G.I may be possible if Terminal should be different.

n = even (2, 4, 6, 8 - -)

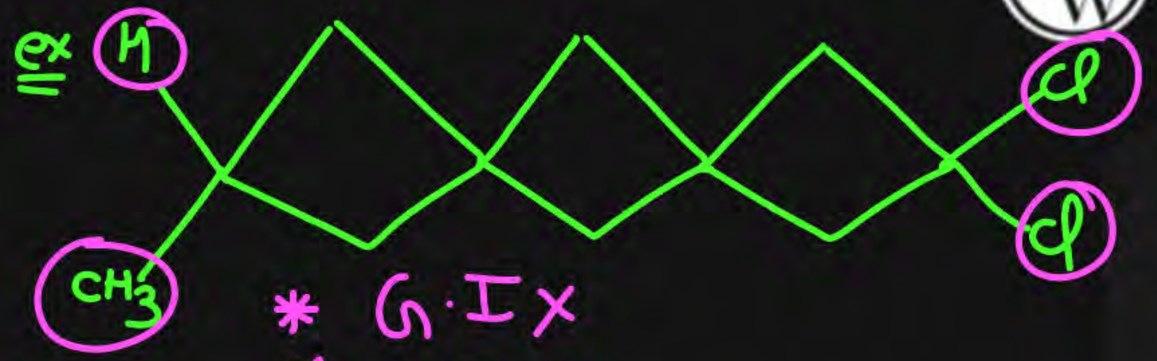
* non-planar
* G.I ✗
* O.I may be possible Terminal grp should be different.

ex



* G.I ✗
* O.I ✗

ex

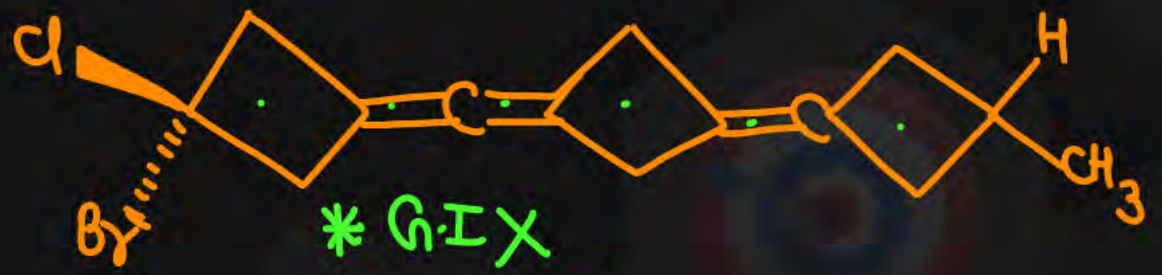


* G.I ✗
* O.I ✗

ex

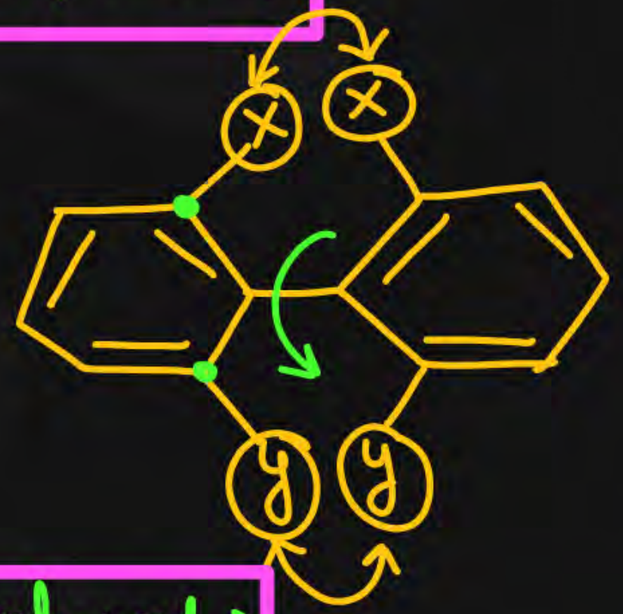
* O.I ✗
* G.I ✓

ex $\boxed{\text{Mix} \Rightarrow \text{Spiro + allens}}$



* G.I ✗
* O.I ✓

Biphenyl compound =>



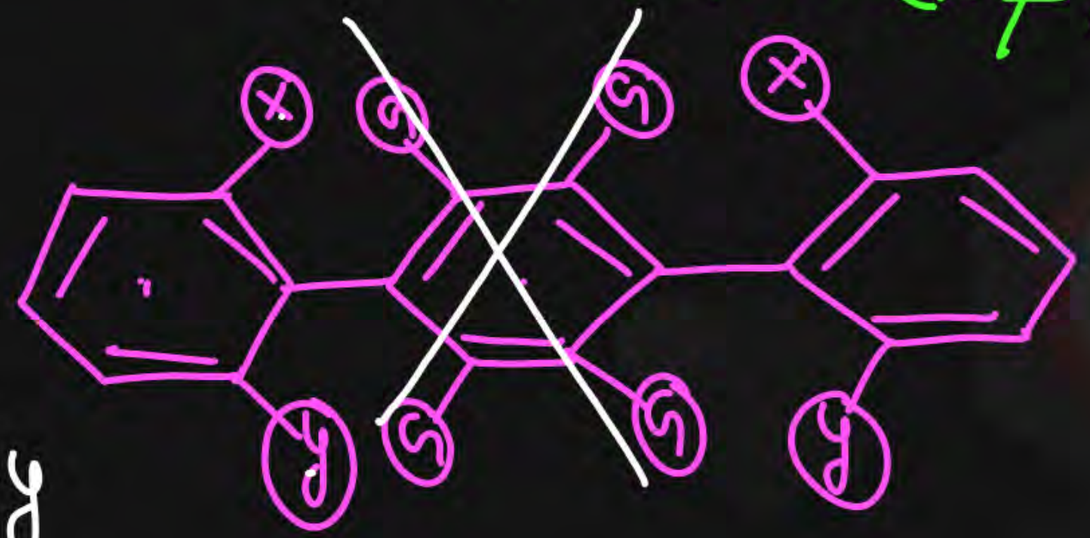
X , y = Bulky grp

* ortho-प्रतिस्थापी Biphenyl compound कभी G.I प्रदर्शित नहीं करते हैं परन्तु O.I प्रदर्शित कर सकते हैं ($X \neq y$)

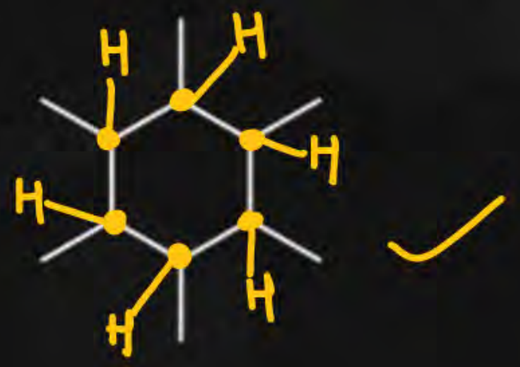
Triphenyl compound =>

* Triphenyl में बीच वाली Ring से कोई नेजा-देजा नहीं है।

G.I तभी प्रदर्शित करेगी जब $X \neq y$



Q. Which of the compound can show geometrical isomerism ?

(1) 

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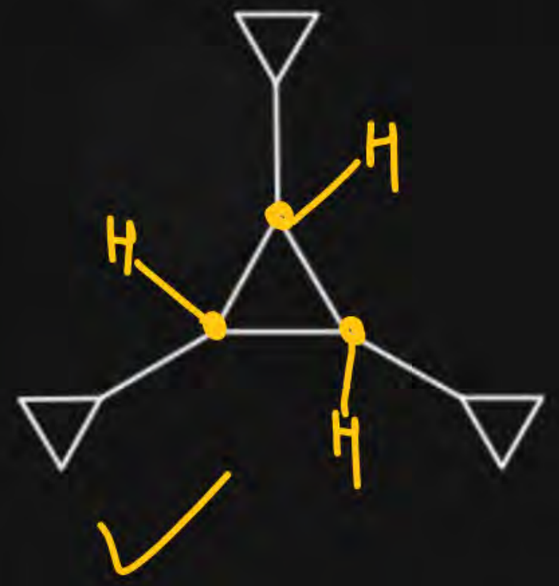
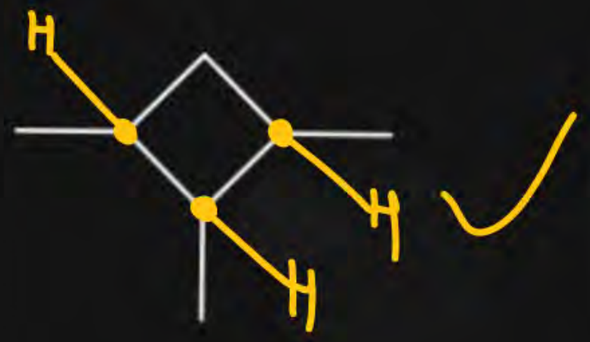
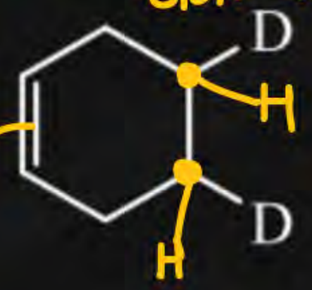
(2) 

(4) 

* double bond के सापेक्ष G.I नहीं होगी परन्तु sp^3 C के सापेक्ष होगी

(5)



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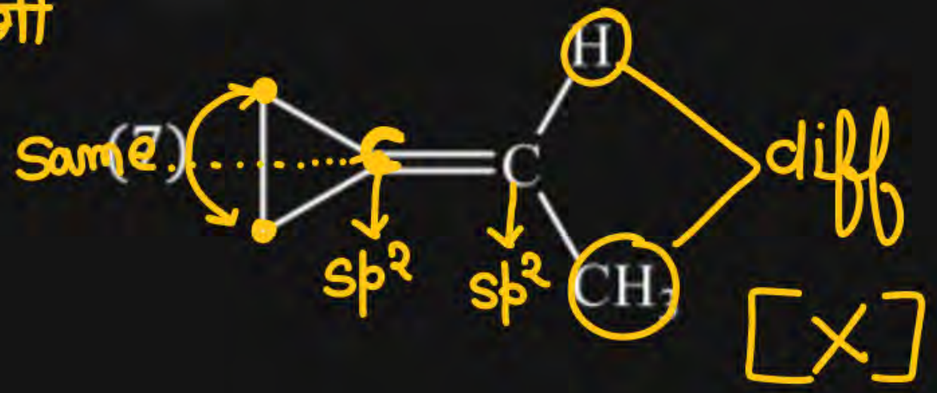
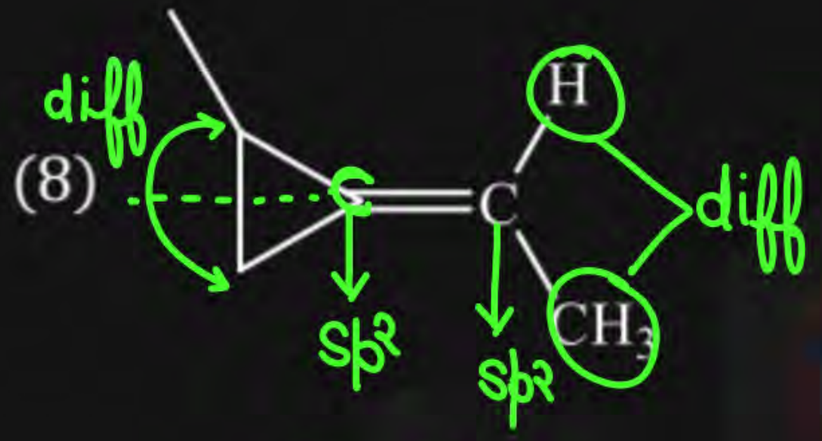


[X]

(6)

[✓]

(8)

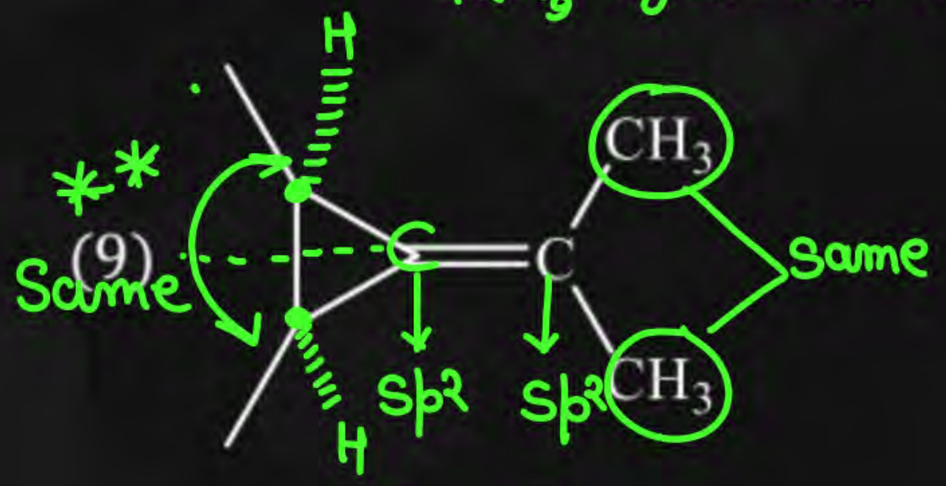


[✓]

* double bond के सापेक्ष G.I नहीं होगी परन्तु cyclic str के सापेक्ष होगी।

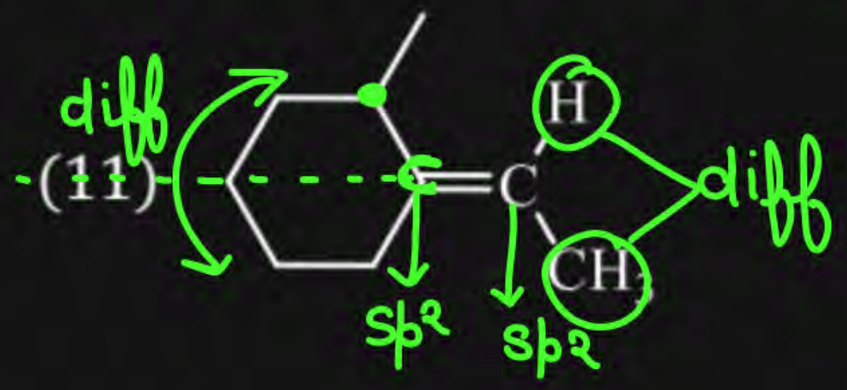
* double bond के सापेक्ष G.I मिलेगी।

(9)



[✓]

(11)



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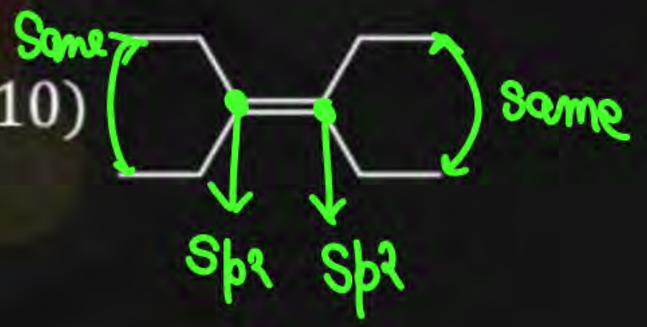
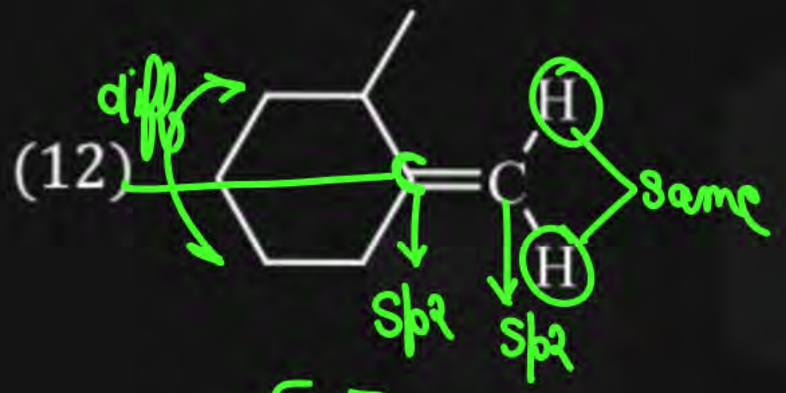


[X]

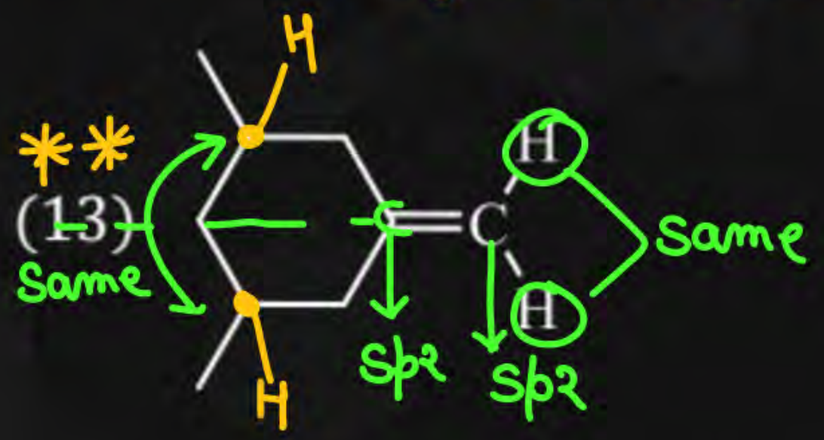
(12)



[X]

* double bond के सापेक्ष नहीं मिलेगी But cyclic के सापेक्ष मिलेगी।

(13)



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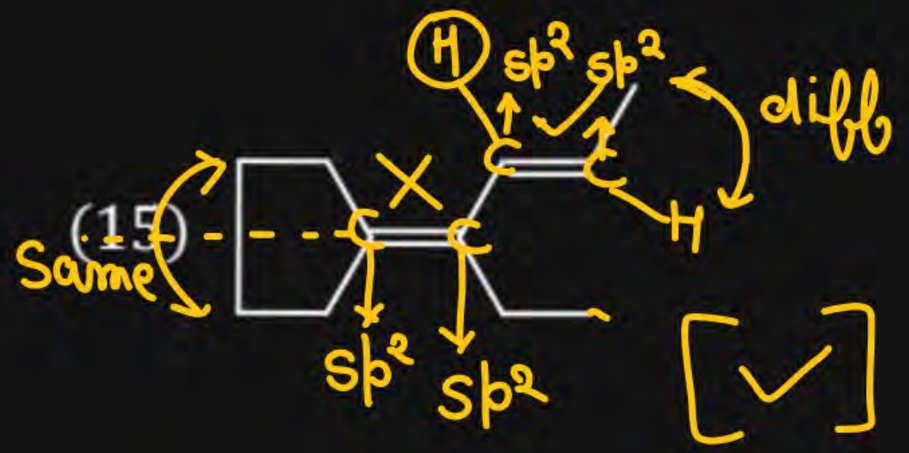

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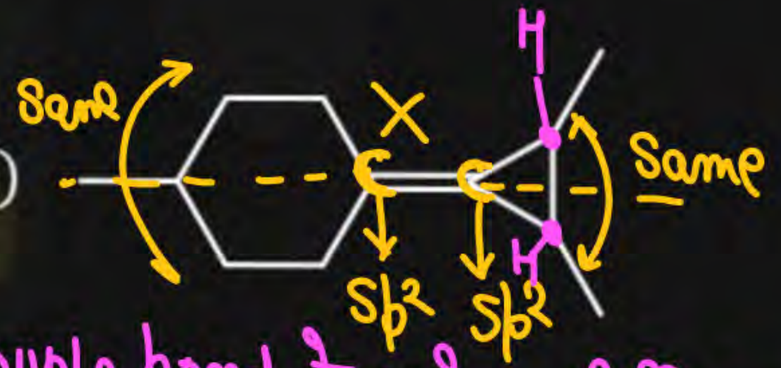
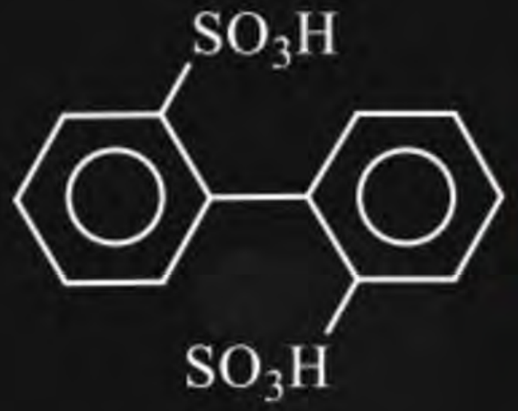


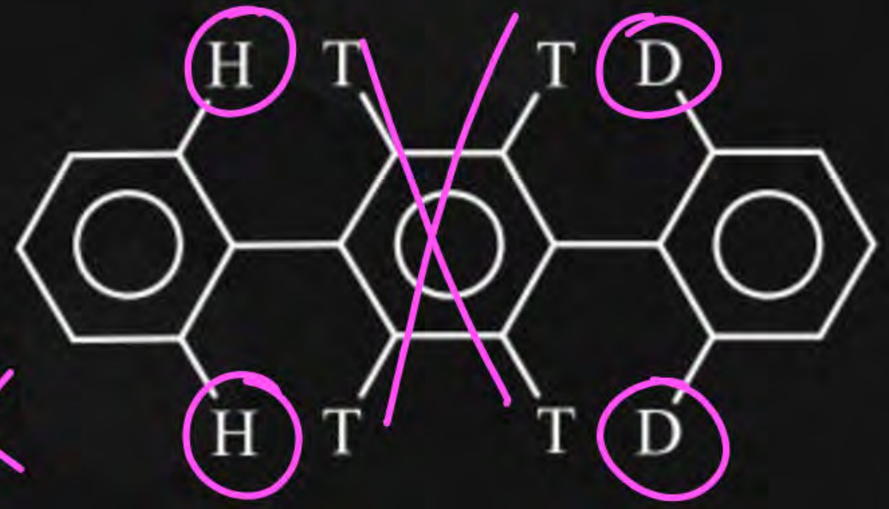
double bond के सापेक्ष नहीं है परन्तु cyclic के सापेक्ष है।

(16)

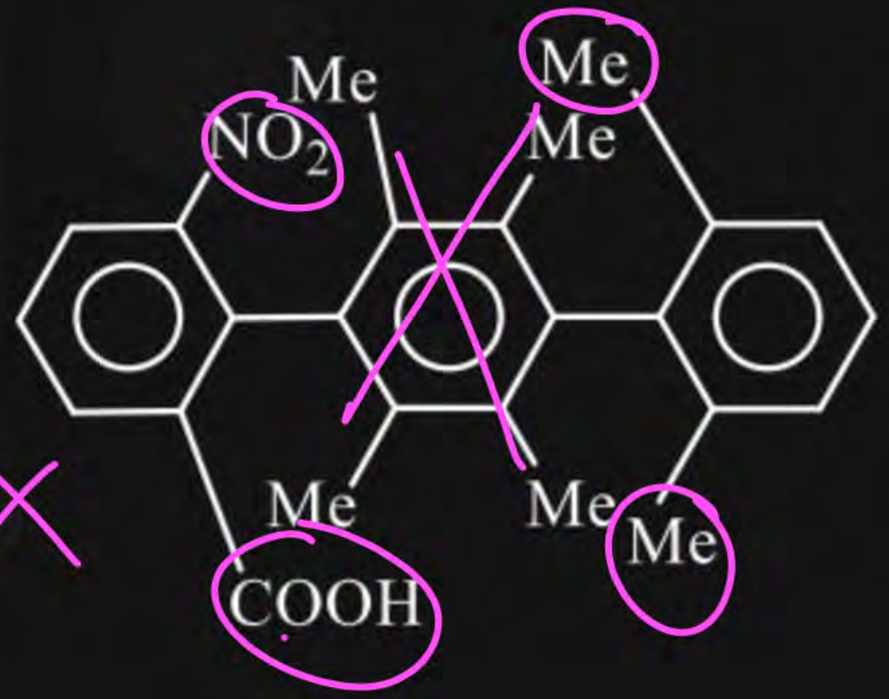


[X]

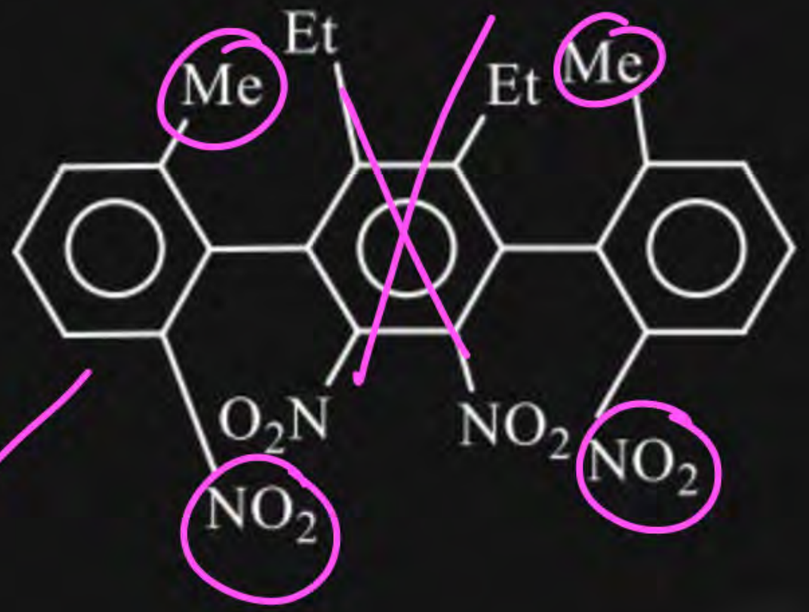
(17)


H
T
T
D
H
T
T
D

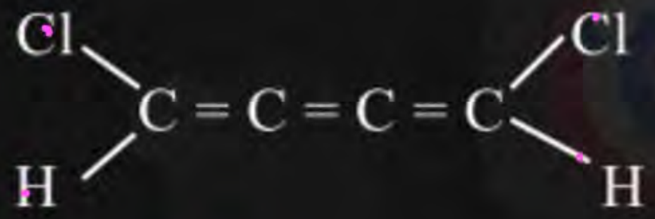
(18)

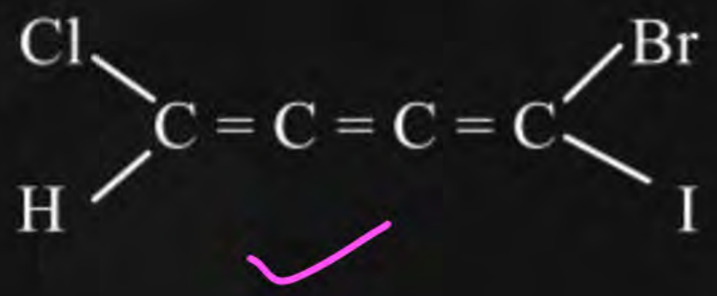

Me
Me
NO2
Me
Me
Me
Me
COOH

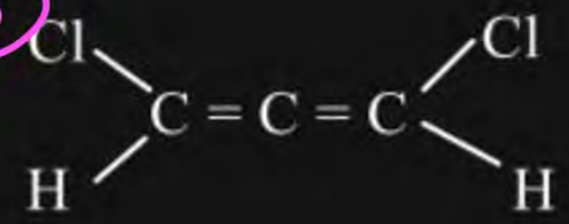
(19)

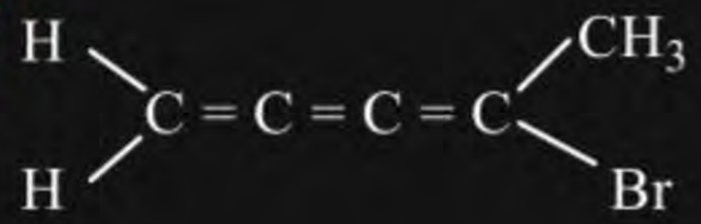

Et
Me
Et
Me
O2N
NO2
NO2
NO2

(20)


Cl
Cl
C = C = C = C
H
H

(21) 

H.W (23) 

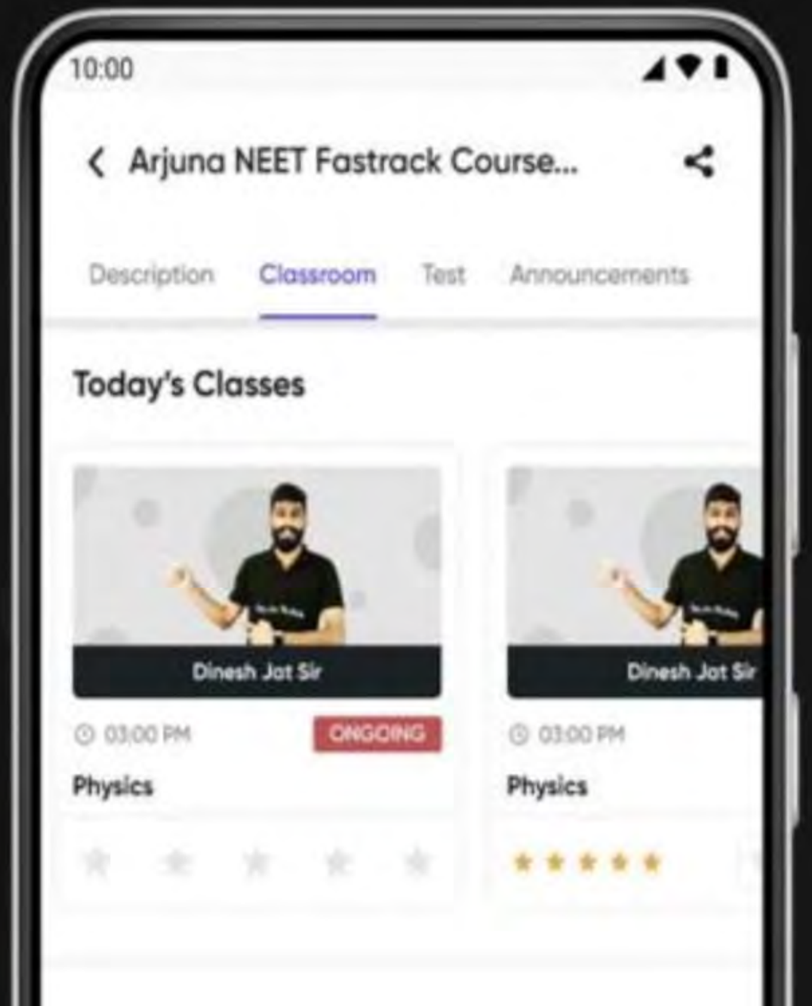
H.W (22) 

(24)

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

Batch - 11YN401MH

Chemistry (OC)

Isomerism

Lecture No.- 7

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic Condition of GI

Topic

Topic

Topic

Topics to be Covered

Topic cis-trans नामकरण

Topic E-Z नामकरण

Topic Syn-Anti नामकरण

Topic DPP-05

ज्यामिती समावयवियों का नामकरण ⇒ [Nomenclature of G.I]

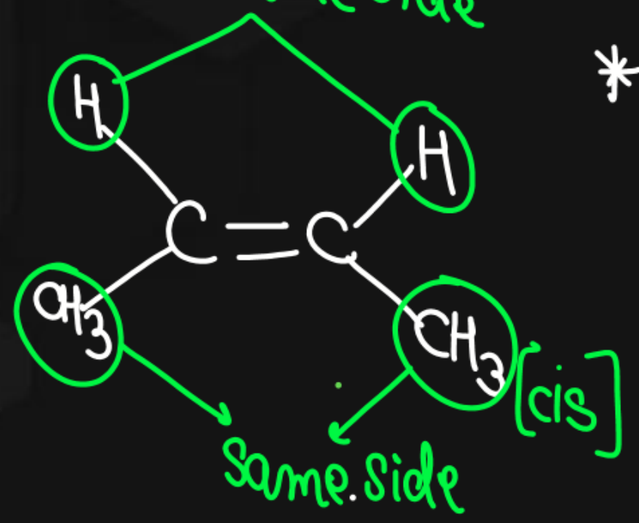
(1) cis–trans

(2) E–Z

(3) Syn–Anti

(1) cis–trans नामकरण ⇒

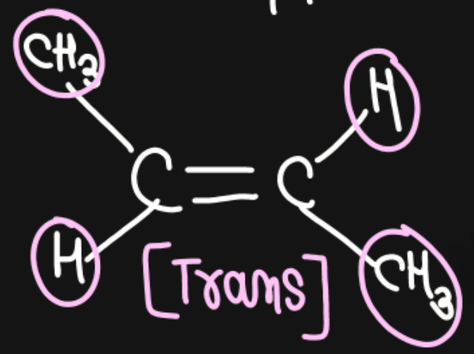
ex



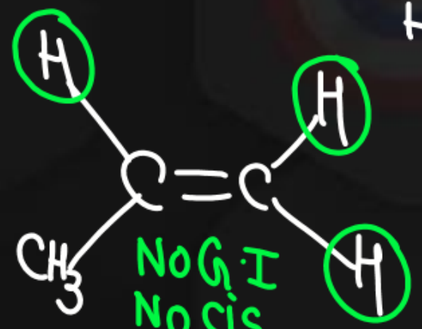
* Same grp ⇒ Same side = cis

* Same grp ⇒ opposite side = trans

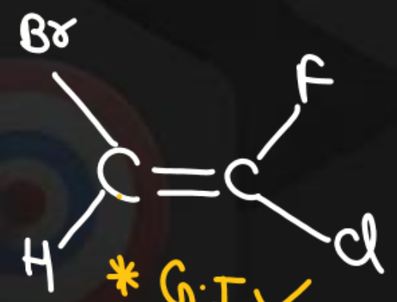
ex



ex



** ex



* G.I ✓

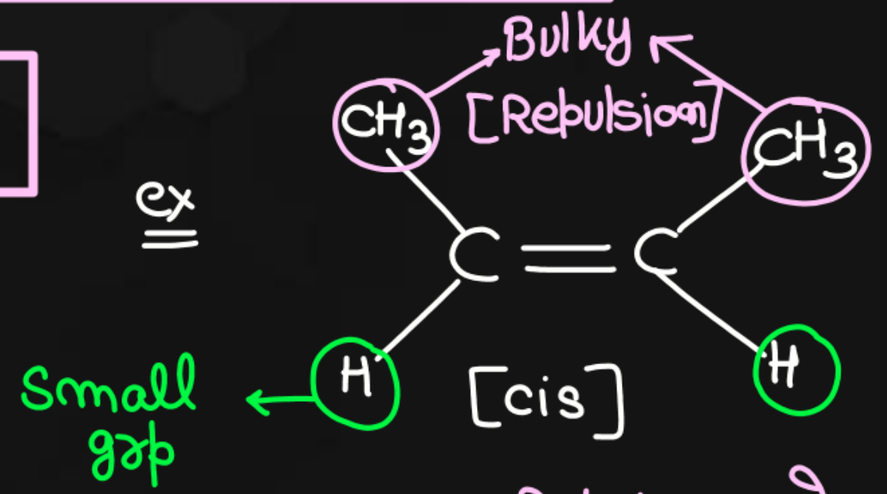
* No cis

* No trans

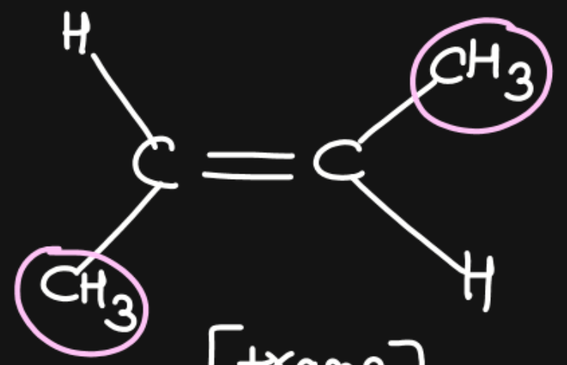
Properties of cis-trans [G.I] ⇒

(1) Stability ⇒

ex



[cis]

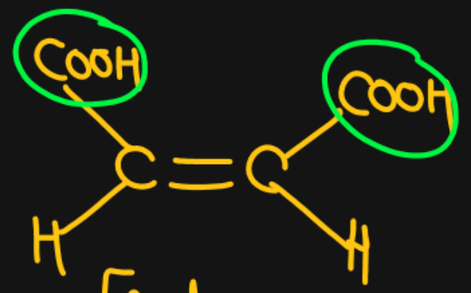


[trans]

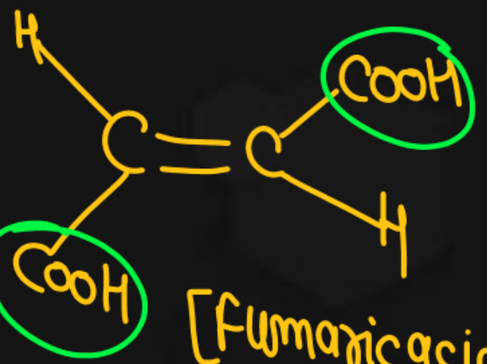
* Steric Repulsion के कारण cis-isomer कम स्थायी होते हैं।

* Steric Repulsion cis-isomer के तुलना मे कम होने के कारण cis से अधिक स्थायी है।

ex



[maleicacid]



[Fumaricacid]

(2) dipole moment ⇒

$\mu = q \times d$

- q → EN
- d → distance

$\mu = 0$ [molecule → Non-polar]

$\mu \neq 0$ [molecule → polar]

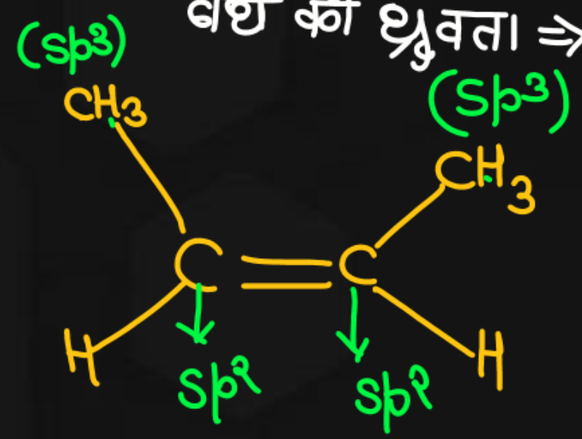
Note ⇒ अणु की ध्रुवता ⇒ μ ≫ EN

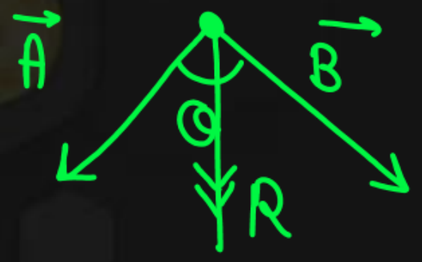
बंध की ध्रुवता ⇒ ΔEN

* μ → vector property → परिमाण, दिशा

[less EN → More EN]

ex



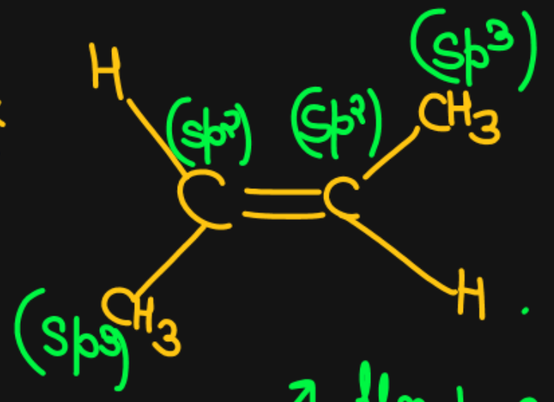


$\mu_{net} \neq 0$

[Polar]

[cis]

ex

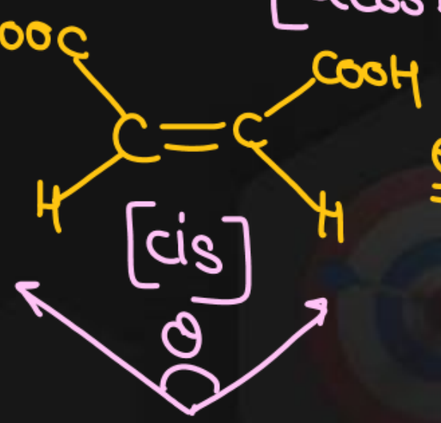


$\mu_{net} = 0$

[Non-polar]

[trans]

ex

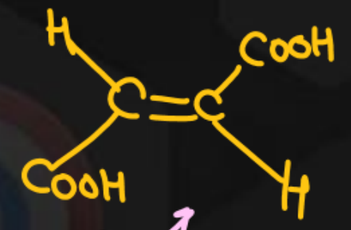


[cis]

$\mu_{net} \neq 0$

[Polar]

ex



[trans]

$\mu_{net} = 0$

[Non-polar]

NOTE ⇒ $sp^3 < sp^2 < sp$

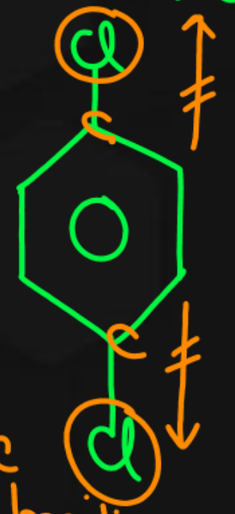
sp^3 → %S = 25%, sp^2 → %S = 33.33%, sp → %S = 50%

$\boxed{\%\ S\ \text{charactor} \propto EN}$

* sp^3 = angular
*

Q Dipole moment के बारे मे जानकारी दे।

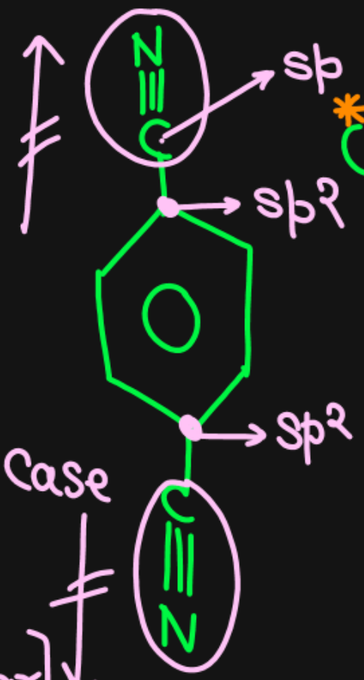
(a)



* Monoatomic case at p-position

$\mu_{net} = 0$
[Non-polar]

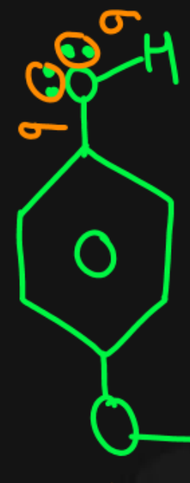
(b)



* Linear diatomic case

$\mu_{net} = 0$
[Non-polar]

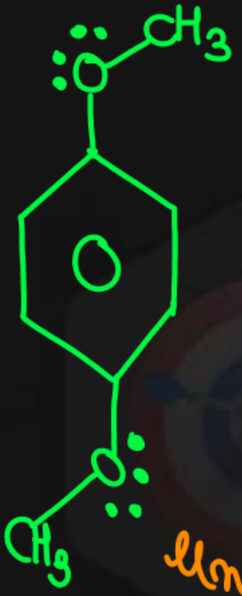
(c)



* angular diatomic case

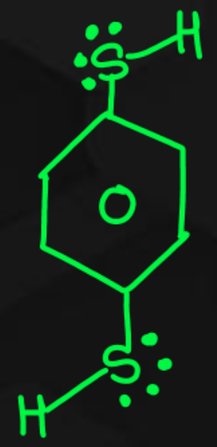
$\mu_{net} \neq 0$

(d)



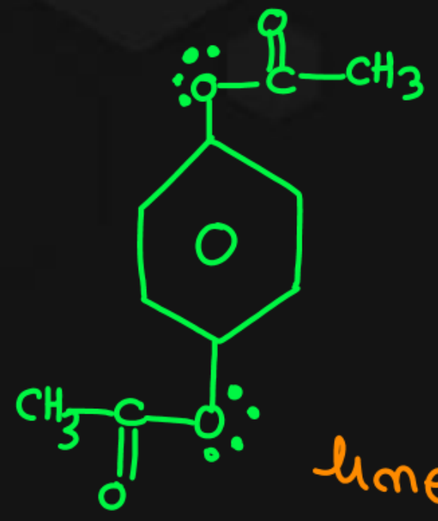
$\mu_{net} \neq 0$

(e)



$\mu_{net} \neq 0$

(F)



$\mu_{net} \neq 0$

(3) B.Pt ⇒

DT funda ⇒

(1) Bonding (Interaction)

H-bonding > dipole-dipole > V.W.F

* $-\overset{O}{\overset{\|}{C}}-OH$
* $-OH$
* $-NH_2$
* $-NH-$
* $-\underset{O}{\underset{\|}{C}}-NH_2$

* $-\overset{O}{\overset{\|}{C}}-$
* $-\underset{O}{\underset{\|}{C}}-H$
* $-\underset{O}{\underset{\|}{C}}-X$

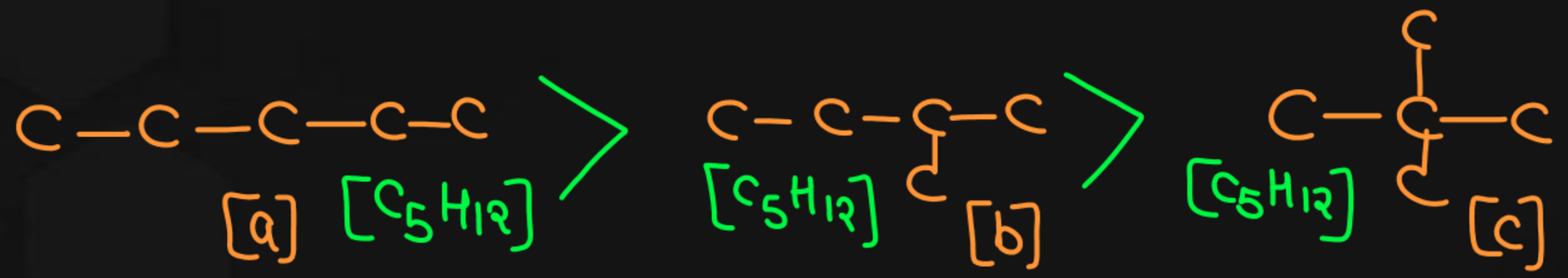
$-\underset{O}{\underset{\|}{C}}-OR$, cyanide, $R-X$, Hydrocarbon

(2) $B.Pt \propto \mu$

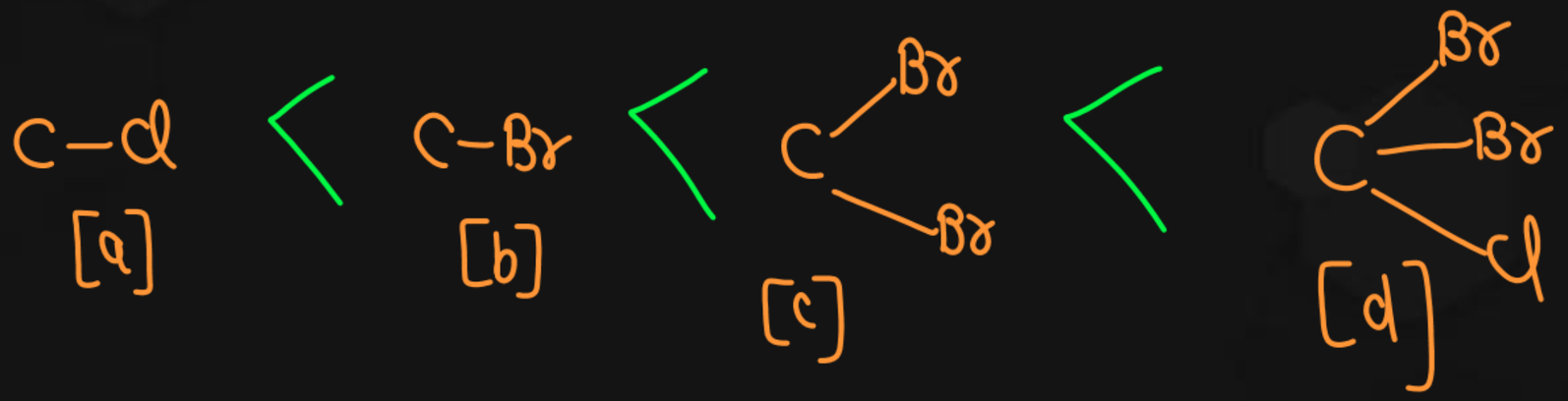
(3) $\downarrow$ $\boxed{B.Pt \propto \frac{\text{molecular weight}}{\text{Branching} \uparrow}}$ → for isomers

Q निम्न यौगिकों B.pt के सही क्रम arrange कीजिये ?

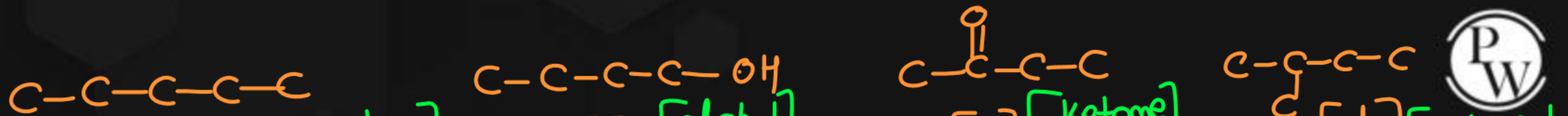
ex



ex



ex



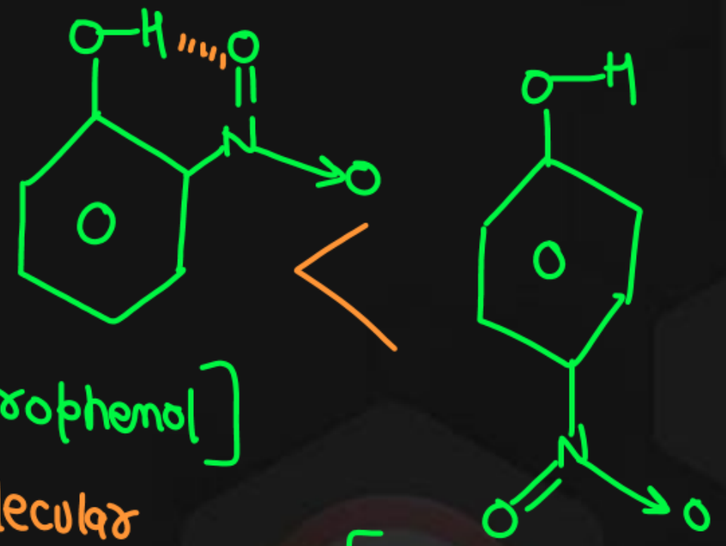
[a] [Hydrocarbon] [b] [alchol] [c] [ketone] [d] [Hydrocarbon]

b > c > a > d

ex

[amide] [a] > [b] [ester]

ex



[o-nitrophenol]
[Intromolecular H-bonding]
[Steam volatile]

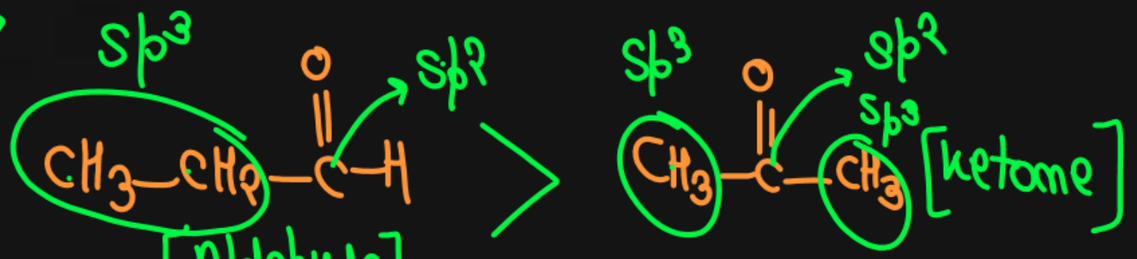
<

[p-nitrophenol]
[Intermolecular H-bonding]

ex

[cis] > [trans]

ex



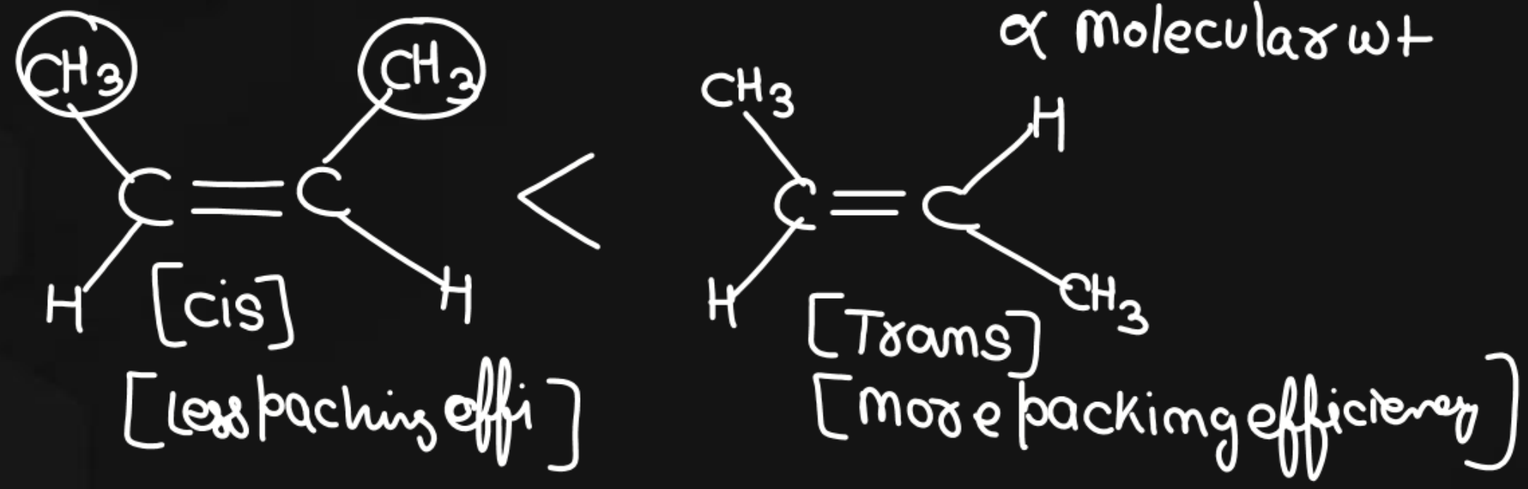
[Aldehyde] > [ketone]

(4) m.pt ⇒

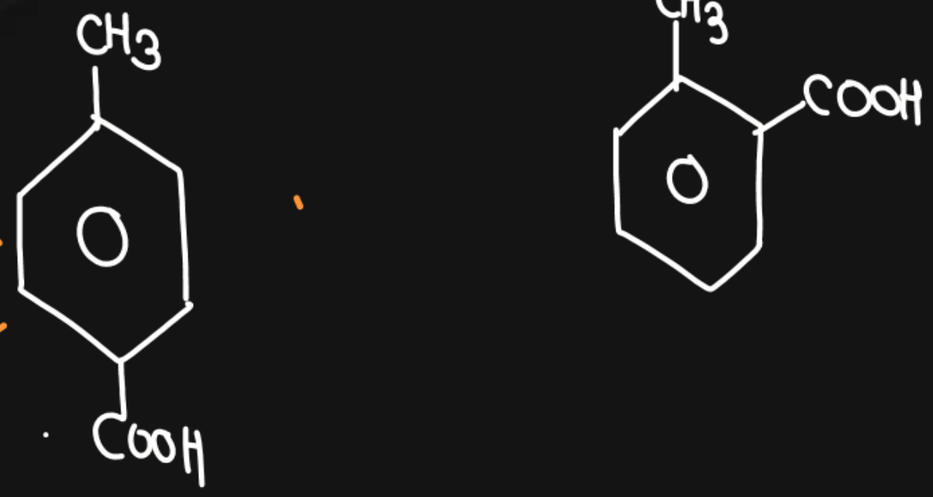
DT funda ⇒

(1) m.pt ∝ Packing efficiency
∝ Symmetry
∝ Molecular wt

ex



ex



* समसमितता का तल (Pos) ✓
* m.pt ↑

* Pos ✗
* m.pt ↓

(5) Solubility [विलेयता] ⇒

like-dissolve-like

* सामान्यतया अध्रुवीय यौगिक - अध्रुवीय विलायकों में घुलनशील होते हैं तथा ध्रुवीय यौगिक ध्रुवीय विलायकों में घुलनशील होते हैं।

***

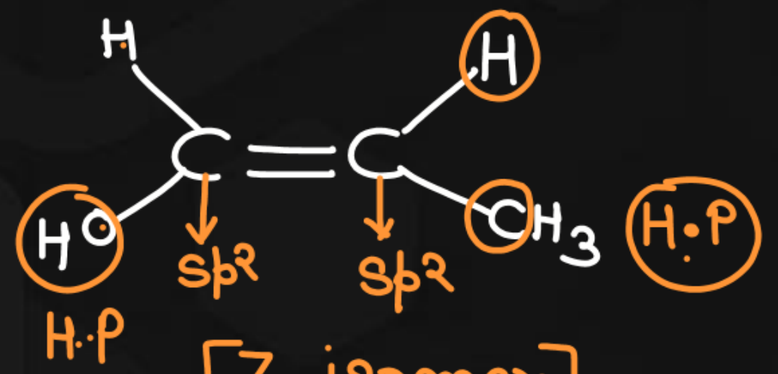
(२) E-Z-system ⇒

* E ⇒ Entezen
* Z ⇒ Zussamann
* समान वरीयता वाले समूह ⇒ same side ⇒ Z-isomer
* समान वरीयता वाले समूह ⇒ opposite ⇒ E-isomer
* वरीयता का निर्धारण C.I.P Rule के द्वारा करते हैं।

Cahan, Ingold, Prelog

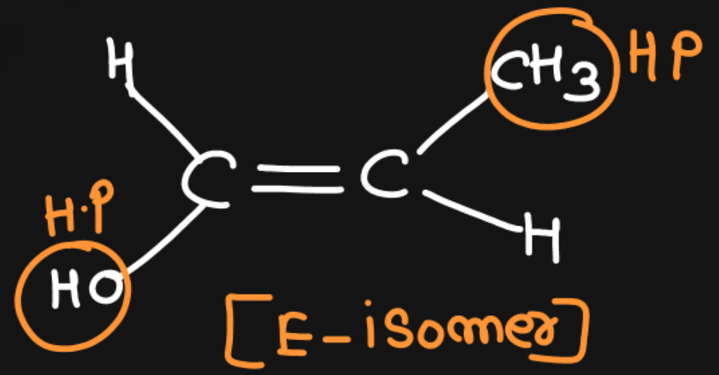
Rule → 1 ⇒ वरीयता का निर्धारण sp^2-C से directly जुड़े atom के atomic number के आधार पर करते हैं।

ex



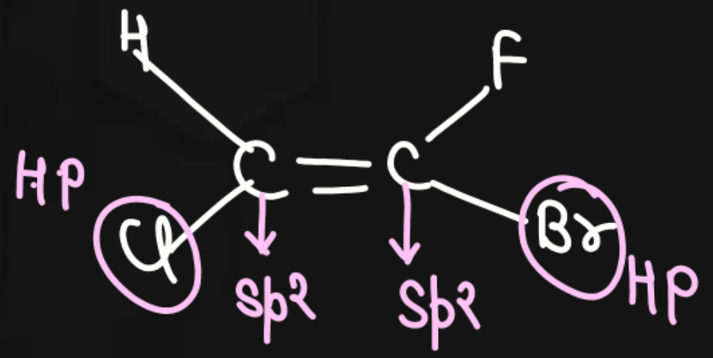
[Z-isomer]

ex



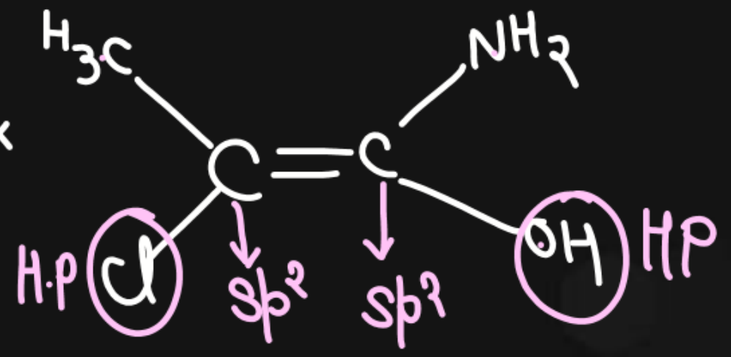
[E-isomer]

ex



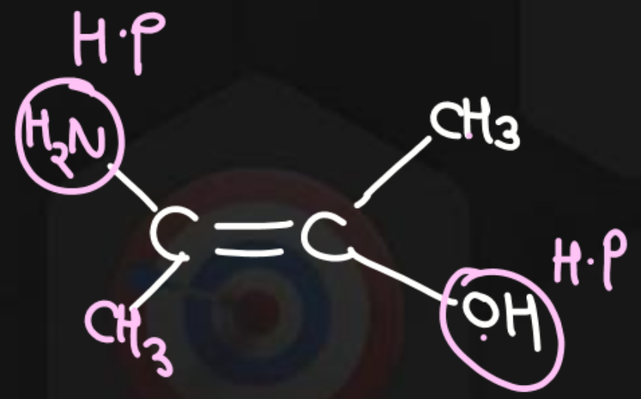
[Z-]

ex



[Z-]

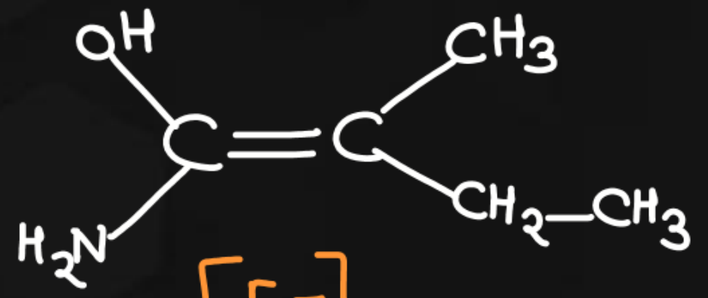
ex



[E-]

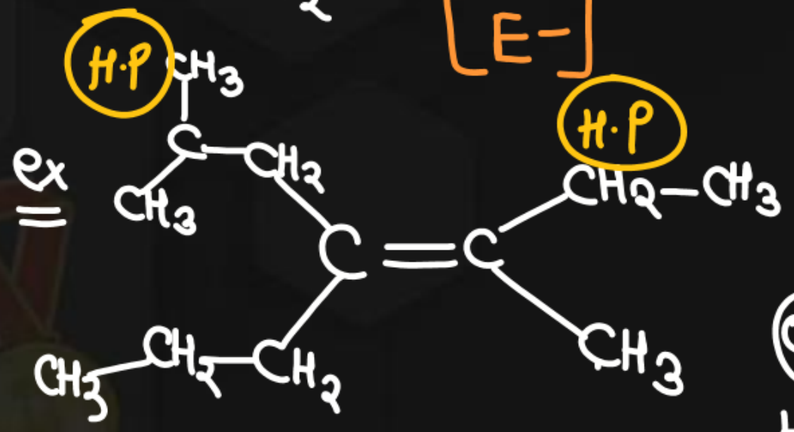
Rule ⇒ 2 ⇒ यदि sp^2-C से जुड़े हुए atom Same हैं तो next atom को देखे।

ex



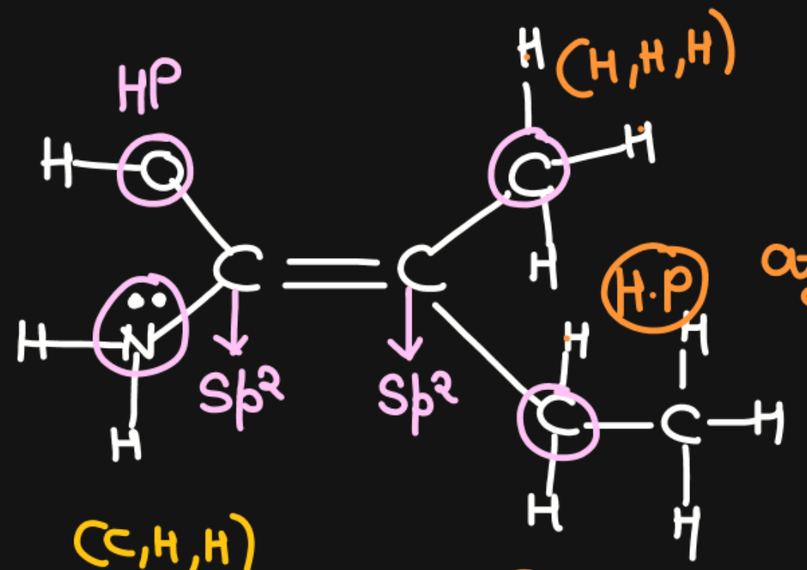
[E-]

ex



[Z-]

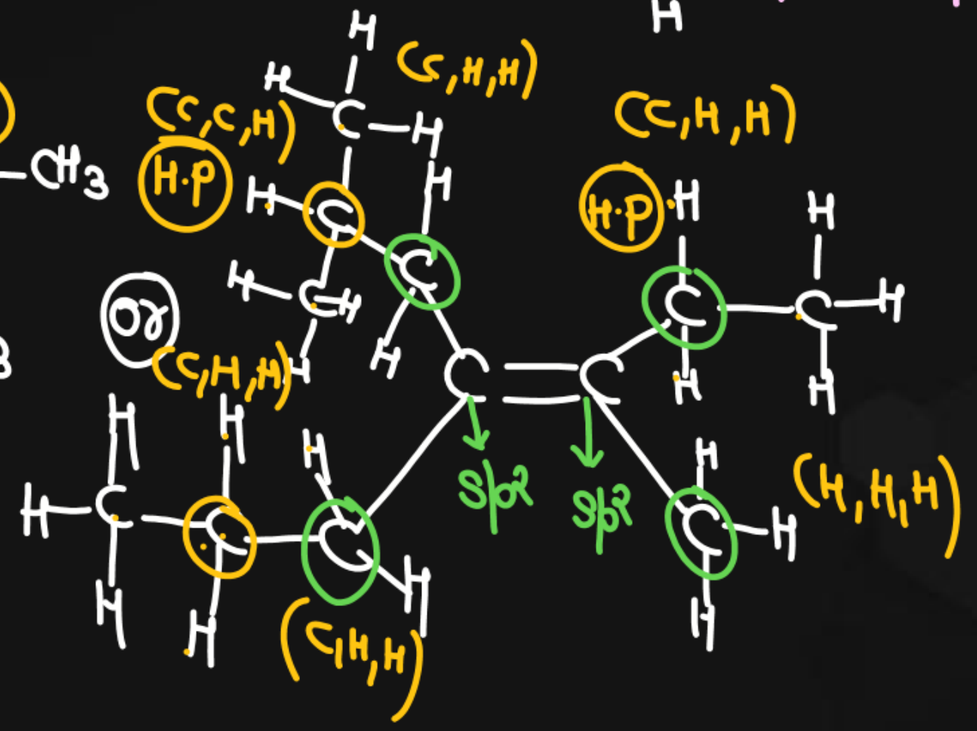
or



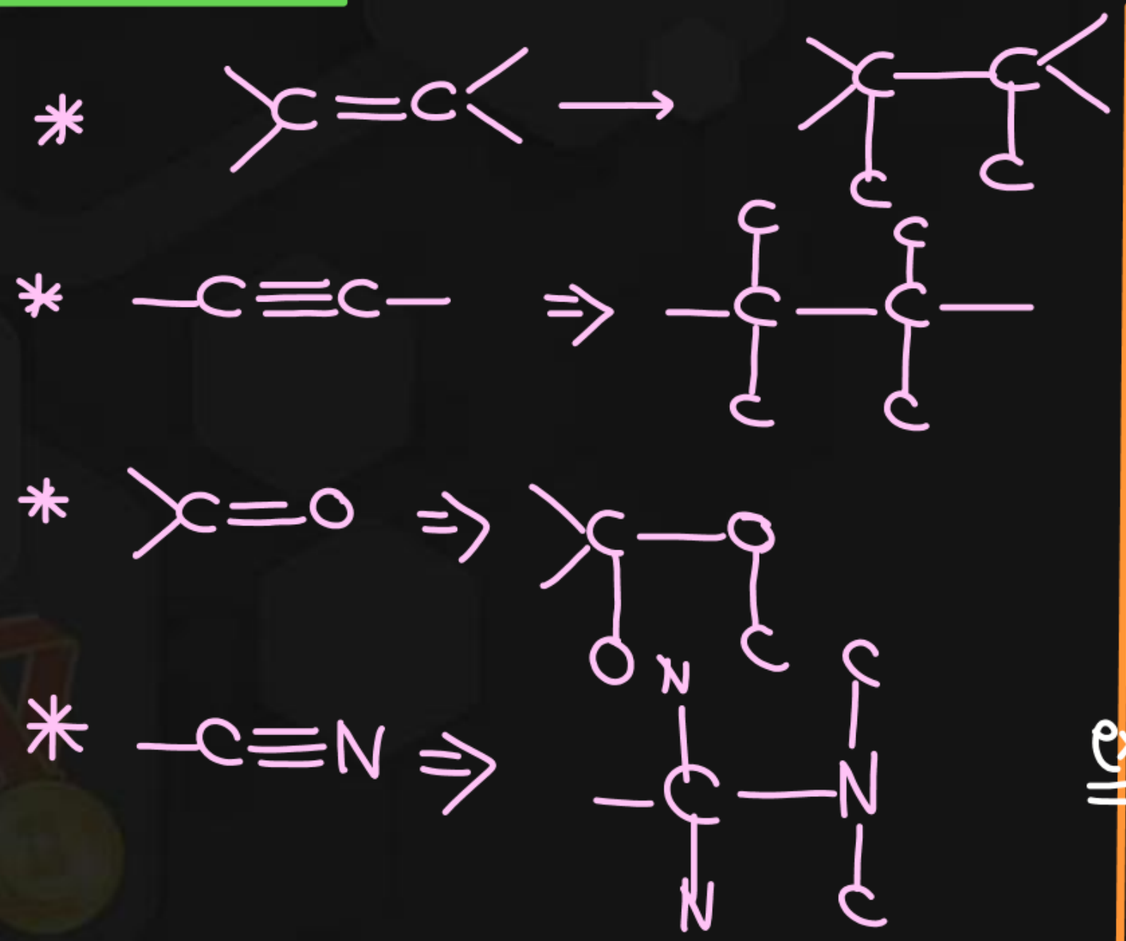
atomic number के घटते क्रम में लिखे।

(H,H,C) ✗
(C,H,H) ✓
(H,C,H) ✗

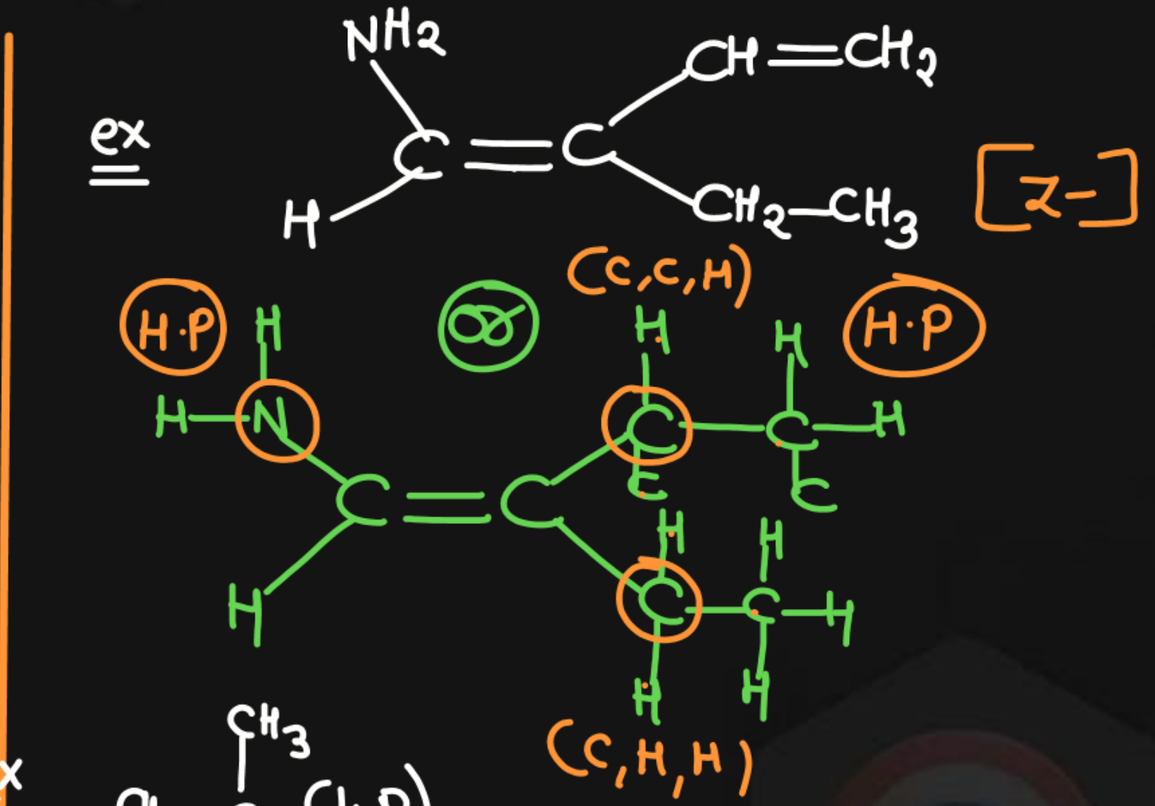
or



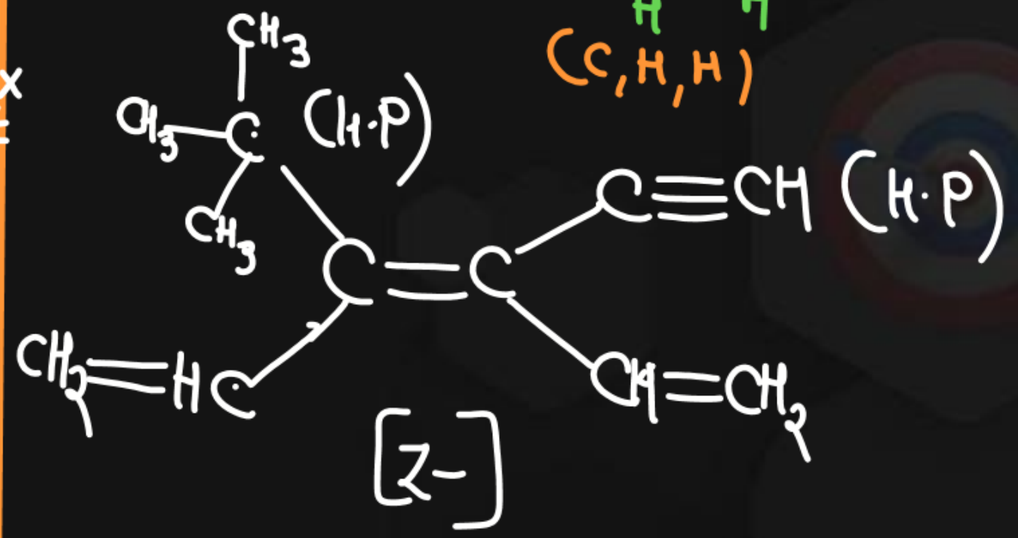
Rule ⇒ 3 ⇒ यदि multiple bond दिया गया हो तो



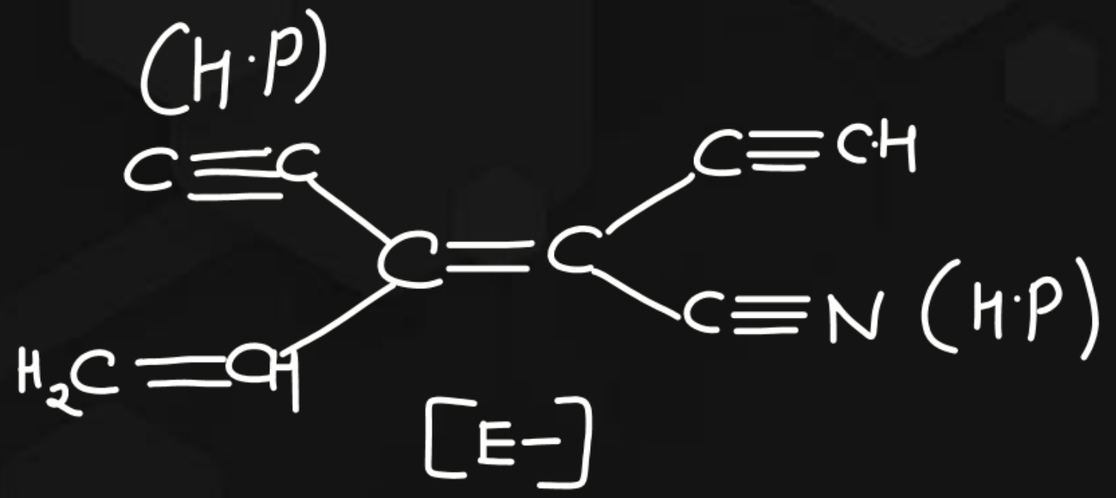
ex



ex

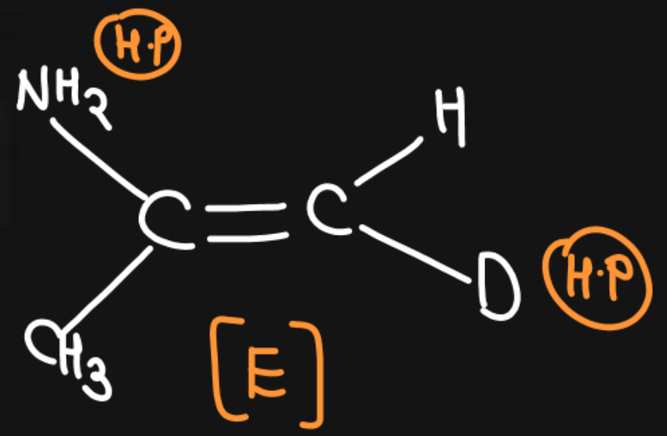


ex

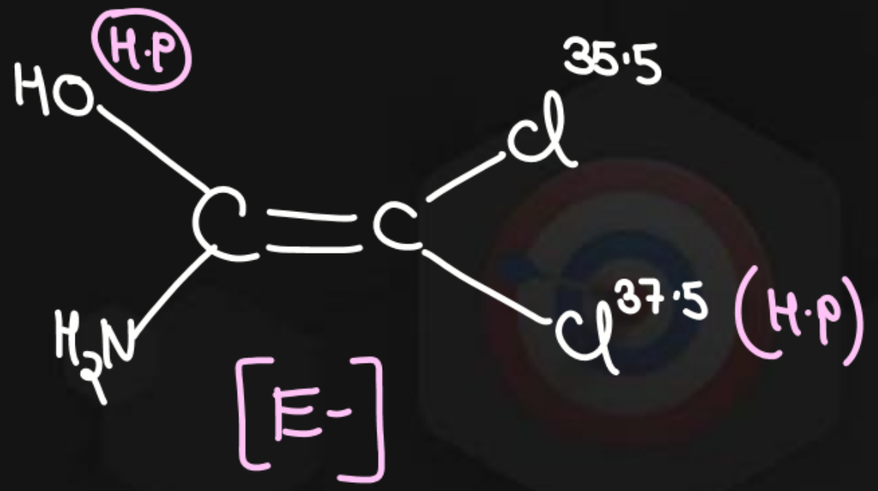


Rule-4 ⇒ यदि समस्थानिक दिया गया हो तो **वरीयता ∝ परमाणु भार**

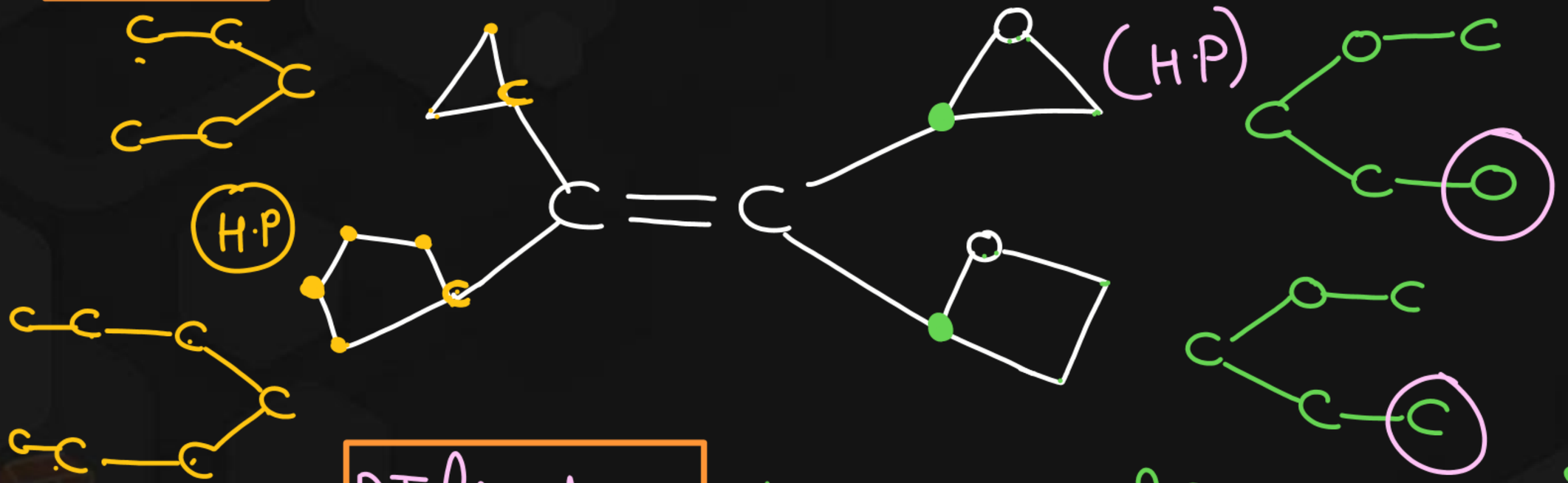
ex



ex



Rule ⇒ 5 यदि sp^2-C से cyclic compound जुड़ा हुआ हो।

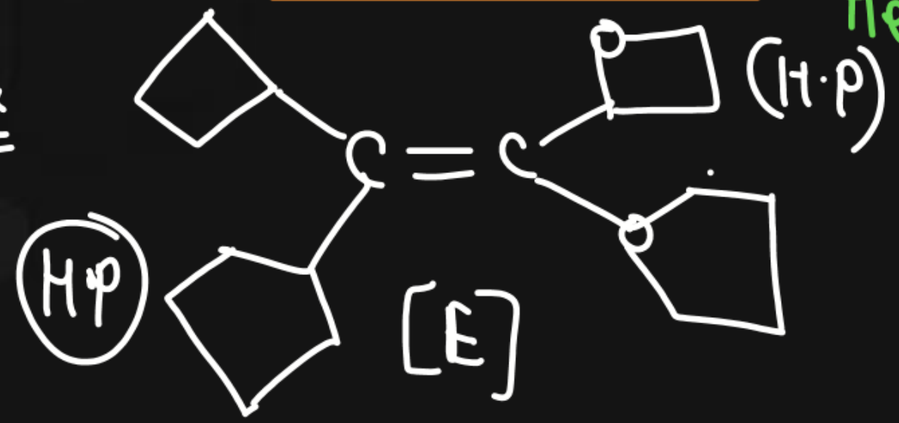


DT funda ⇒

Homocyclic ⇒ बड़ी Ring ⇒ Priority दो।

Heterocyclic ⇒ Small Ring ⇒ Priority दो।

ex



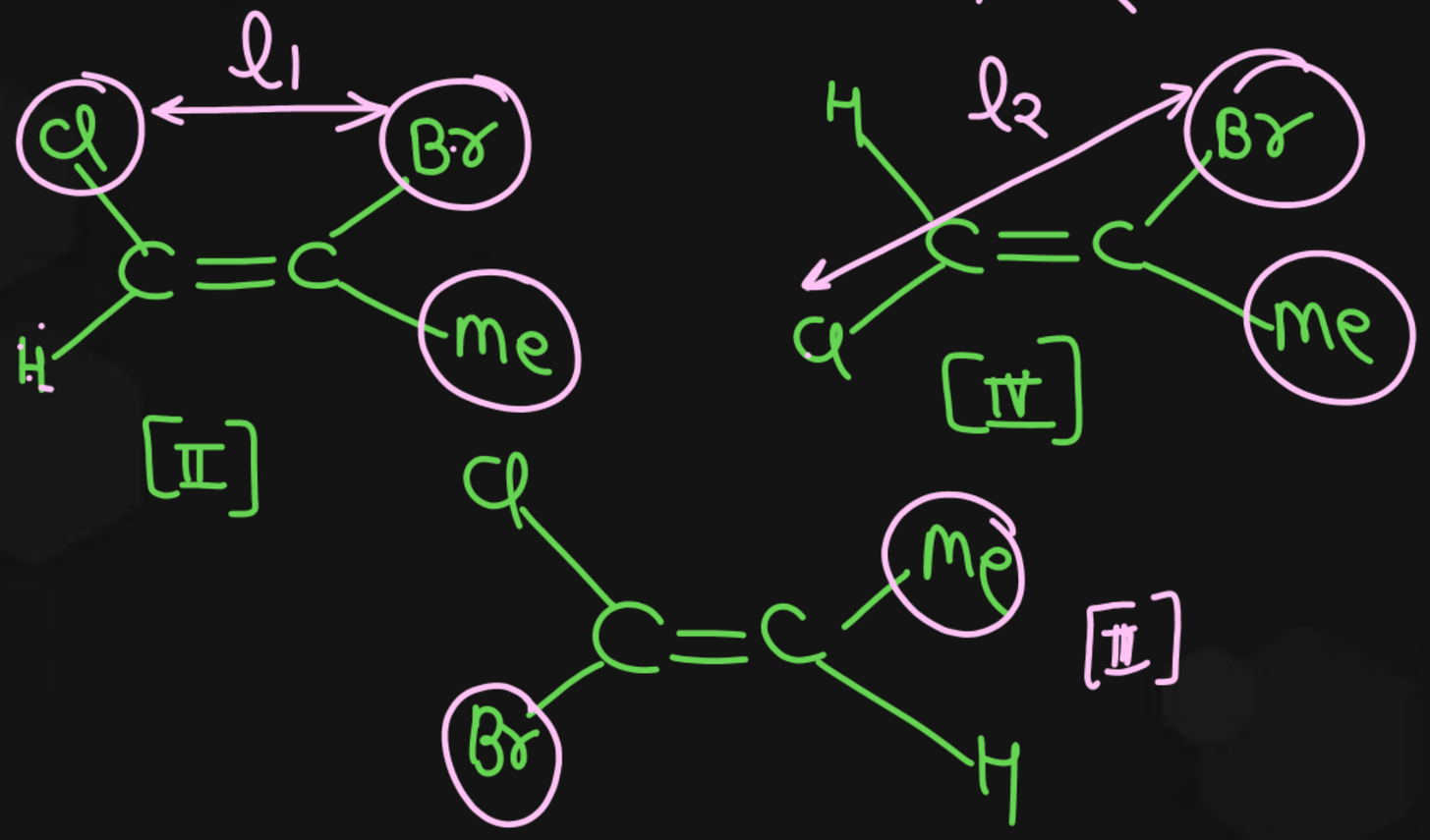
(3) Syn-Anti System ⇒

कर चुके हैं।

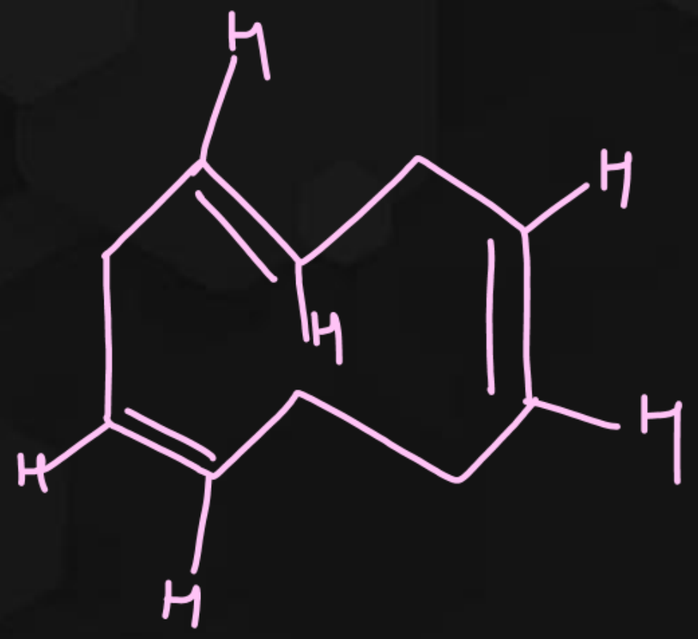
DPP-05

Q. 6

$l_1 \neq l_2$



Q.9



2 mins Summary

* cis-trans
* E-Z

Homework

DPP-06, 04

Next Class Target

Topic ज्यामिति समानयती की गणना।

Topic

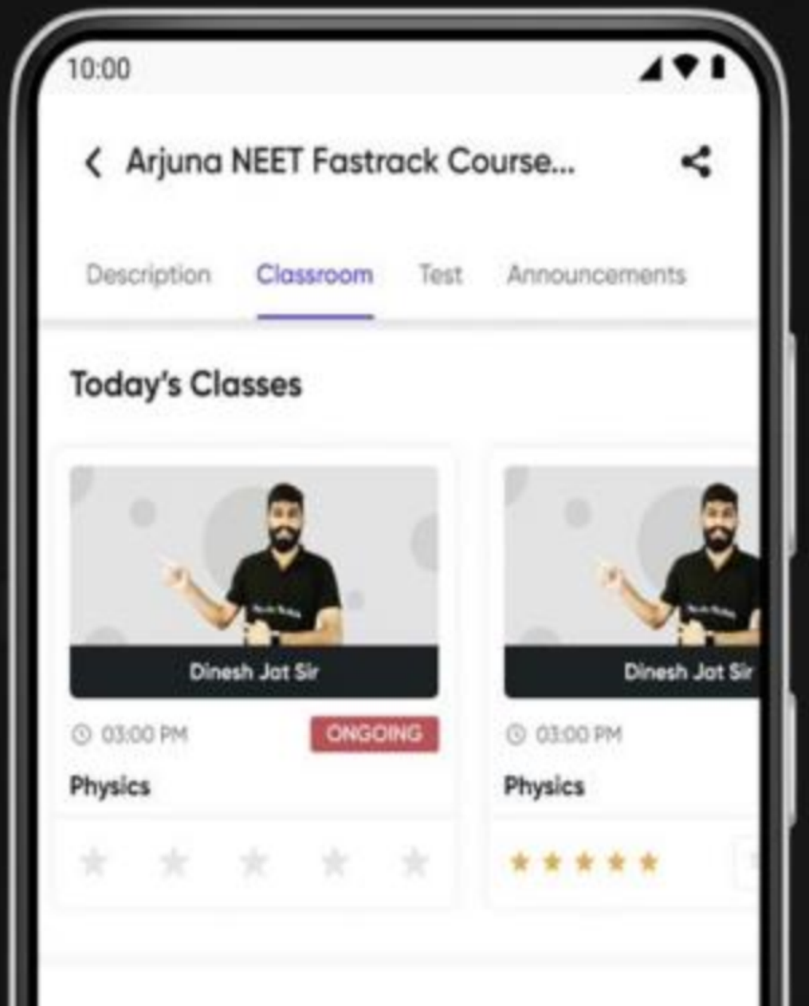
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

11-YN401MH

Chemistry (OC)

Isomerism (समावयवता)

Lecture No.- 08

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic cis-trans

Topic E-Z

Topic Syn-Anti

Topic

Topics to be Covered

Topic ज्यामिति समावयवियो की गणना

Topic Homework

Topic DPP-06

Topic

ज्यामिती समावयवी की गणना ⇒
[Calculation of G.I]

Case-1 Molecule → unsym.

तो No of G.I = 2^n

Where n = no of geomatricle centre

Case-II Molecule → Sym.

तो No of G.I = $2^{n-1} + 2^{P-1}$

n = odd (1, 3, 5, 7 ---)
तो $P = \frac{n+1}{2}$

n = even (2, 4, 6, 8 ---)
तो $P = n/2$

Type-1 Question ⇒

ex

$$\overset{R_1}{CH_3}-CH=CH-CH=CH-CH=CH-CH=CH-\overset{R_2}{CH_2-CH_3}$$

* $R_1 \neq R_2$
* Molecule → unsym

$n = 3$

∴ no of G.I $= 2^n = 2^3 = 8$

ex

$$CH_3-CH=CH-CH=CH-CH=CH-CH=CH-CH=CH-CH_3$$

* $R_1 = R_2$
* Molecule → Sym
* $n = 4$ (even)

∴ no of G.I $= 2^{n-1} + 2^{n/2 - 1}$

$= 2^{4-1} + 2^{2-1}$

$= 2^3 + 2^1$

$= 10$

ex $CH_3-CH=CH-CH=CH-CH=CH-CH_3$

* $R_1 = R_2$
* Molecule → sym
* $n = 3$ (odd)

तो no of G.I $= 2^{n-1} + 2^{\frac{n+1}{2}-1}$

$= 2^{3-1} + 2^{4/2-1}$

$= 2^2 + 2^1$

$= 4 + 2 = 6$

Type-2 Question ⇒

* $R_1 = R_2$
* Molecule → sym
* $n = 3$

तो No of G.I $= 2^{n-1} + 2^{\frac{n+1}{2}-1}$

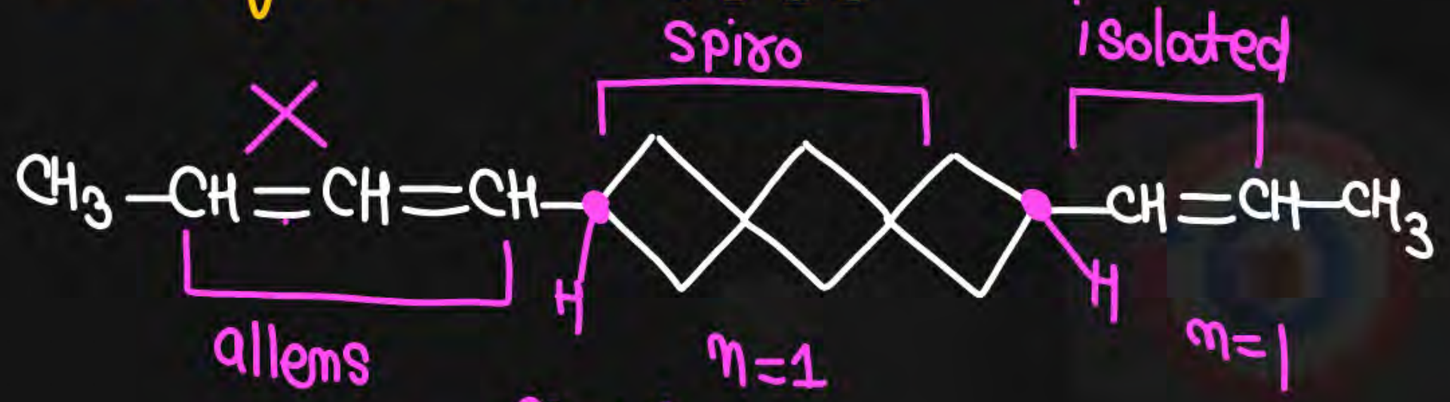
$= ----$

ex

* $R_1 \neq R_2$
* molecule → unsym
* $n = 6$

तो no of GI $= 2^n = 2^6 = 64$

Type-3 Question ⇒



$n_{Total} = 2$

molecule unsym

* तो GI $= 2^2 = 4$

ex

allens
$n = 1$

spiro
$\times$

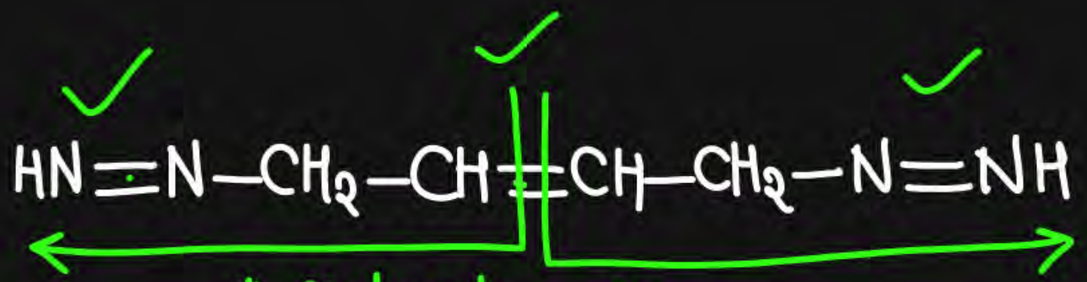
conjugated
$n = 2$

$n_{Total} = 3$

* Molecule → unsym

तो No of G.I $= 2^n = 2^3 = 8$

Type-3 Question ⇒



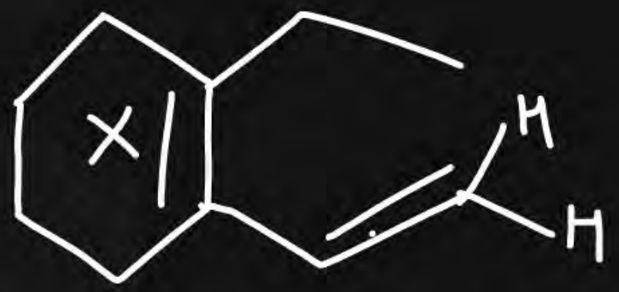
* Molecule → sym
* $n = 3$
* तो no of G.I $= 2^{n-1} + 2^{\frac{n+1}{2}-1}$

$= 2^{3-1} + 2^{4/2-1}$

$= 2^2 + 2^1 = 6$

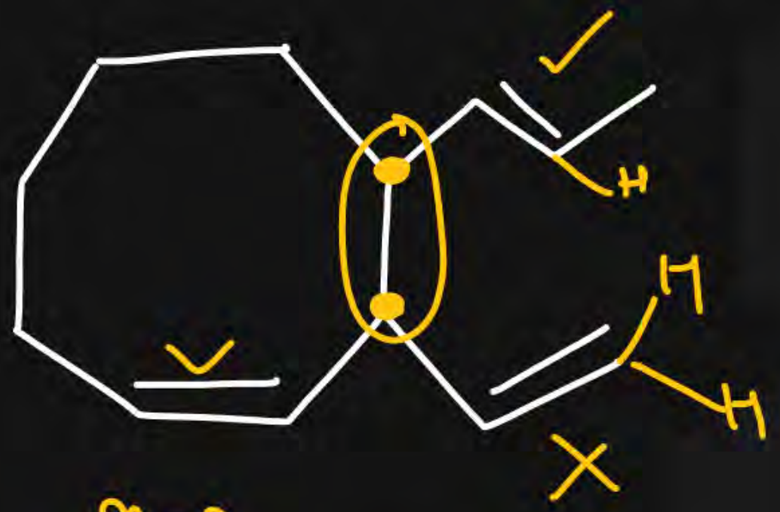
Type-4 question ⇒

ex



No G.I

ex



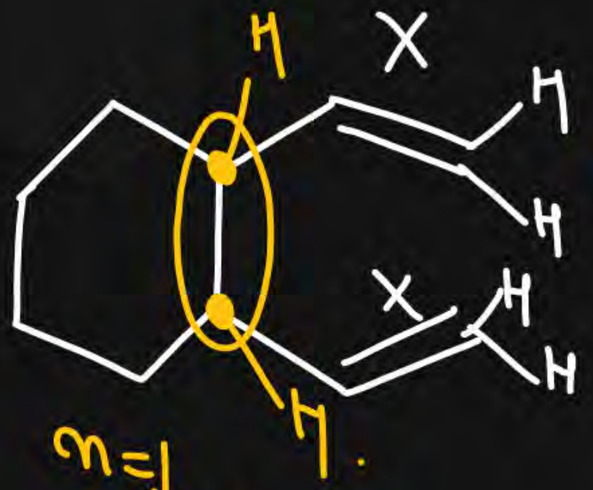
$n = 3$

Molecule unsym

की $G.I = 2^n$

$= 2^3 = 8$

ex

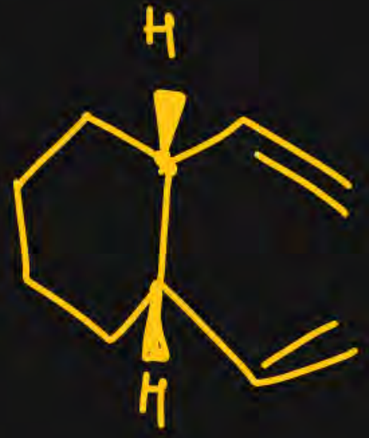


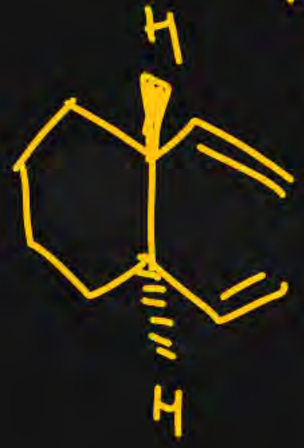
$n = 1$

cis

Trans

⇒



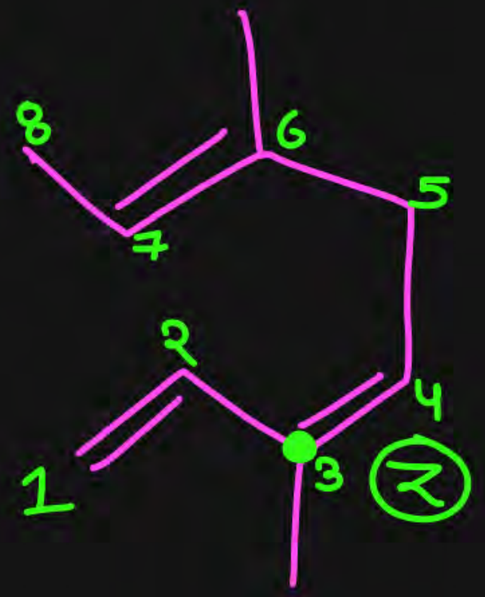


Dpp-06

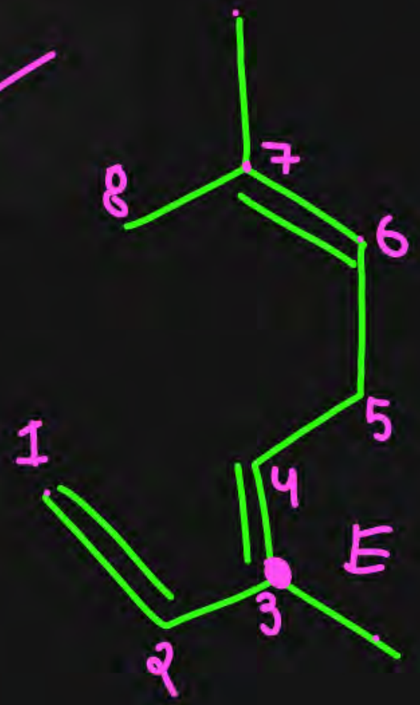
Q. 2

(1)

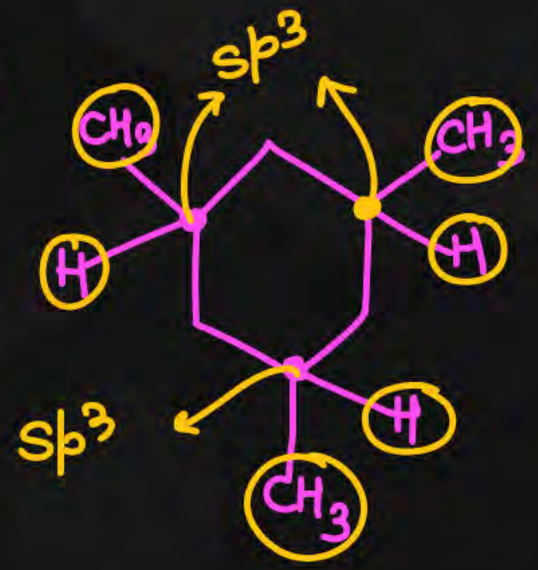
(3)



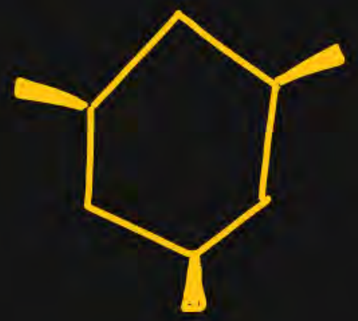
~~(4)~~



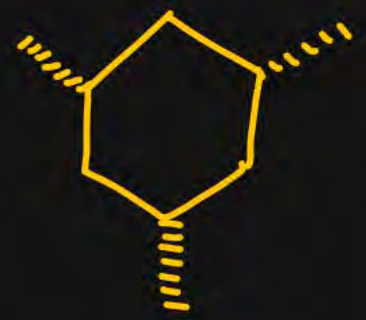
Q.5



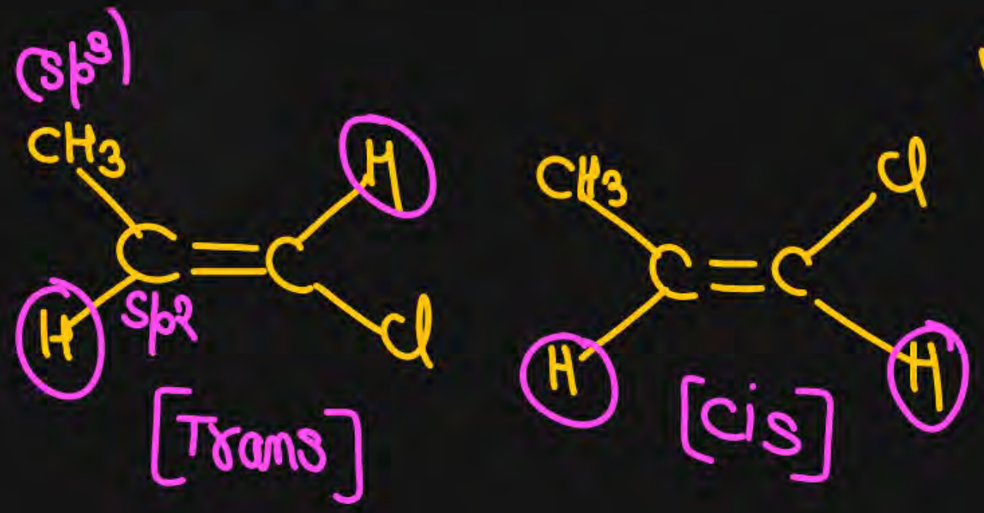
→



or

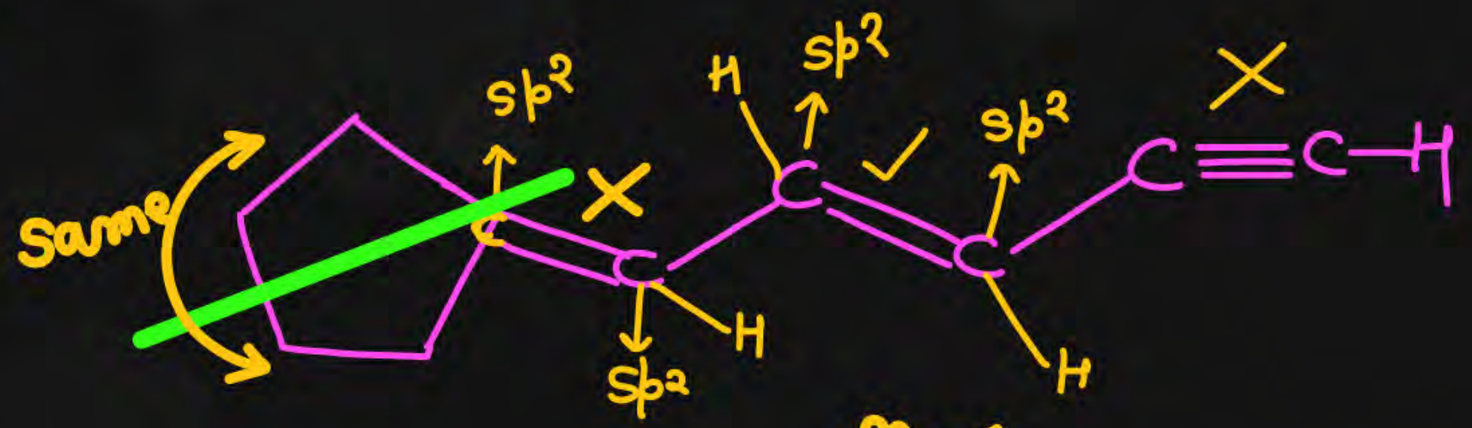


Q.6



or

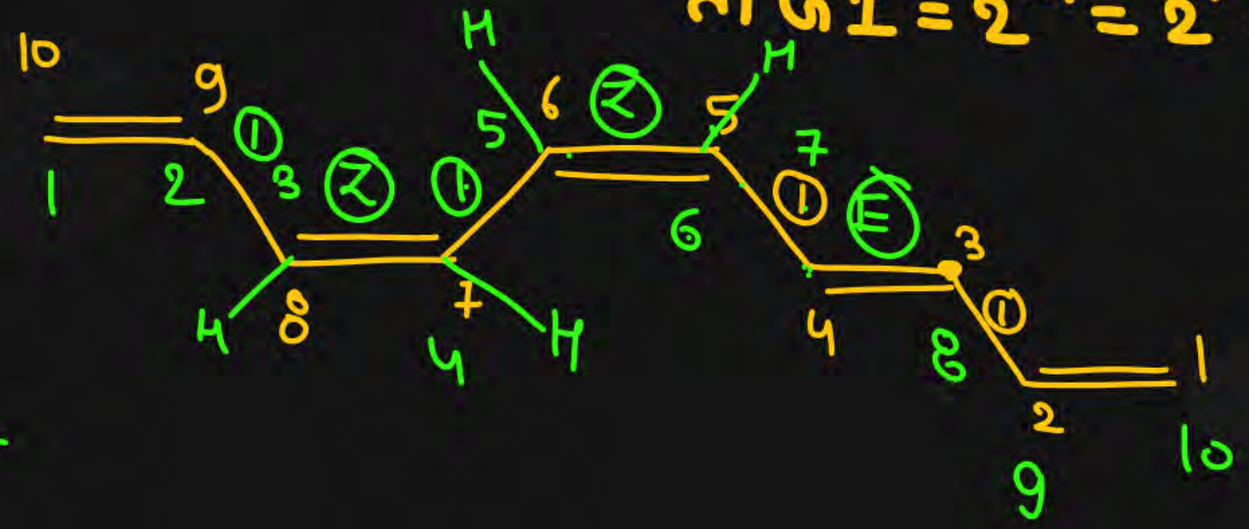
Q.8



$n = 1$

तो $GI = 2^n = 2^1 = 2$

Q.9



2 mins Summary

* ज्यामिती समावयवी की गणना

Homework

Module Question

Next Class Target

Topic संश्रेषण समावयवता

Topic

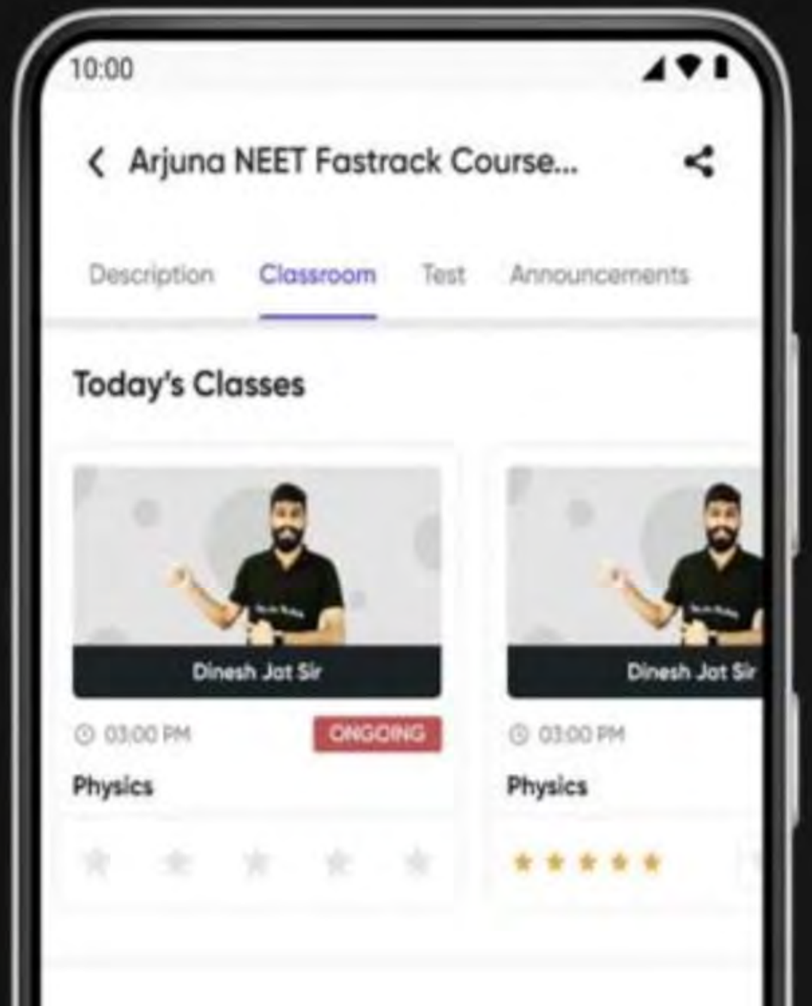
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

11-YN401MH

- Chemistry (OC)
- Isomerism (समावयवता)

Lecture No.- 09

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic ज्यामिती समावयवी की गणना

Topic

Topic

Topic

Topics to be Covered

Topic संक्षेपण समावयवता

Topic

Topic

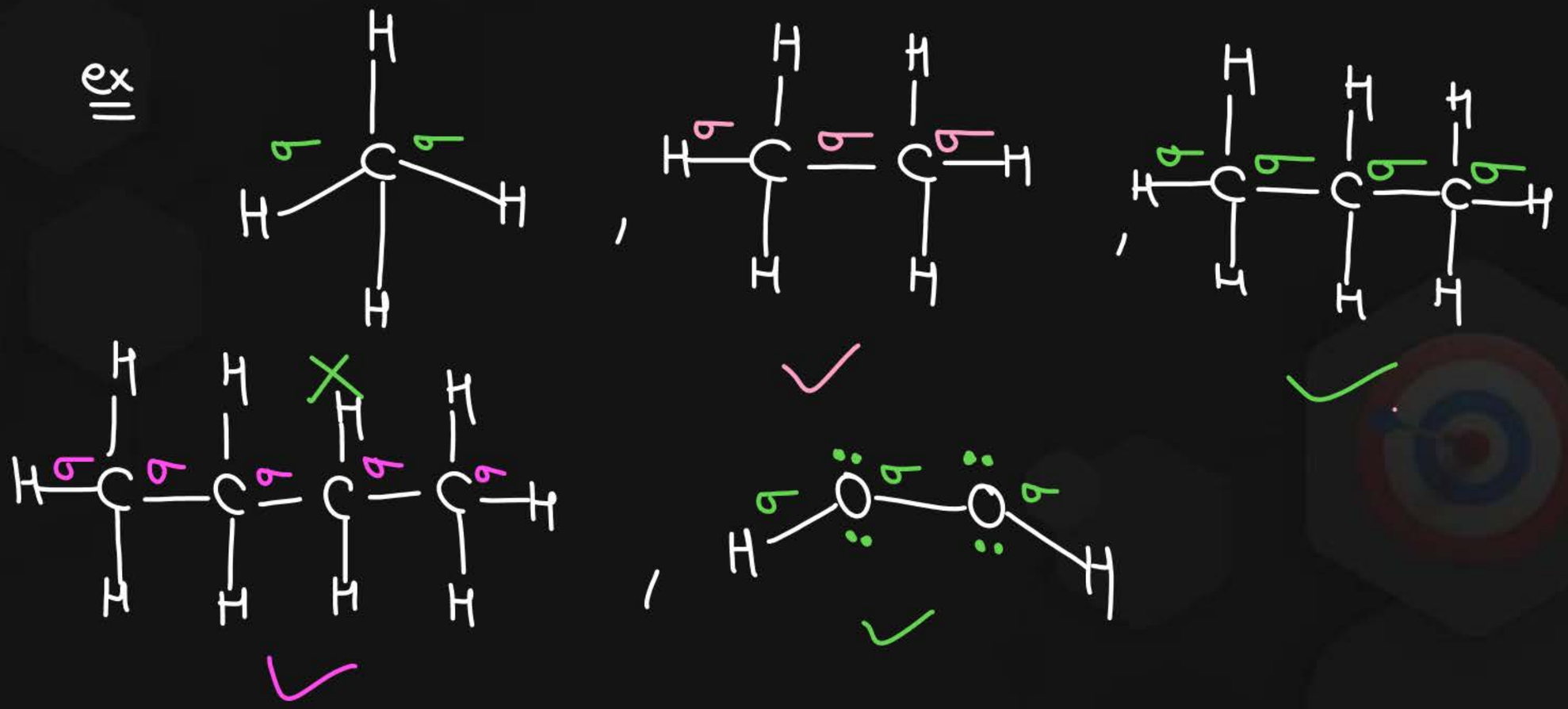
Topic

संरूपण समावयवता [conformational isomerism]

DT funda ⇒

* Condition ⇒ कम से कम 3 σ-bond लगातार उप० होने चाहिए।

ex

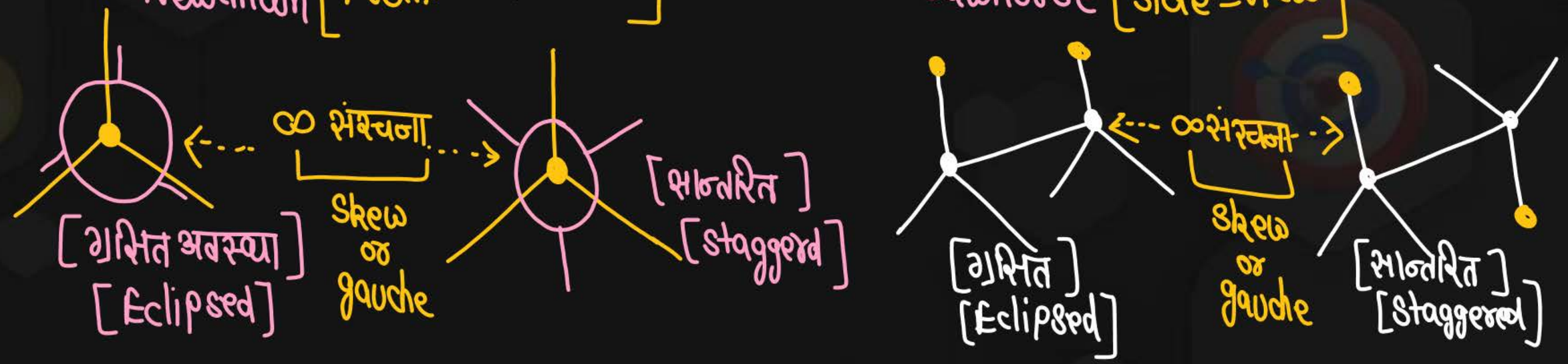


* संरूपण समावयवी Room Temp पर एक-दूसरे मे change होते रहते हैं। क्योंकि इन्हे आपस मे change होने के लिए बहुत कम energy की आवश्यकता होती है। और यह energy Room Temp पर available होती है। (Molecular collision)

* संरूपण समावयवी को P.E के आधार पर अध्ययन करते हैं। (Conformation analysis)

* **3D Representation**

- Newman [Front-Back View]
- Sawhorse [Side-view]



* ग्रसित अवस्था में bond pair के $e^{\ominus}$ समान्तर स्थिति में होते हैं। जिसके कारण Repulsion अधिक लगता है, energy बढ़ती है एवं स्थायीत्व कम होता है।

* आन्तरित अवस्था में bond pair के $e^{\ominus}$ प्रतिसमान्तर स्थिति में होते हैं जिसके कारण Repulsion कम लगता है। energy कम होती है तो स्थायीत्व बढ़ता है।

* ग्रसित एवं आन्तरित के बीच बनने वाली ∞ संरचना Skew (or) gauche कहलाती है।

* ग्रसित अवस्था → gauche (or) Skew ← आन्तरित अवस्था

ग्रसित अवस्था [energy High] [Stability ↓] $\theta = 0^\circ, 120^\circ, 240^\circ, 360^\circ$

आन्तरित अवस्था [energy कम] [Stability ↑] $\theta = 60^\circ, 180^\circ, 300^\circ$

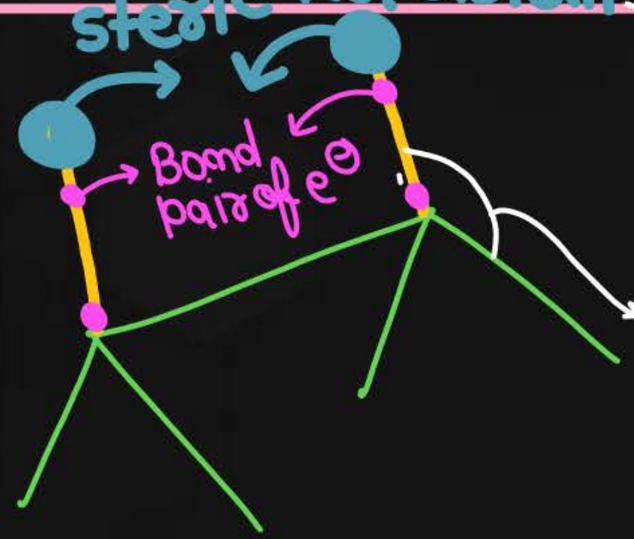
*** Stability order ⇒ आन्तरित > gauche > ग्रसित

100% सत्य नहीं है।

* संरूपण समावयवी घूर्णन के कारण घूर्णन समावयवी कहलाते हैं।

* संरूपण समावयवता के कारण → Bond angle, Bond Length → No change

परन्तु dihedral angle (द्वितलीय कोण) change होता है।



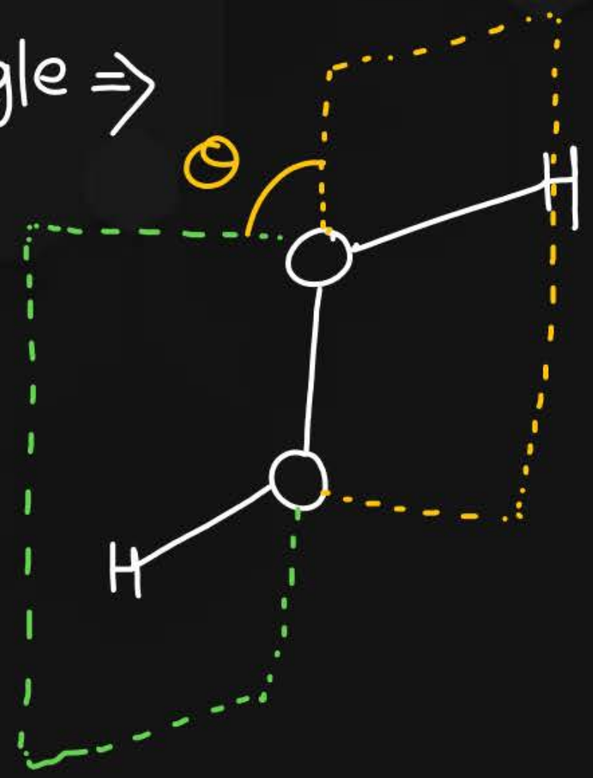
→ when large grp present at Same side

* Pitzer strain / Eclipsing strain / Torsional Bond angle ⇒ केवल ग्रसित अवस्था Bond pair के e⊖ के बीच लगने वाला प्रतिकर्षण।

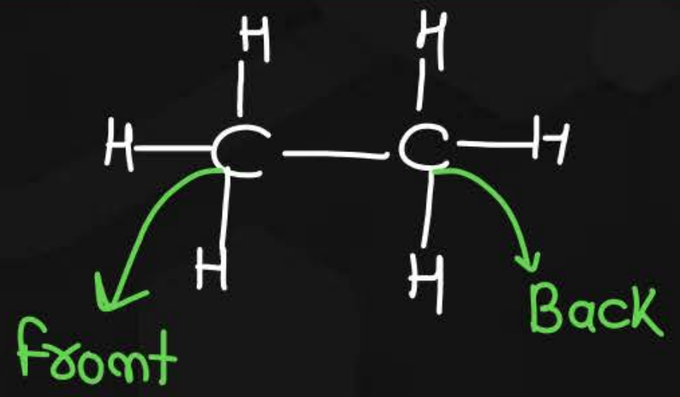
* Dihedral angle ⇒

दो तलों के मध्य

उत्पन्न angle Dihedral angle.



ऐथेन मे संरूपण समाम्यवता =>



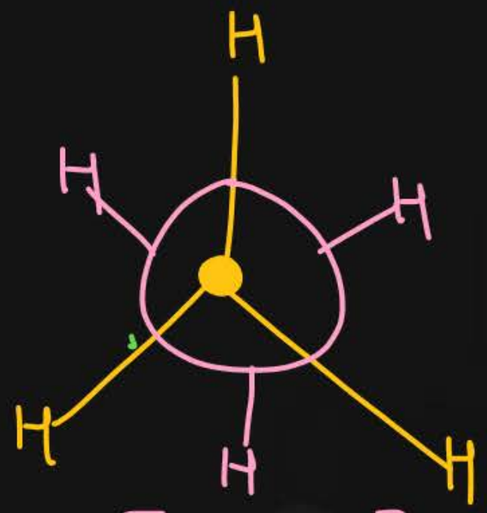
[ग्रसित]

$\theta = 0^\circ, 120^\circ, 240^\circ, 360^\circ$

[Min Stable]

[High energy]

Rotate back carbon at 60°



[सान्तरित]

$\theta = 60^\circ, 180^\circ, 300^\circ$

[Max stable]

[Min energy]

2 mins Summary

संरूपण समावयता

Homework

Revise notes

Next Class Target

Topic विभिन्न अणुओं में संरूपण समातयतता

Topic

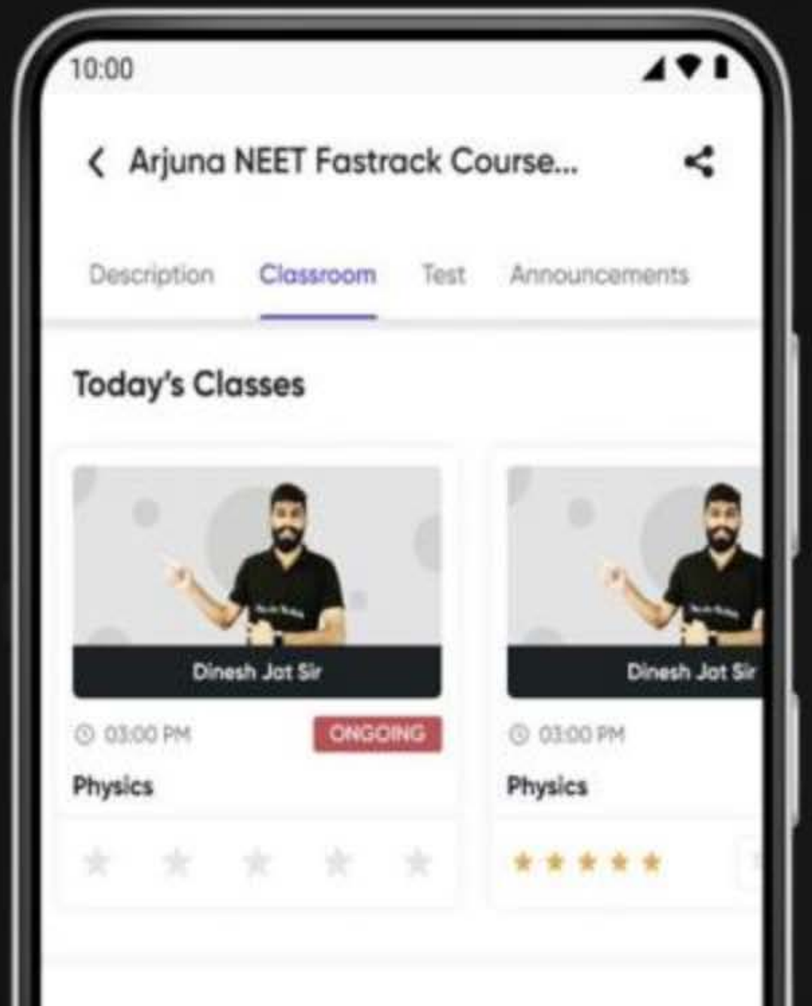
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

11-YN401MH

- Chemistry (OC)
- Isomerism (समावयवता)

Lecture No.- 10

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic संरूपण समावयवता

Topic

Topic

Topic

Topics to be Covered

Topic Butane के संरूपण समावयवी

Topic gauche form

Topic Interconversion Introduction

Topic

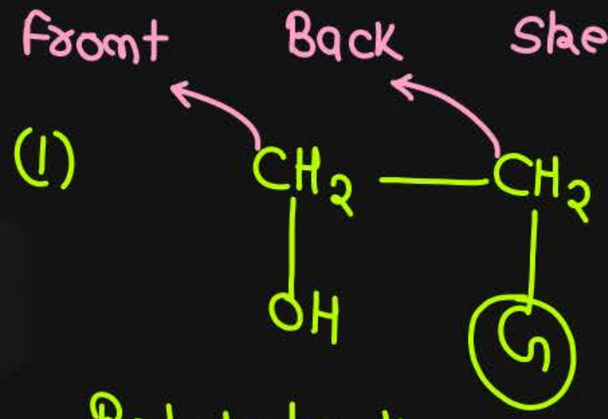
NoTe ⇒ Stability normal order ⇒ सान्तरित > gauche or skew > ग्रसित

* ***

NoTe ⇒ Stability order ⇒ gauche or skew > सान्तरित > ग्रसित

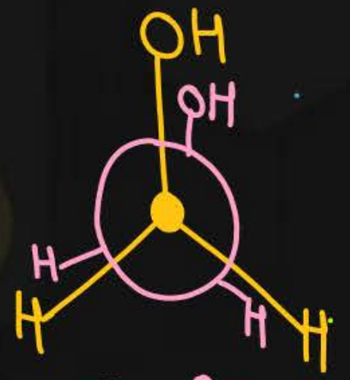
Sp. Case ⇒

(1)



[H-bonding]

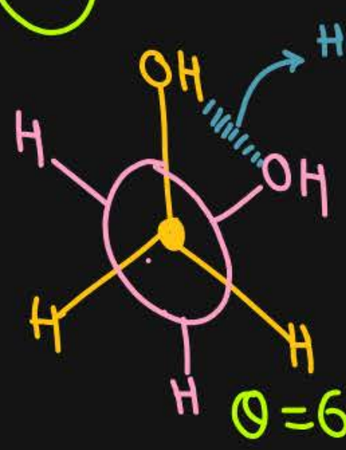
G = OH, NO_2, F, $-\overset{O}{\overset{\|}{C}}-H$, $-\overset{O}{\overset{\|}{C}}-OH$



θ = 0° [ग्रसित अवस्था]

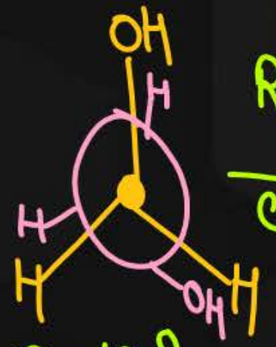
[energy ↑] [stability ↓]

Rotate back → carbon at 60°



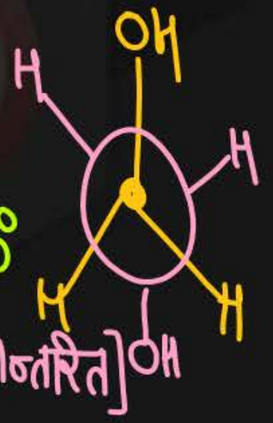
θ = 60°

Rotate back → carbon at 60°

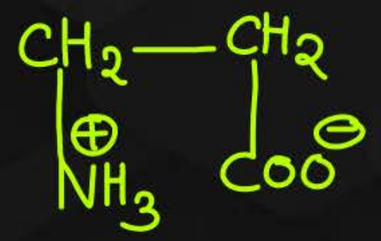


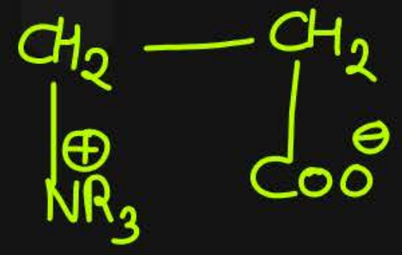
θ = 120°

Rotate back → carbon at 60°

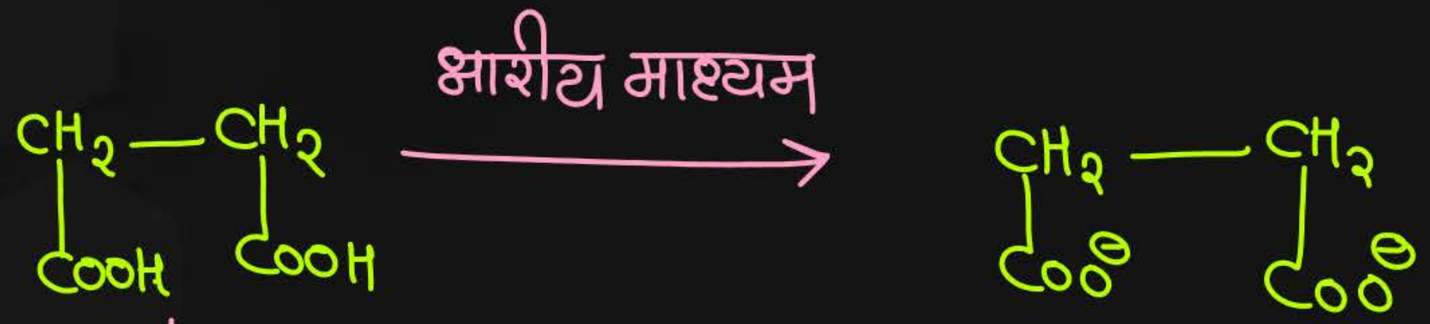


θ = 180° [सान्तरित]

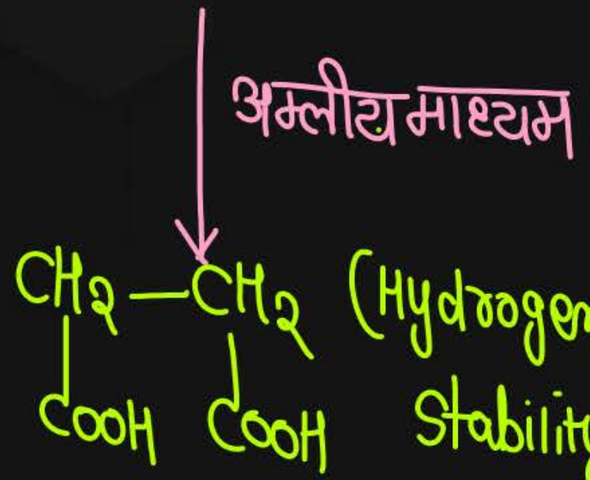
(2) 

or 

* Stability order ⇒ gauche > अन्तरित > ग्रसित [Ionic attraction]

(3) 

Stability order ⇒ अन्तरित > gauche > ग्रसित



(Hydrogen-bonding)

Stability ⇒ gauche > अन्तरित > ग्रसित

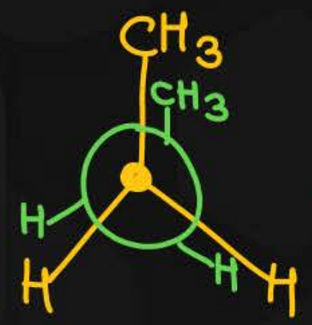
Butane का संरूपण समातयती अध्ययन ⇒

$CH_3-CH_2-CH_2-CH_3$

Front → CH_3 ; Back → CH_3

⑥ → 120°, 240°

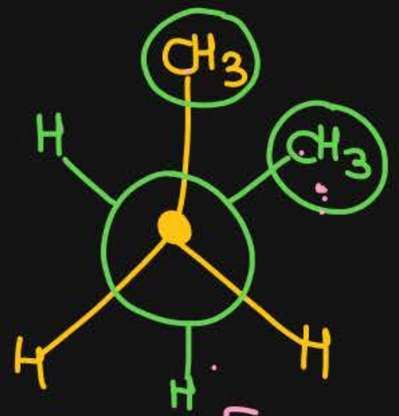
* अगर CH_3, CH_3 के बीच में angle → 60° [Synclined]
* अगर CH_3, CH_3 के बीच angle → 120° [Anticlined]



Rotate back → Carbon at 60°

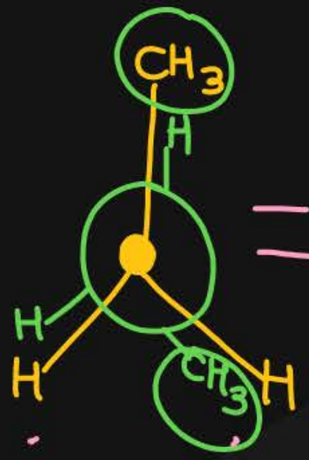
$\theta = 0°$

* [पूर्ण ग्रसित]
[SynPeriplanar]



$\theta = 60°$, [Synclined], gauche or skew

Rotate back → Carbon at 60°

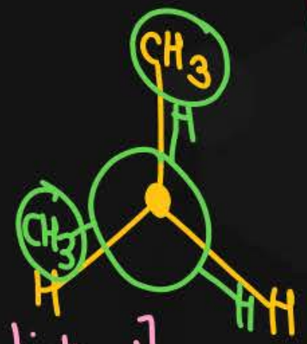


$\theta = 120°$
[Anticlined] or gauche or skew
[अपूर्ण ग्रसित]

—||—

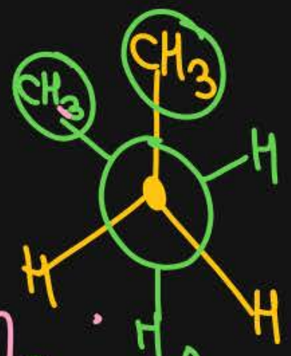
$\theta = 180°$
[पूर्ण प्रतिसित]
[AntiPeriplanar]

—||—



[Anticlined] $\theta = 240°$

—||—



[Synclined] $\theta = 300°$

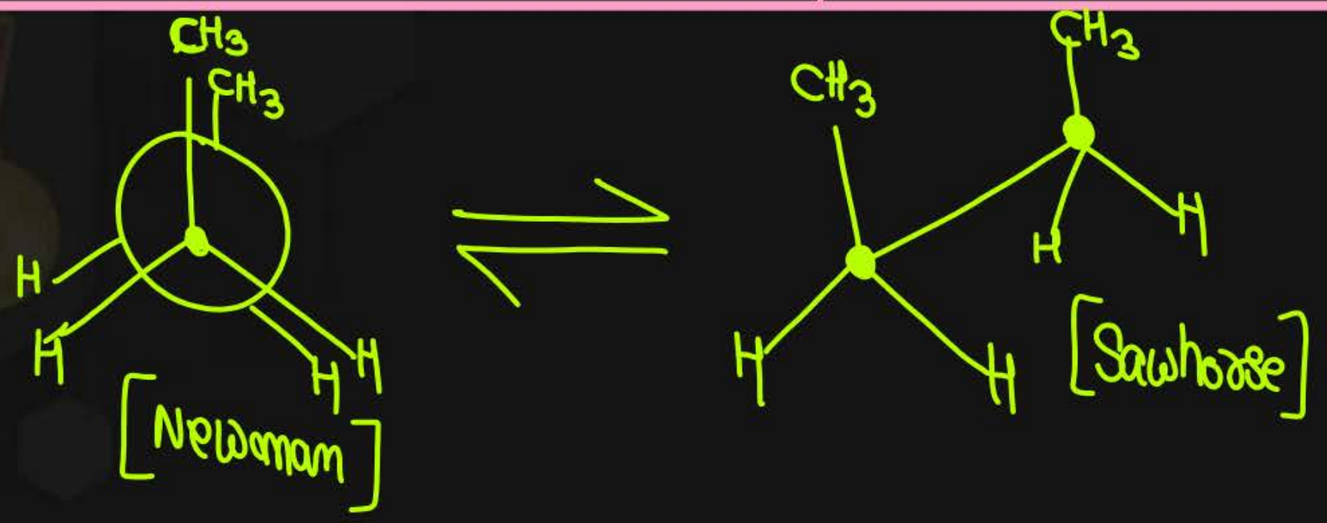
—||—

* NOT for Neet
* Only for JEE

Interconversion

* Newman to Sawhorse / Sawhorse to Newman
* Newman to Fisher / Fisher to Newman
* Sawhorse to Fisher / Fisher to Sawhorse
* wedge-dash to Fisher / Fisher to wedge-dash

* Newman to Sawhorse / Sawhorse to Newman ⇒



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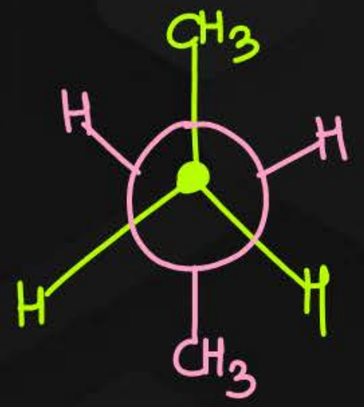
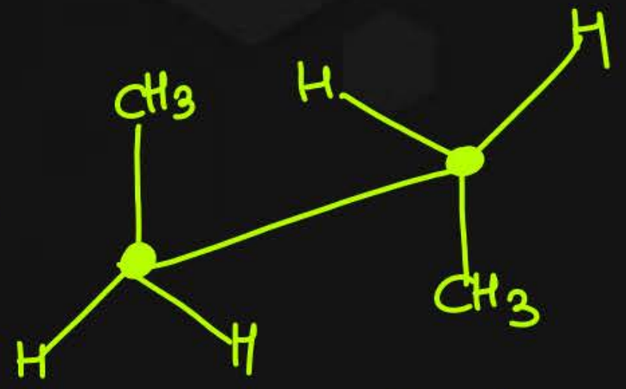


[सान्तरित]

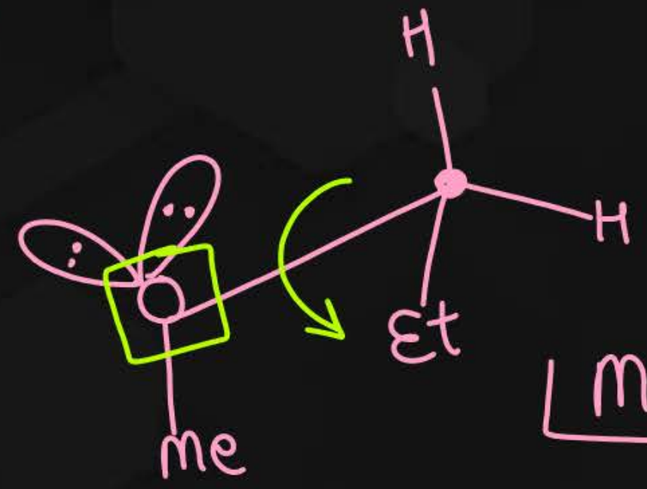
⇌



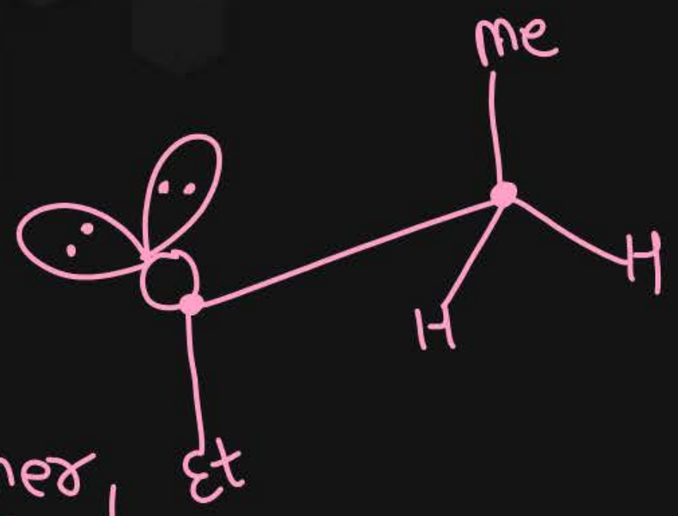
[सान्तरित]

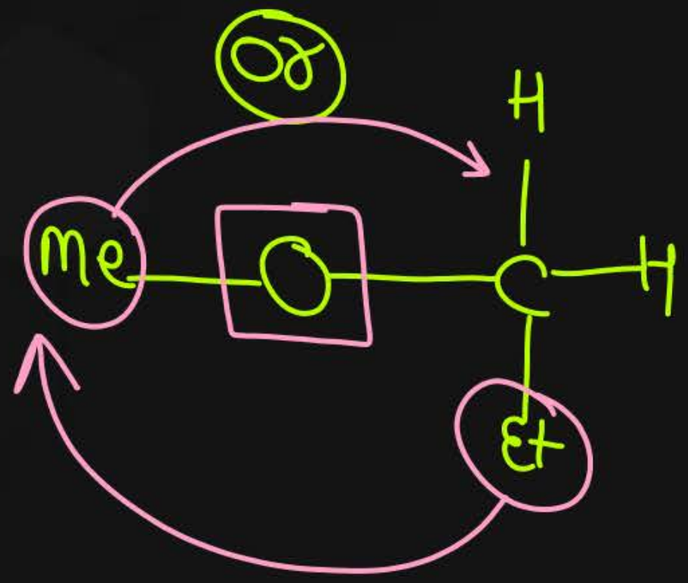
DPP-07

Q.4

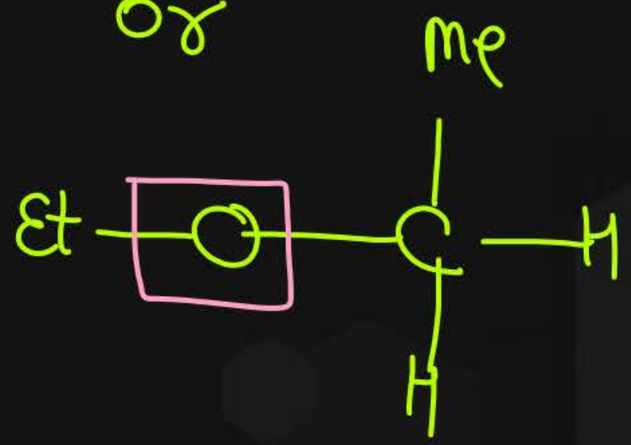


Metamer

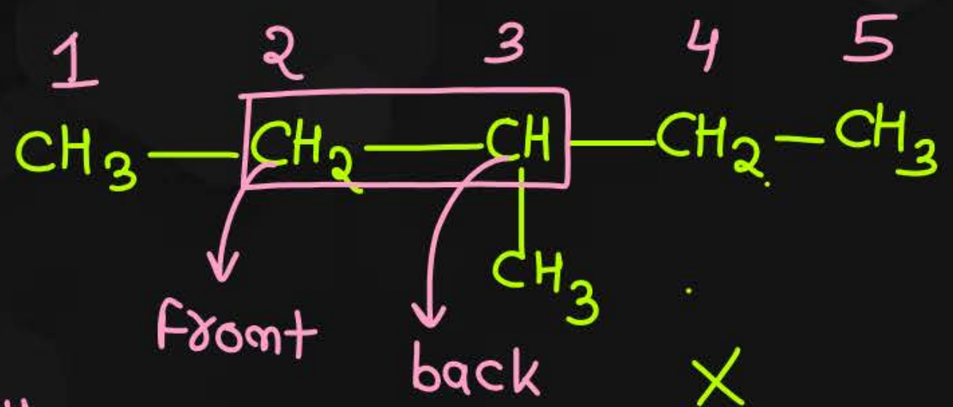


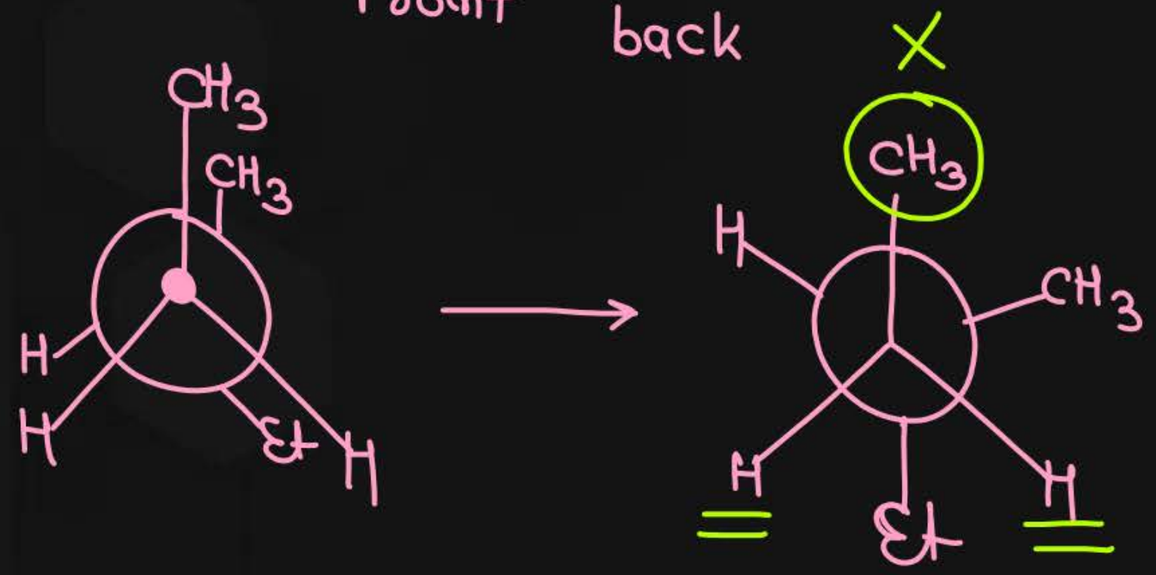


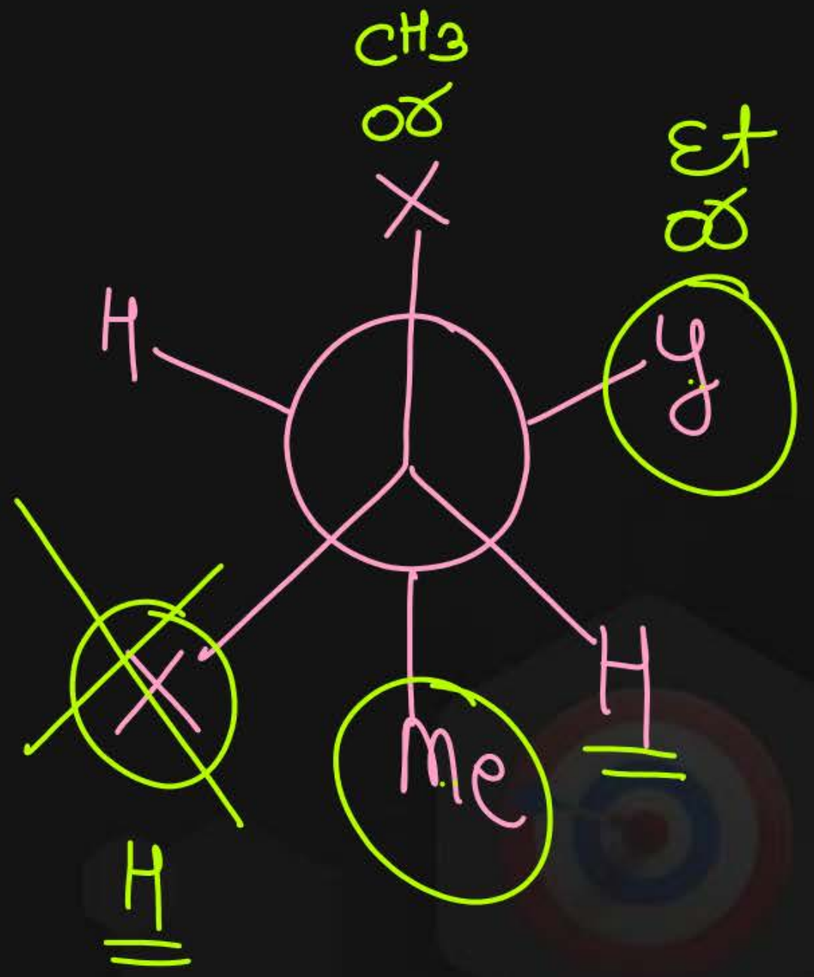
or



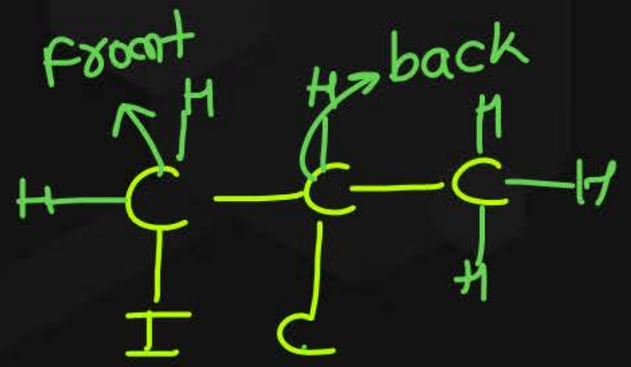
Q.7

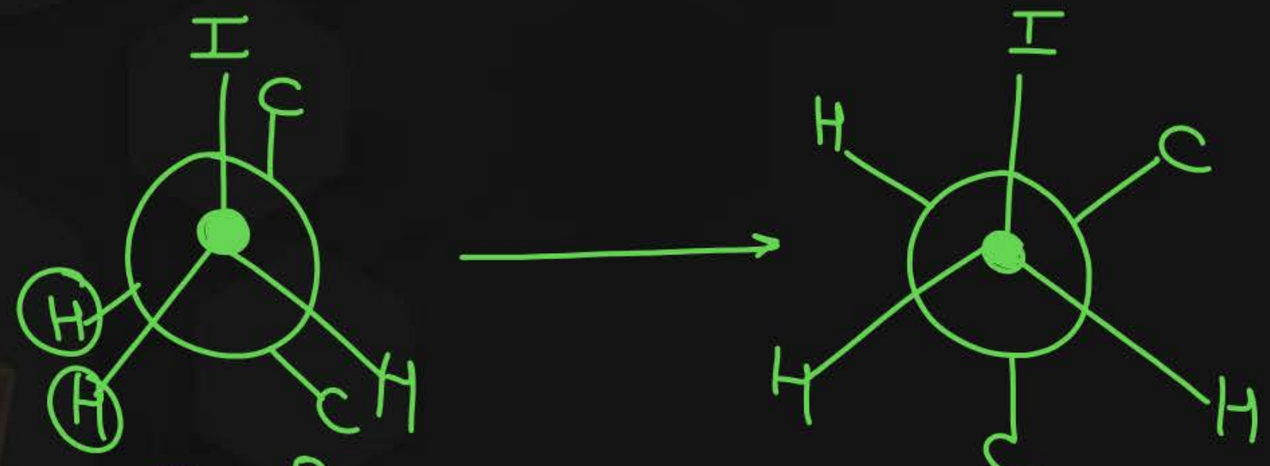

1 2 3 4 5
CH3 — CH2 — CH — CH2 — CH3
CH3
front
back


CH3
CH3
H
H
Et
H
X
CH3
H
CH3
H
Et
H


CH3
X
Et
H
y
X
Me
H
H

Q.9





$\theta = 0^\circ$

आंशिक [ग्रसित]

[Less stable]

आंशिक [आलसित]

[more stable]

2 mins Summary

विभिन्न अणुओ मे संरूपण

Homework

Module Question

Next Class Target

Topic अन्तर्पविर्तन

Topic

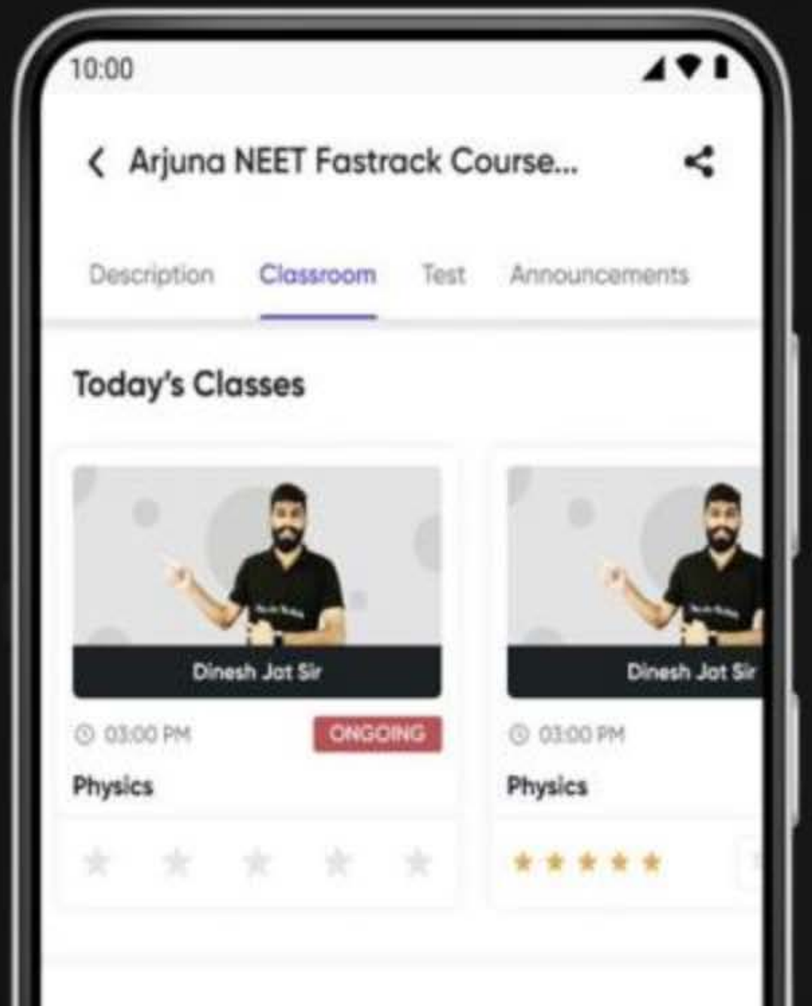
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

11-YN401MH

Chemistry (OC)

Isomerism (समावयवता)

Lecture No.- 11

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic संश्रपण समावयवता

Topic

Topic

Topic

Topics to be Covered

Topic

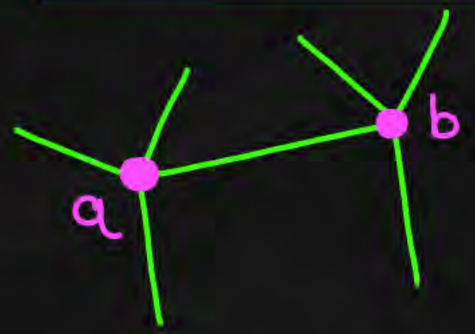
Topic साइक्लोहेक्सेन मे संरूपण समावयवता

Topic

Topic

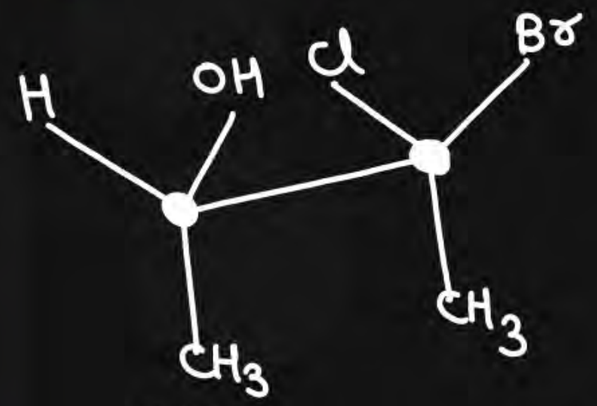
Sawhorse to Fisher / Fisher to Sawhorse ⇒

*

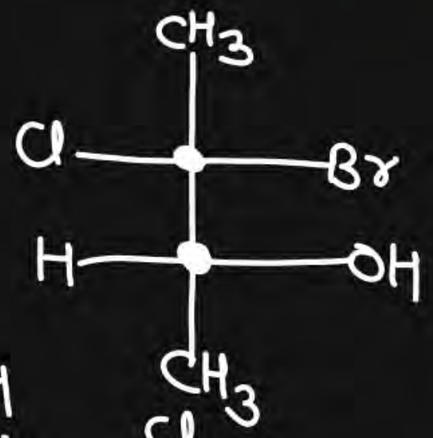


⇒ Fisher ⇒

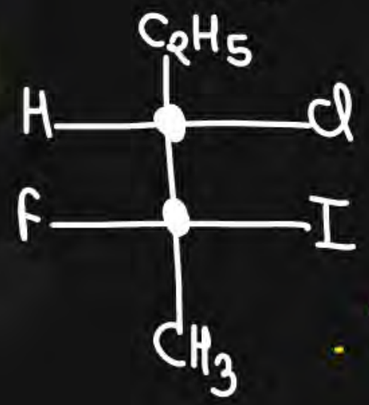
ex



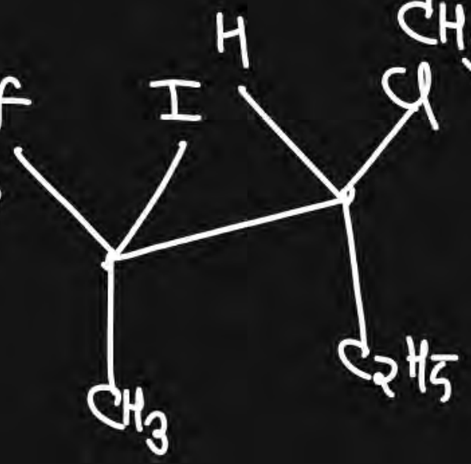
⇒



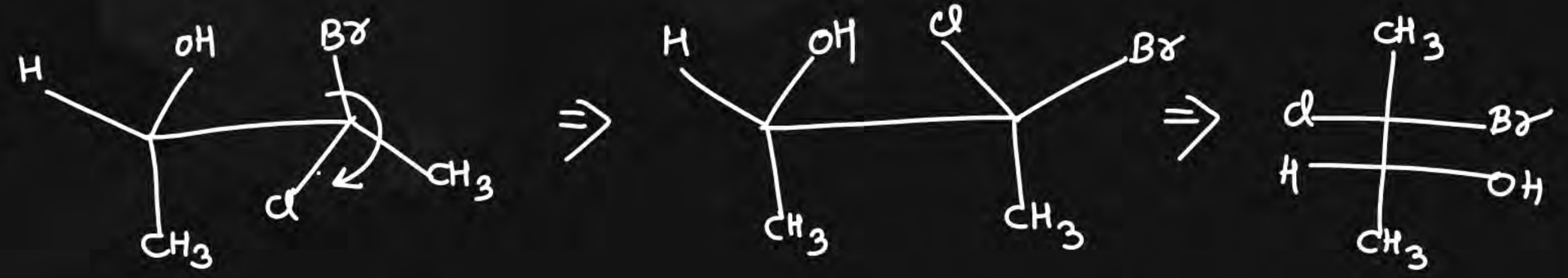
ex



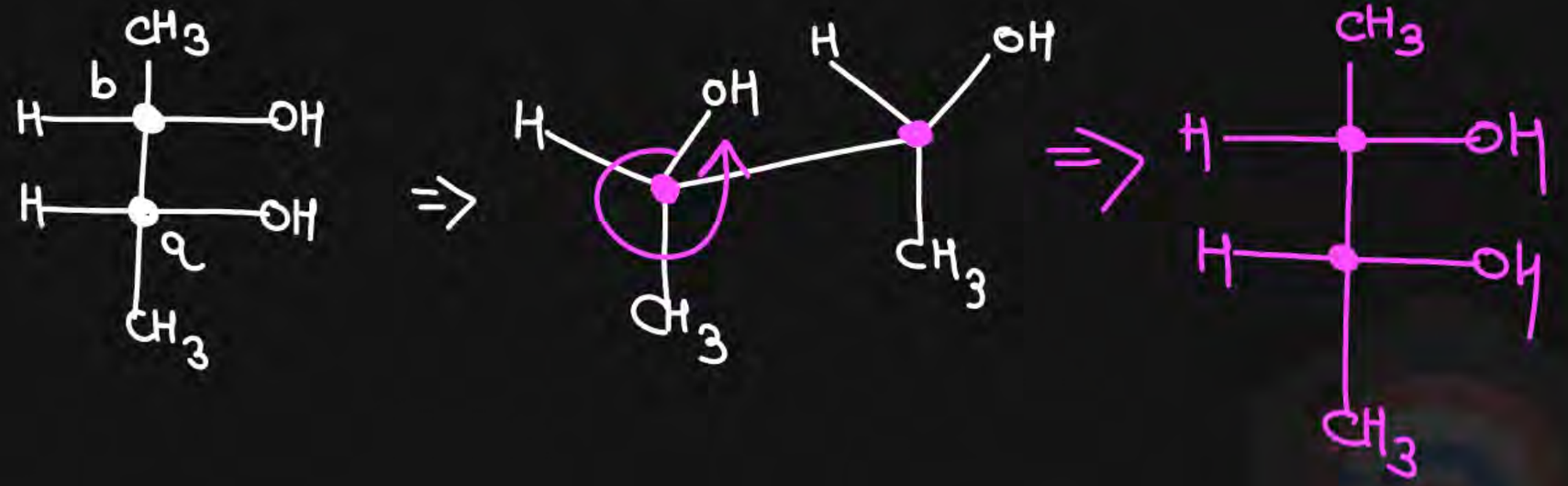
⇒



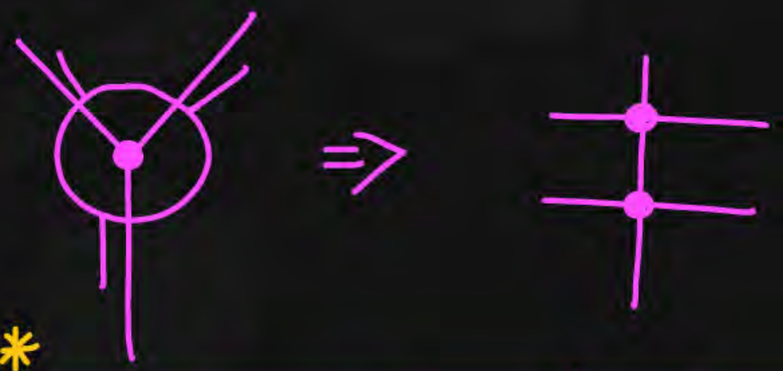
ex


H
OH
Br
Cl
CH3
CH3
H
OH
Cl
Br
CH3
CH3
CH3
Cl
Br
H
OH
CH3

Dpp-07 Q.3


CH3
b
H
OH
H
OH
a
CH3
H
OH
H
OH
CH3
CH3
CH3
H
OH
H
OH
CH3

Newman to Fisher / Fisher to Newman ⇒

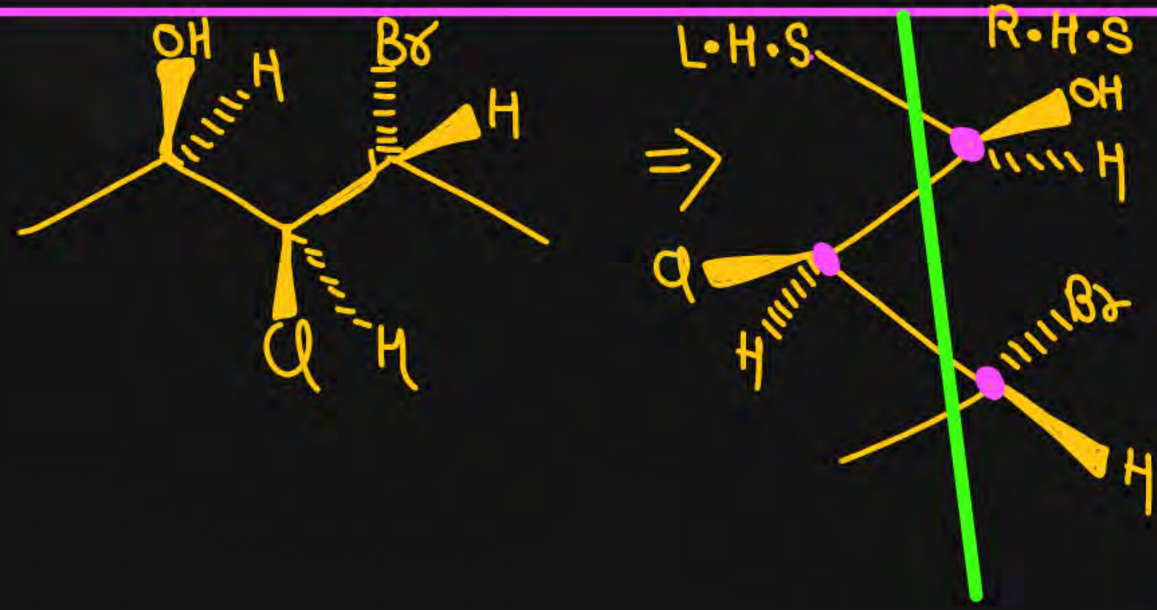


DT funda ⇒ Right वाला wedge left में और left वाला wedge Right वाला लिखना है।

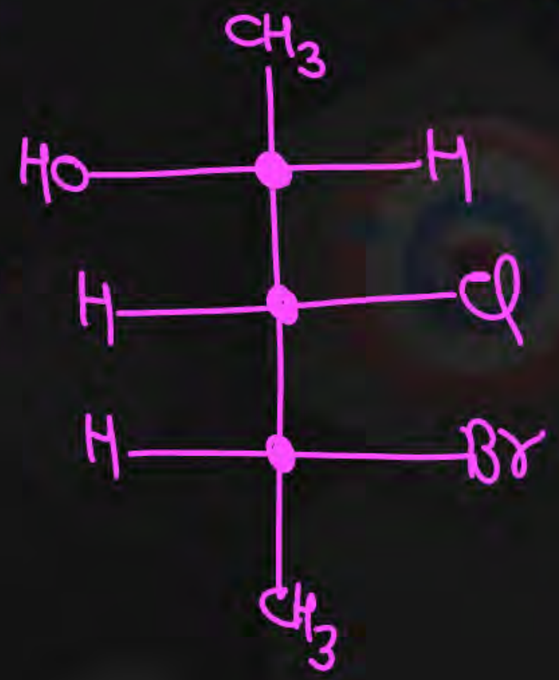
* * *

wedge-dash to Fisher / Fisher to wedge-dash ⇒

Ex

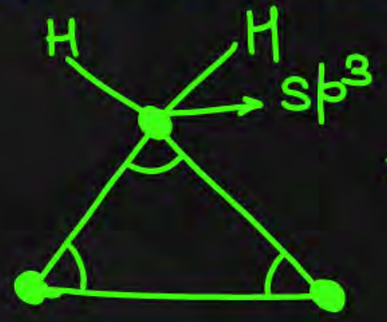


⇒



Cyclohexane ⇒

* cyclic compound में केवल cyclopropane ही planar होता है बाकि सभी cycloalkane non-planar होते हैं।

* 

⇒ Bayer **angle strain** theory
[बेअर का कोणीय विकृति सिद्धान्त]

→ $109^\circ 28'$ Bond angle से विचलन (or) परिवर्तन कोणीय विकृति or angle strain कहलाता है।

** angle strain $= \frac{1}{2}(109^\circ 28' - \text{Actualangle})$
(बाहर वाली)
$[1^\circ = 60\ \text{min}]$

* $sp^3 C \rightarrow$ Tetrahedral
(Bondangle $= 109^\circ 28'$)

* Bayer की angle strain theory केवल lower cycloalkane पर ही लागू होती है।

Cycloalkane	Bond angle	Actual Bond angle	angle strain
	$109^\circ 28'$	60	$\frac{1}{2}(109^\circ 28' - 60) = 24^\circ 44'$
	$109^\circ 28'$	90°	$\frac{1}{2}(109^\circ 28' - 90) = 9^\circ 44'$
	$109^\circ 28'$	108°	$\frac{1}{2}(109^\circ 28 - 108^\circ) = 0^\circ 44'$
	$109^\circ 28'$	120°	$\frac{1}{2}(109^\circ 28' - 120^\circ) = -5^\circ 6'$

* cyclohexane में angle strain 0ve आने के कारण non-planar व staggered अवस्था में रहता है। इसी कारण cyclohexane हमेशा chair form में होता है।

angle strain

Torstional strain

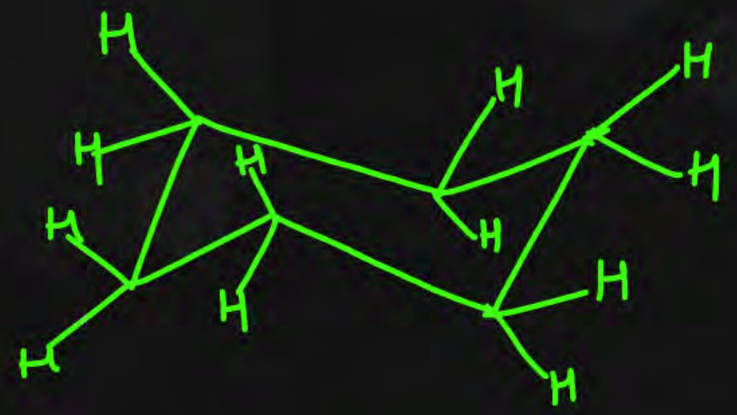
* Stability ⇒ 3 < 4 < 5 < 6 > 7

* axail-equitorial Trick

→ axail position = 6

→ equitorial position = 6

* *



12 Hydrogen

6 - axail ⇌ 6 - equitorial

Flipping

Confirmations of Cyclohexane

[only JEE]

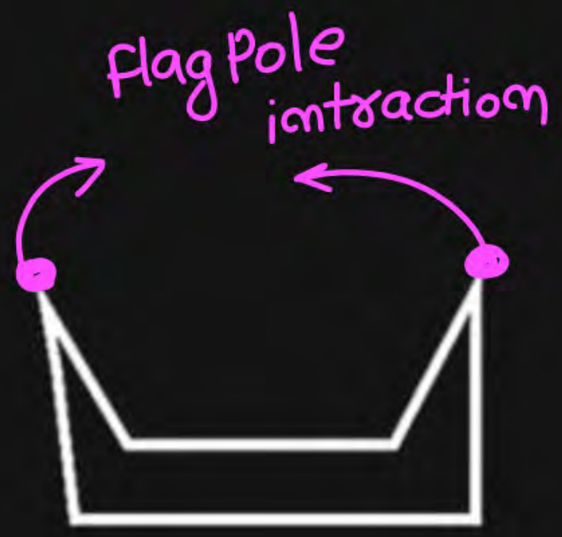
Chair Form : Most stable form
It is staggered form
No angle Strain
No torsional strain

Half-Chair Form :

- Angle strain
- Torsional strain
- Highly unstable

Confirmations of Cyclohexane

Boat Form : It is eclipsed form
No angle strain
Nut it has torsional strain



Confirmations of Cyclohexane

Twist Boat Form :

- It is Partially eclipsed form
- No angle strain
- Nut it has torsional strain

Stability order ⇒ Chair form > Boat > Twist Boat > Half-chair

Energy order ⇒ Chair form < Boat < Twist Boat < Half-chair

2 mins Summary

संक्षपण

Next Class Target

Topic प्रकाशिक समावयवता

Topic

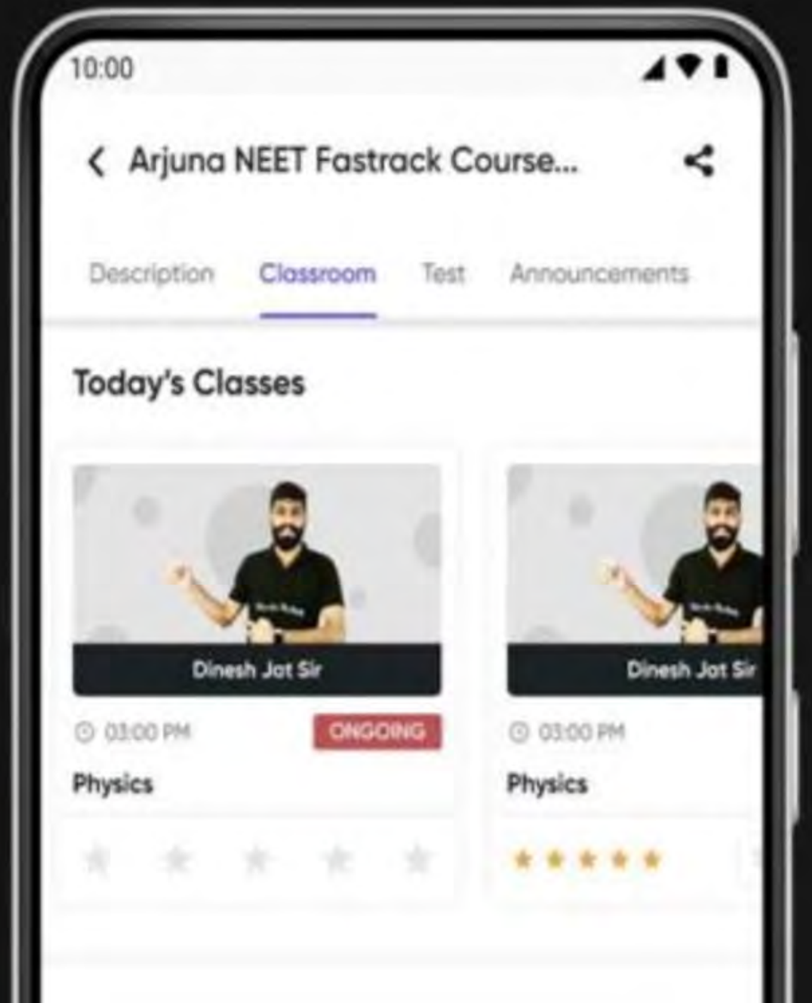
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

Batch code : 11-YN401MH

- Chemistry (OC)
- Isomerism (समावयवता)

Lecture No.- 12

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic साइक्लोहेक्सेन मे संरूपण समावयवता

Topic

Topic

Topic

Topics to be Covered

Topic प्रकाशिक समावयवता

Topic Pos, Cos, उपादान

Topic DPP-08

Topic

optical isomerism [प्रकाशिक समावयवता]

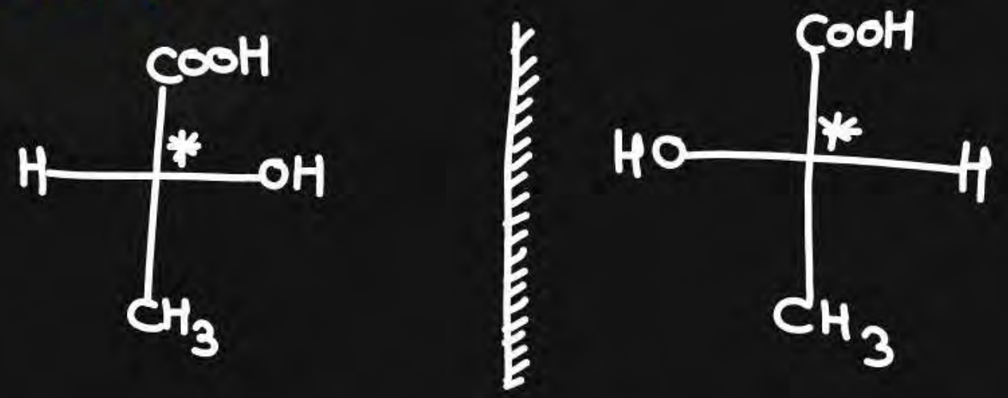
* M.F => Same
* arrangement of atom or group in 3D-Space are diff.

प्रकाशिक समावयता

- प्रकार
- नामकरण
  * d-l system
  * D-L system
  * R-S system

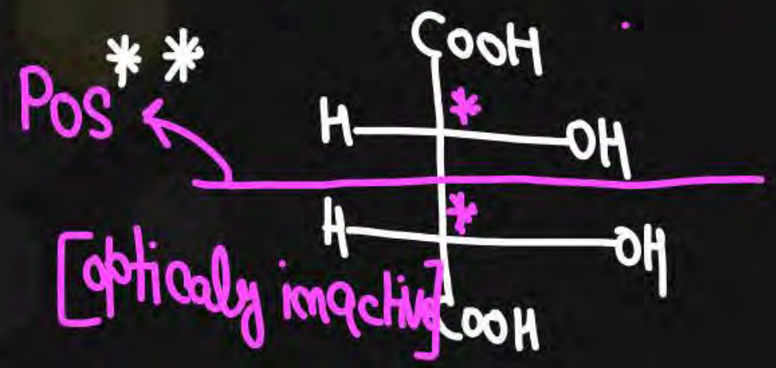
प्रकाशिक समावयवता ⇒

ex

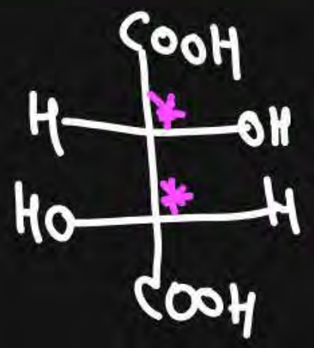


* Condition ⇒ यदि किसी यौगिक मे 1 chiral carbon उप० हो तो वह सदैव प्रकाशिक सक्रिय होगा।

[chiral carbon (or) chiral centre ⇒ ऐसा centre जिस पर directly जुड़े हुऐ चारो grp diff है]



[optically inactive]



[optically active]

* यदि किसी यौगिक मे 1 से अधिक chiral centre हो तो वह optically active हो भी सकता है और नही भी।

यदि यौगिक मे समामिति तत्व उप० है।

* POS
* COS
* AOS
* AAOS

(या तो दोनो उप० हो या दोनो मे से कोई एक)

Compound → optically inactive

यदि किसी यौगिक मे एक भी समामिति तत्व (POS, COS) उप० नही है।

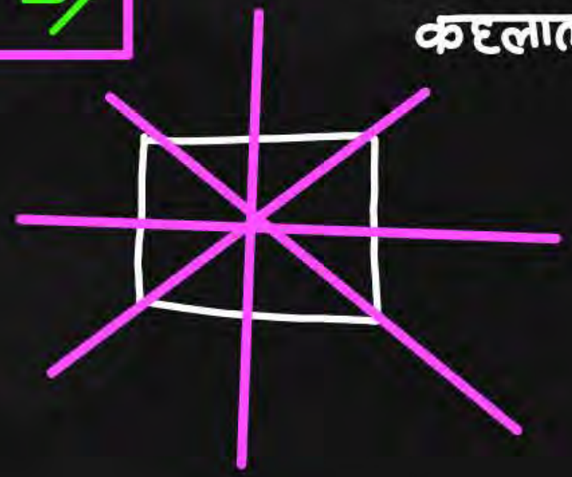
Compound optically active

Syn. element

(1) POS ⇒

ऐसा तल जिसे molecule के बीच में से गुजारने पर molecule दो equal भाग में बट जाये या एक-दूसरे का प्रतिबिम्ब दिखे POS कहलाता है।

ex



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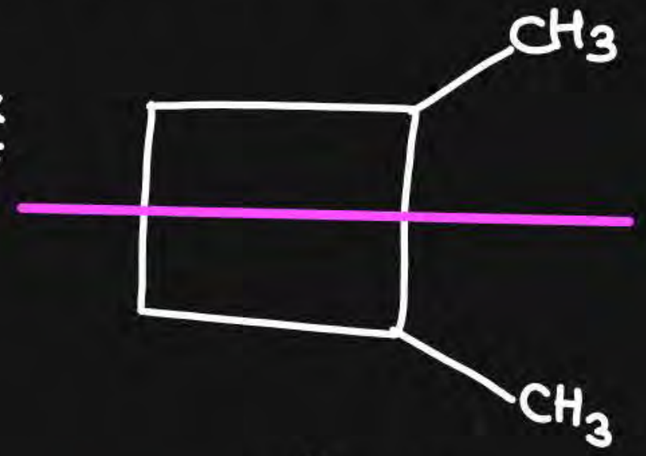

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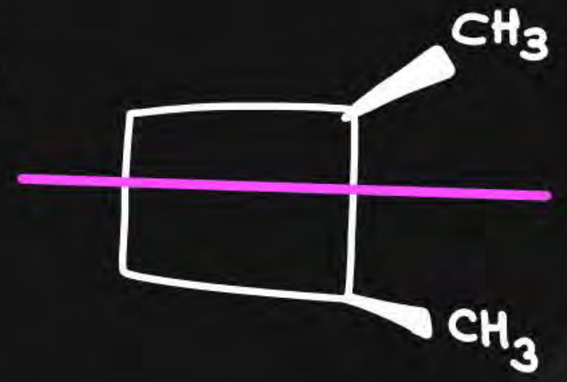
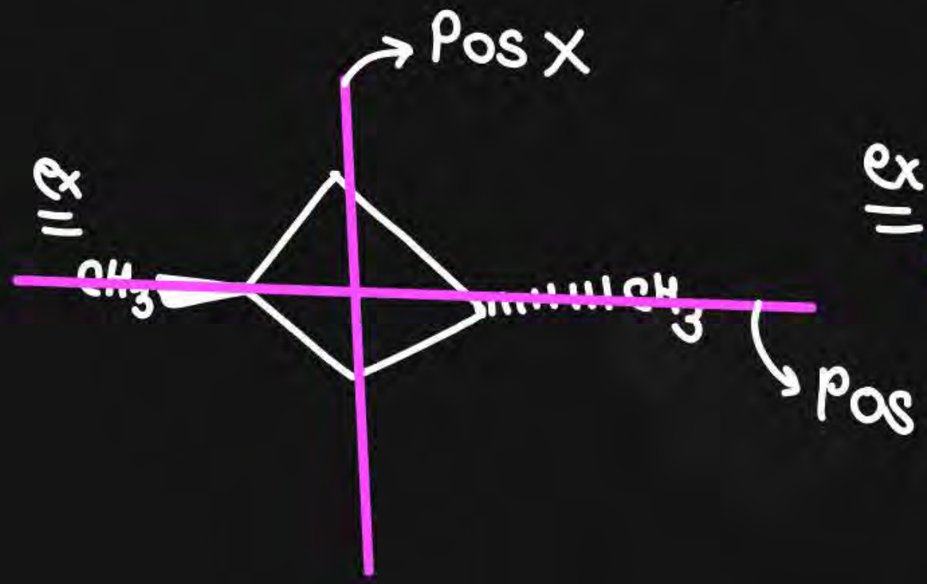


ex

ex



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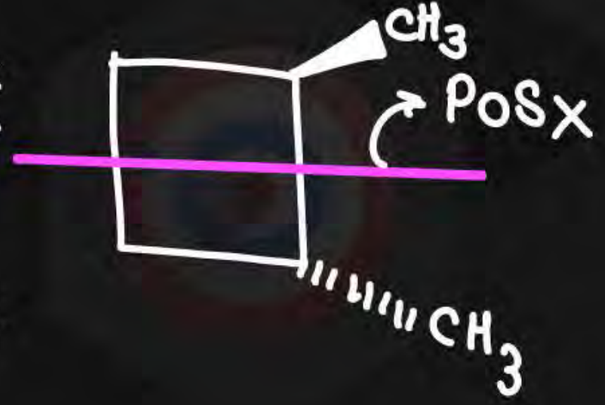
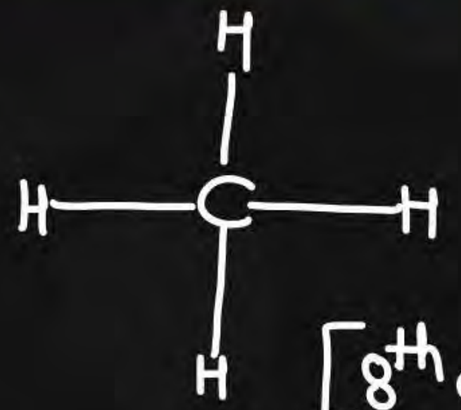


(2) CoS ⇒

molecule के centre मे present ऐसा point जिससे equal distance पर opposite direction मे same atom मिले।

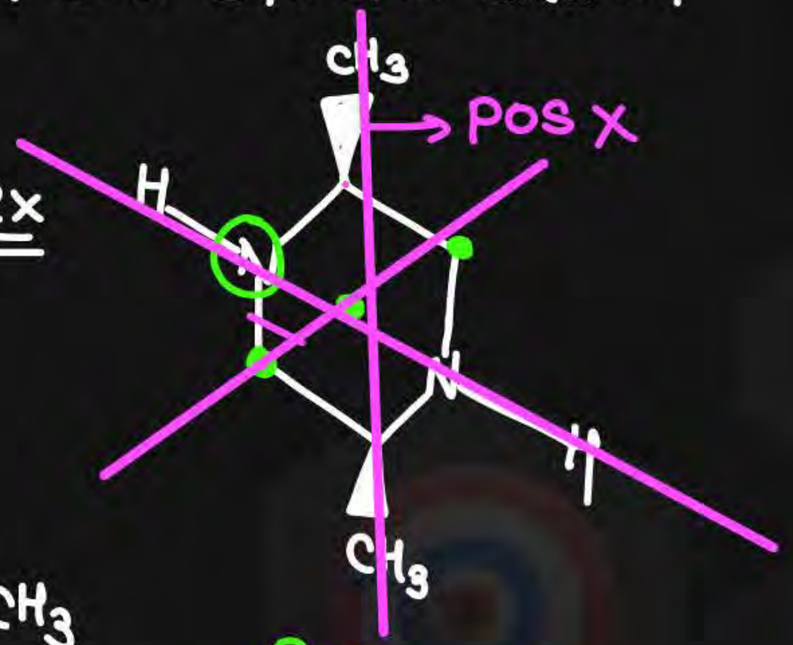
ex



[8th class]

DT funda ⇒ 2D-str or Fisher formula मे CoS अ० नही होता है।

ex



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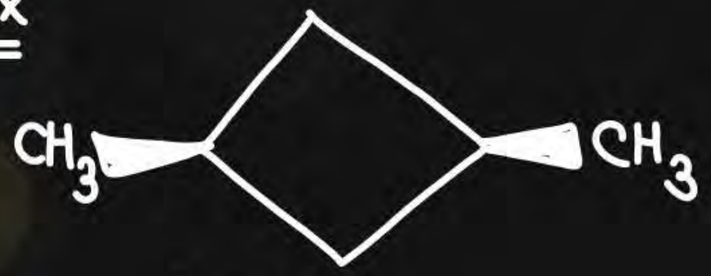
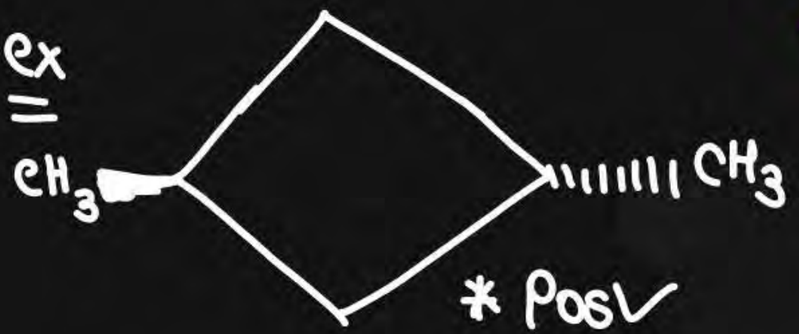


Pos ✓

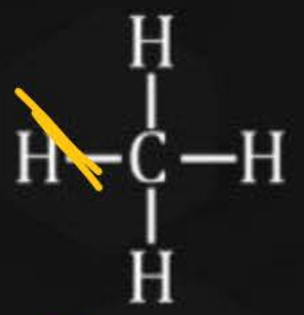
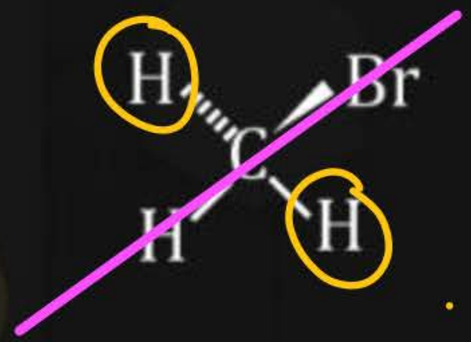
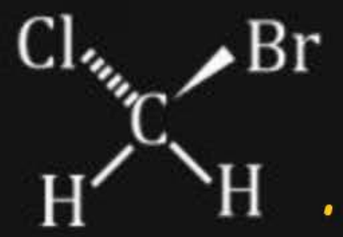
Cos ✗

ex

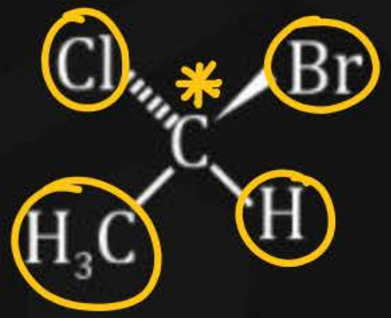
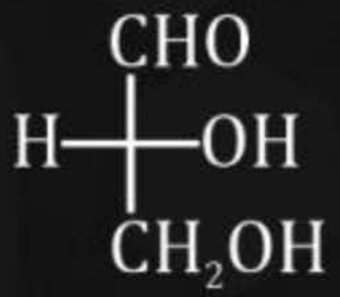
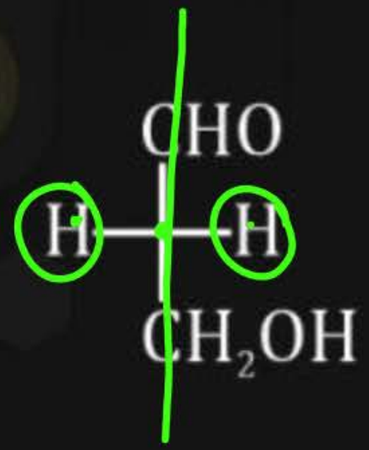


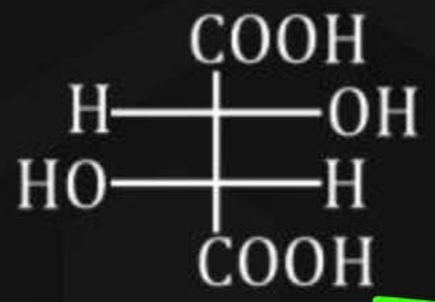
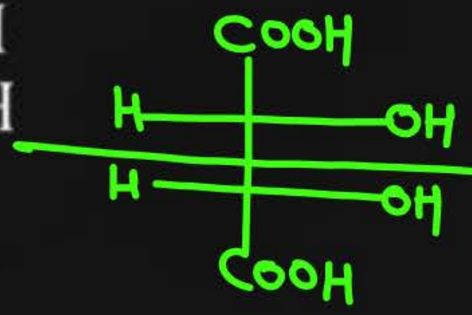
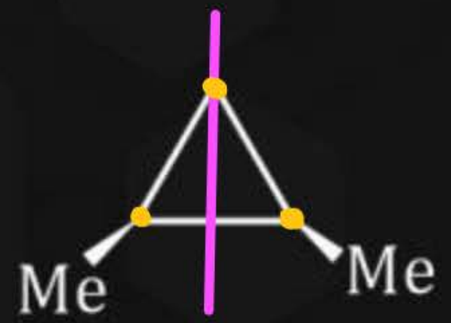
* Pos ✓
* Cos ✓

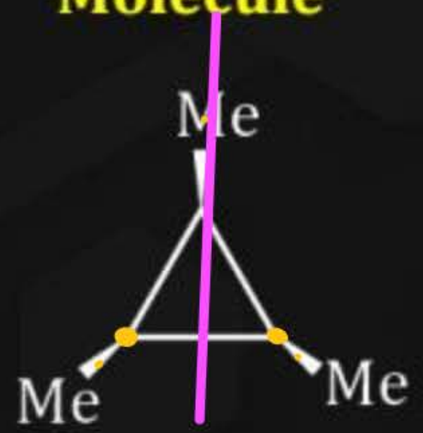
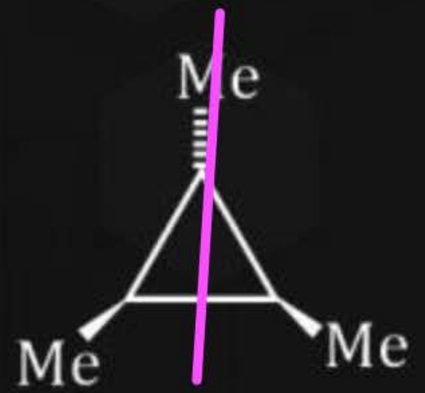
Confirmations of Cyclohexane

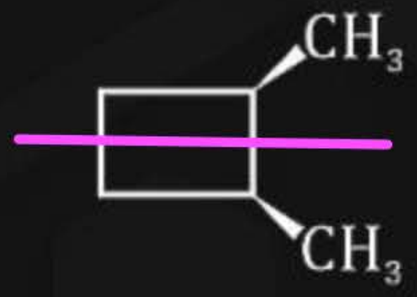
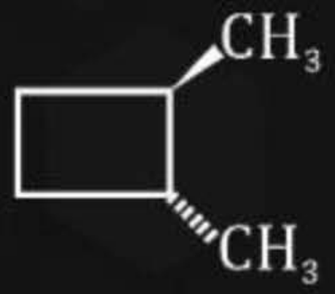
	Molecule	POS	COS	Chirality
ex=		✓	✗	Achiral (optically inactive)
ex=		✓	✗	Achiral (optically inactive)
ex=		✓	✗	Achiral (optically inactive)

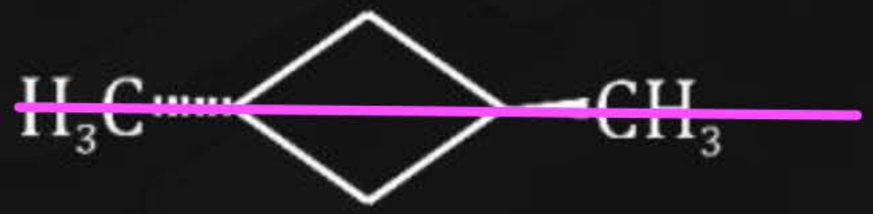
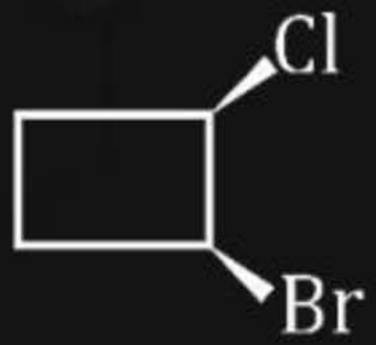
[Tetrahedral str मे COS नही होता है]

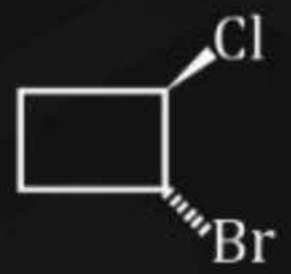
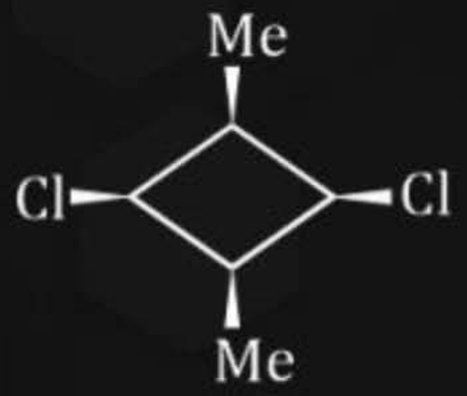
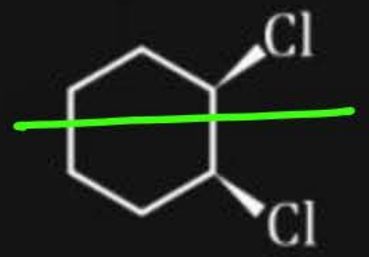
Molecule	POS	COS	Chirality
ex 	✗	✗	chiral (optically active)
ex 	✗	✗	chiral (optically active)
ex 	✓	✗	Achiral (optically inactive)

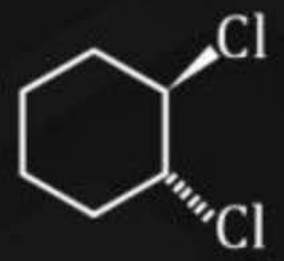
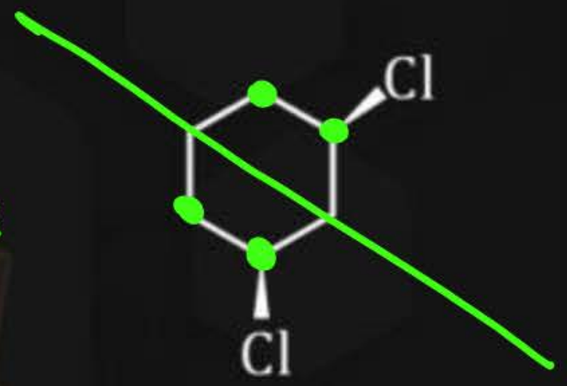
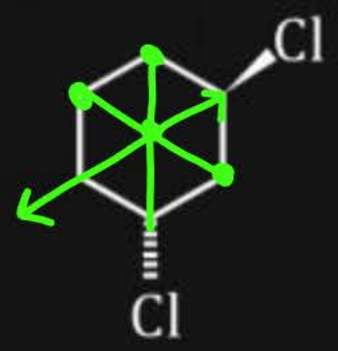
	Molecule	POS	COS	Chirality
ex =	 	×	✓	×	chiral (optically active)
		✓	×	Achiral (optically inactive)
ex =		✓	×	Achiral (optically inactive)
ex =		×	×	Chiral (optically active)

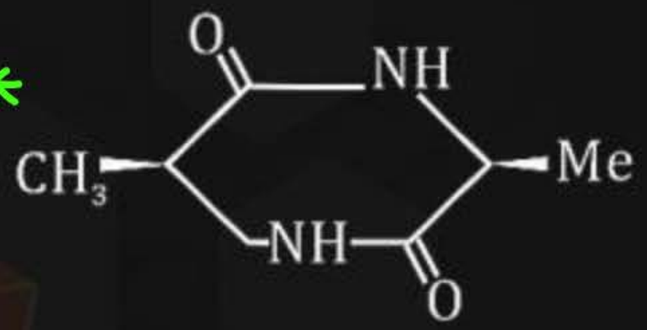
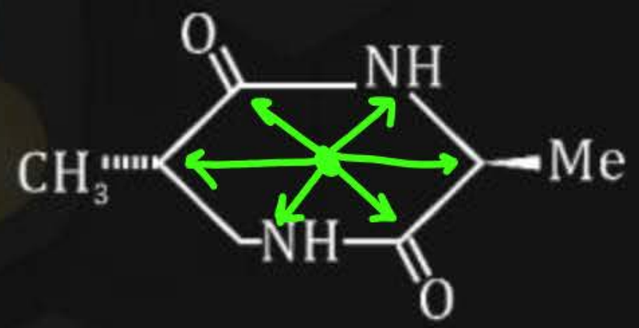
	Molecule	POS	COS	Chirality
ex II		✓	✗	Achiral (optically inactive)
ex II		✓	✗	Achiral (optically inactive)
ex II		✗	✗	Chiral (optically active)

	Molecule	POS	COS	Chirality
ex		✓	✗	Achiral (optically inactive)
ex		✗	✗	chiral (optically active
ex		✓	✗	Achiral (optically inactive)

Molecule	POS	COS	Chirality
ex 	✓	✓	Achiral (optically inactive)
ex	✓	×	—"—
ex 	×	×	optically active

	Molecule	POS	COS	Chirality
ex		✗	✗	
ex		✓	✗	
ex		✓	✗	

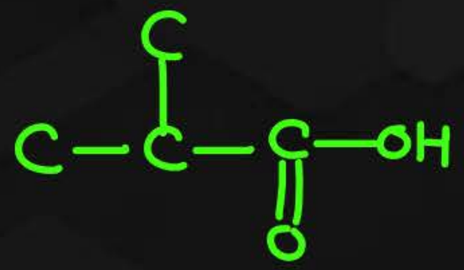
	Molecule	POS	COS	Chirality
ex 1		✗	✗	optically active
ex 2		✓	✗	optically inactive
ex 3		✗	✗	optically active

Molecule	POS	COS	Chirality
ex	✓	✗	optically inactive
** ex 	✗	✗	optically active
*; ex 	✗	✓	optically inactive

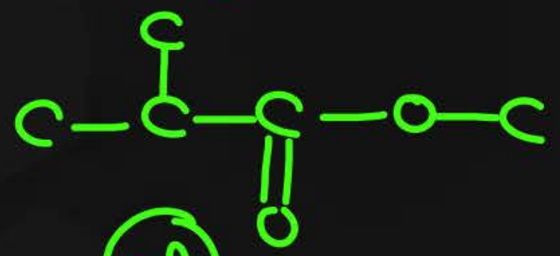
DPP-08

Q.1

(1)



(2)



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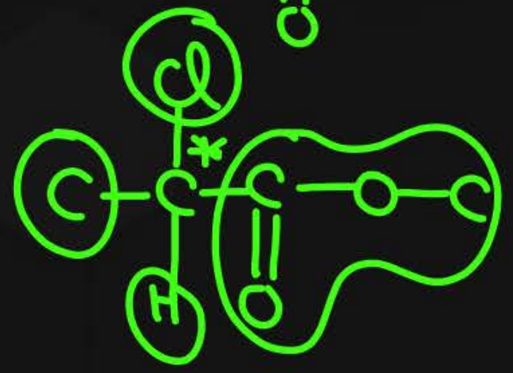

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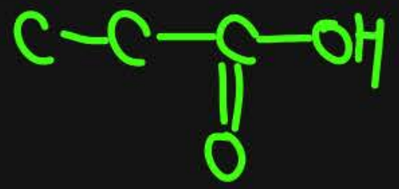
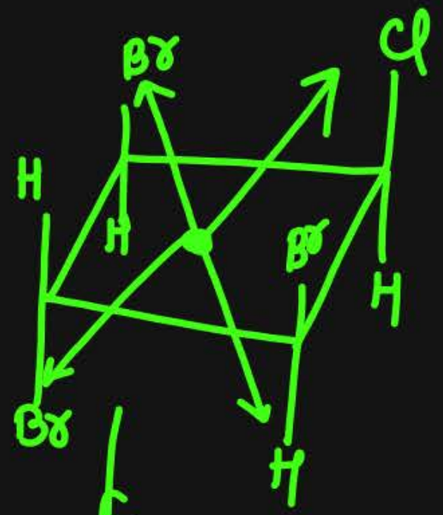


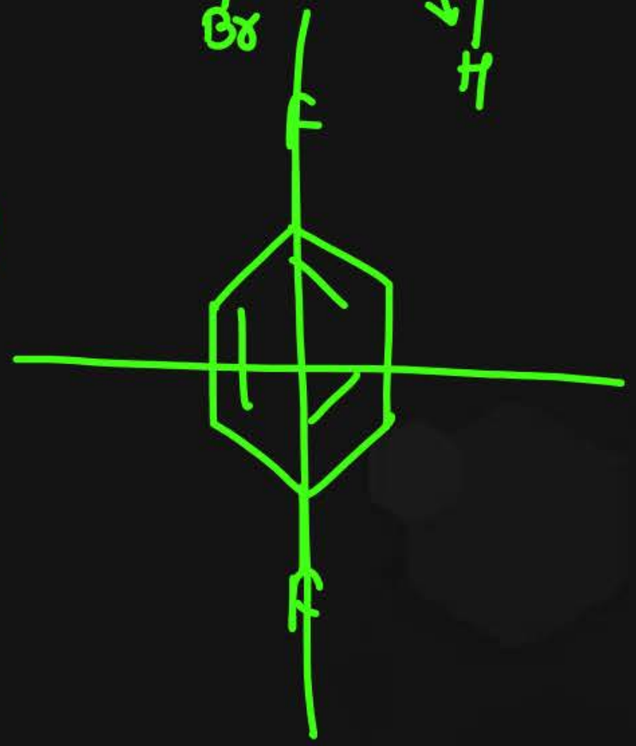
Q.7

(3)



* Pos ✓
* Cos ✗

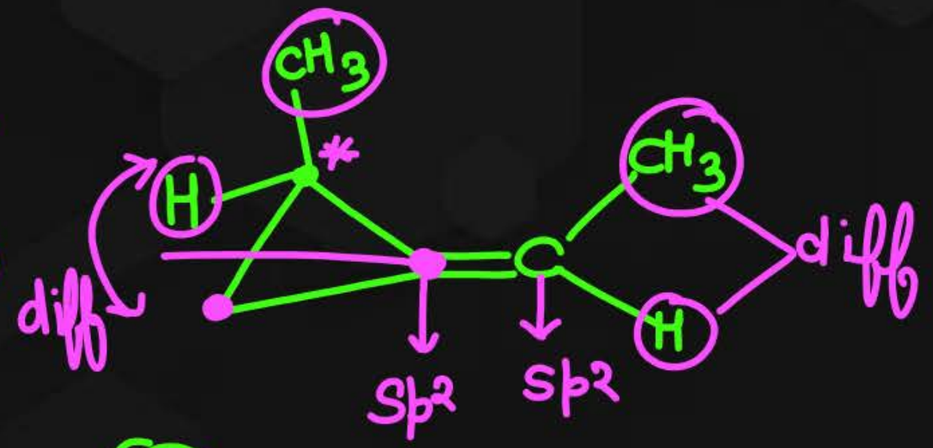
(4)



* Pos ✓
* Cos ✓

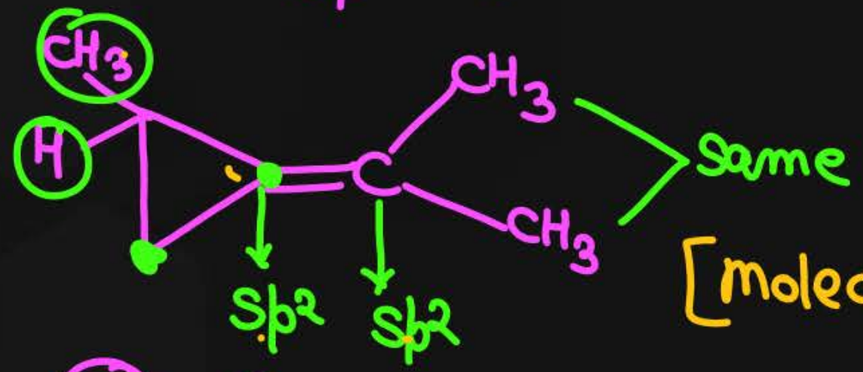
Q.8

(1)



* G.I ✓
* O.I ✓

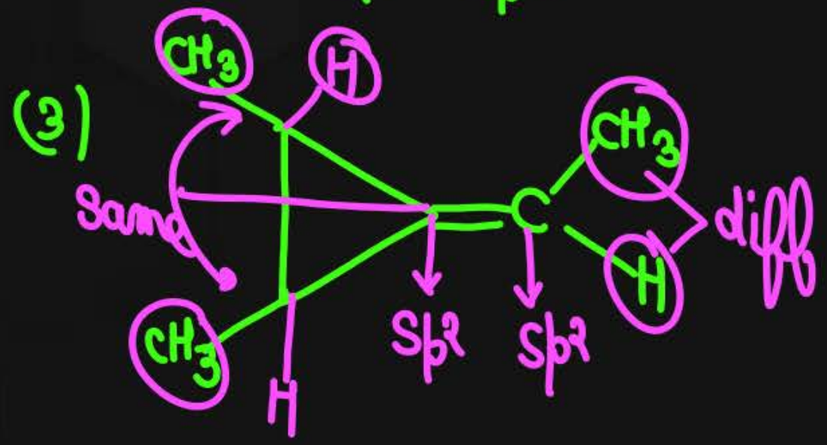
(2)



* G.I ✗
* O.I ✓

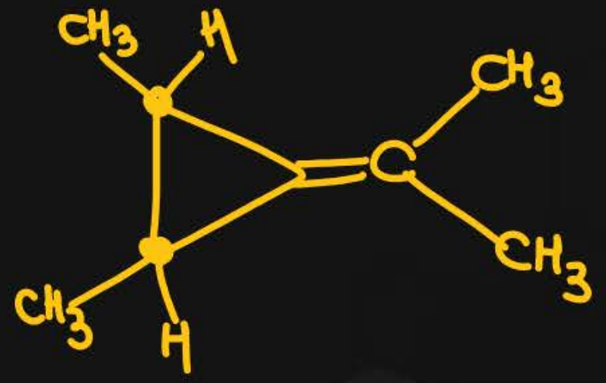
[molecular plane present]

(3)



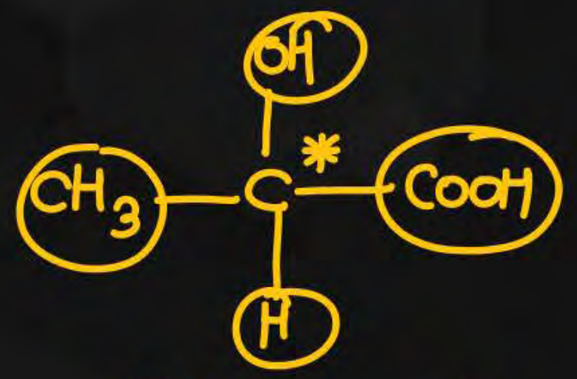
* G.I ✓
* O.I ✓

(4)



* O.I ✗
* G.I ✓

Q.12



[Lactic acid]

2 mins Summary

प्रकाशिक सक्रियता

Homework

Dpp-08

Next Class Target

Topic प्रकाशिक समावयवी के प्रकार

Topic

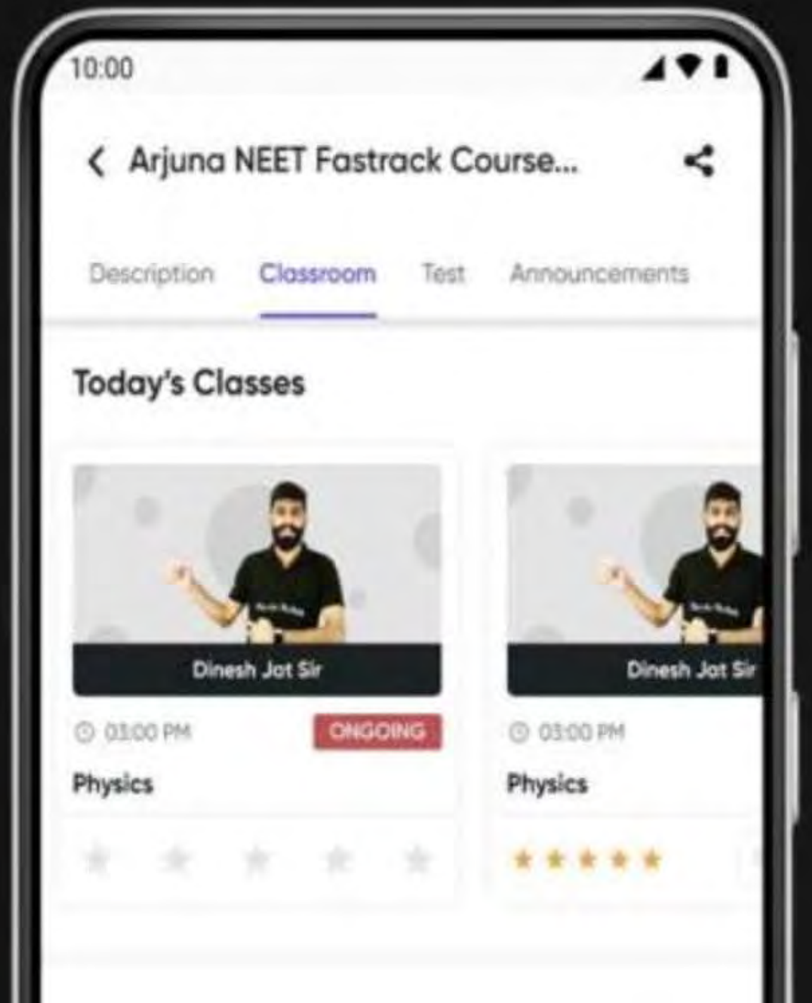
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us

VIDYAPEETH

11-YN401MH

- Chemistry (OC)
- Isomerism (समावयवता)

Lecture No.- 13

By- Deewan Tiwari Sir

Recap of Previous Lecture

Topic

प्रकाशिक समावयवता

Topic

Topic

Topic

Topics to be Covered

Topic निशान - formula

Topic D-L System

Topic example

Topic

Configuration of optical isomer ⇒
[प्रकाशिक समावयवी का नामकरण]

सापेक्ष विन्यास
[Relative Configuration]

↓

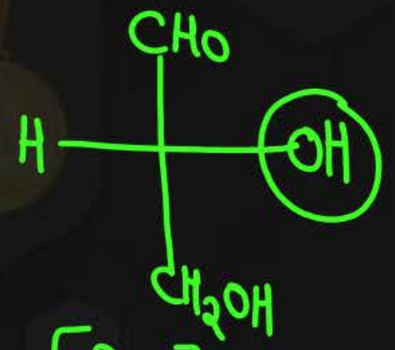
किसी भी प्रकाशिक समावयवी का विन्यास Standared यौगिक के विन्यास के आधार पर दिया जाता है।

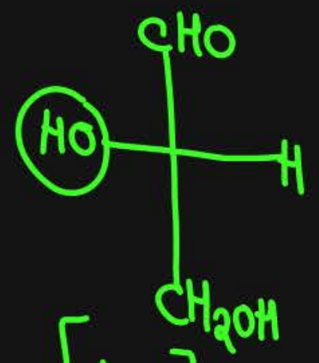
निरपेक्ष विन्यास
[Absulute configuration]

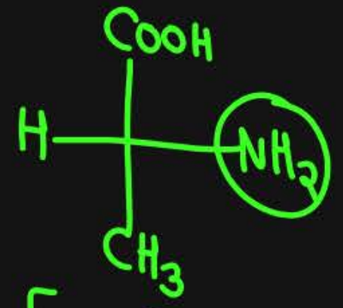
↓

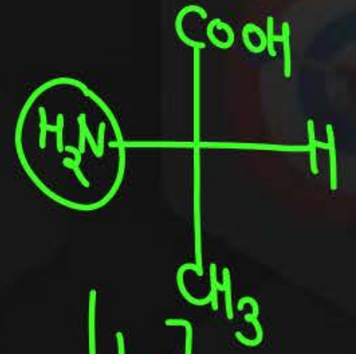
किसी भी प्रकाशिक यौगिक का विन्यास बताने के लिए Standared यौगिक की आवश्यकता नहीं है।

सापेक्ष विन्यास [Relative confi]

- Carbohydrate
  - Stand. Comp. glyceraldehyde
    - 

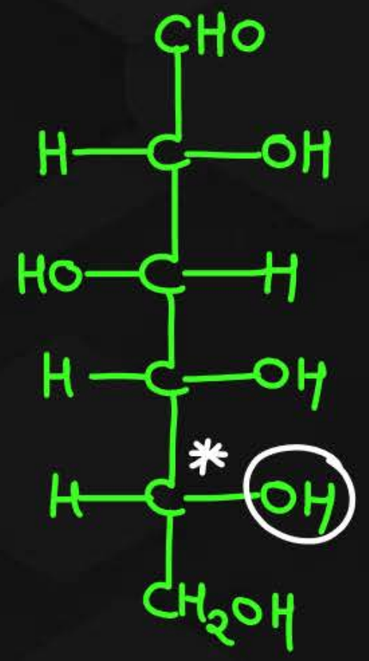
      [D-]
    - 

      [L-]
- Amino acid
  - Alanine
    - 

      [D-]
    - 

      [L-]

ex



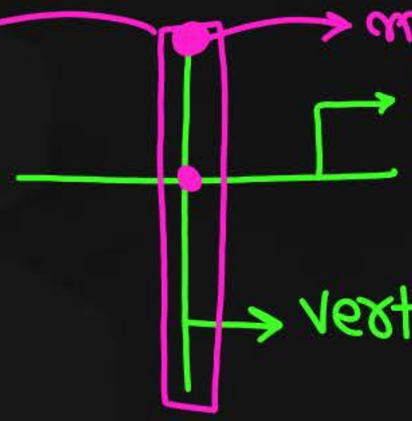
[D-glucose]

DT funda ⇒

* For carbohydrate check only last chiral centre.
* For amino acid check only last chiral centre.
* if OH and NH_2 both are present then check NH_2 Position.

Fisher formula ⇒

* 2D-Formula
* केवल ग्रसित अवस्था [Eclipsed] exist करता है।
* Parent chain



most priority F.G

Horizontal line (पास) or (towards the viewer)

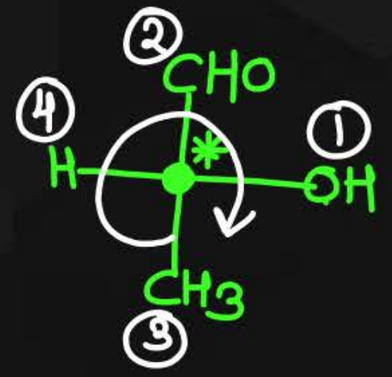
Verticle line (दूर) or (away from viewer)

[Fisher-Projection]

* यदि Verticle line पर parent chain नहीं आती है तो even change कीजिये।

DT funda ⇒

(1)



[clockwise]

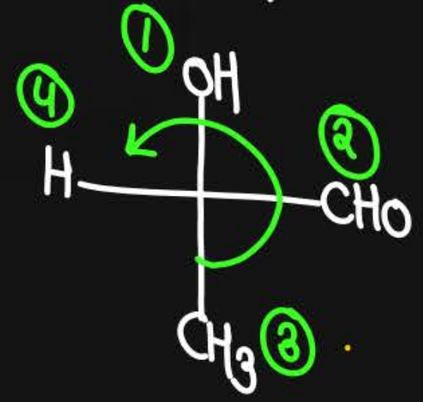
* अगर 4th priority grp

- दूर (1 → 2 → 3)
- पास (3 → 2 → 1)

grp change

- odd change → Configuration change हो जाएगा

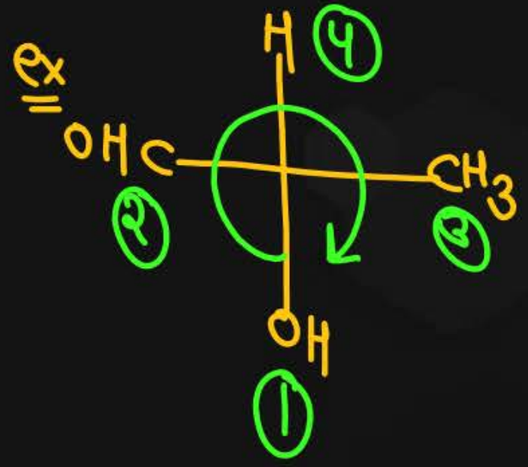
ex



[Anticlockwise]

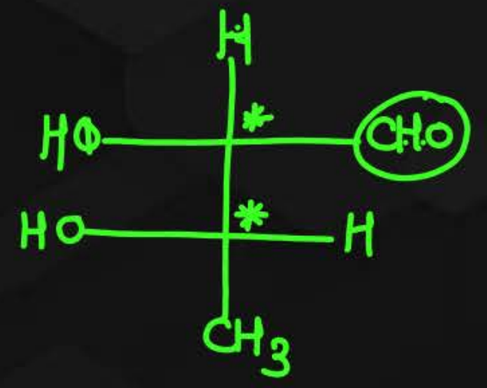
- even change → Configuration change नहीं होगा।

ex

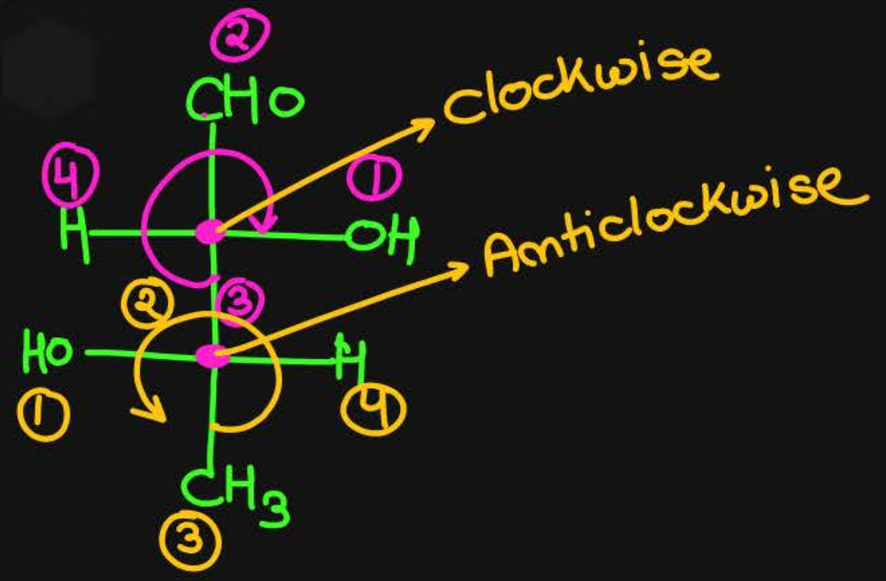


[clockwise]

ex

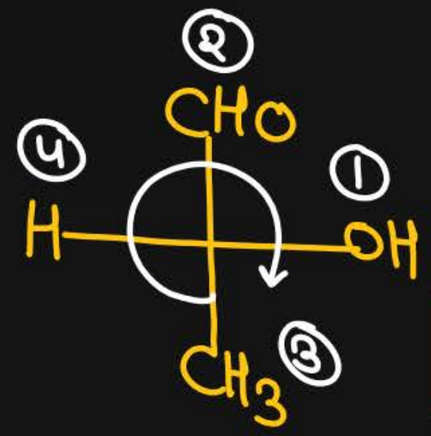


even change →



(2)

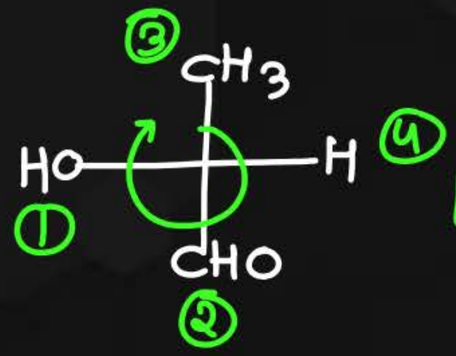
[clockwise]



Change in angle

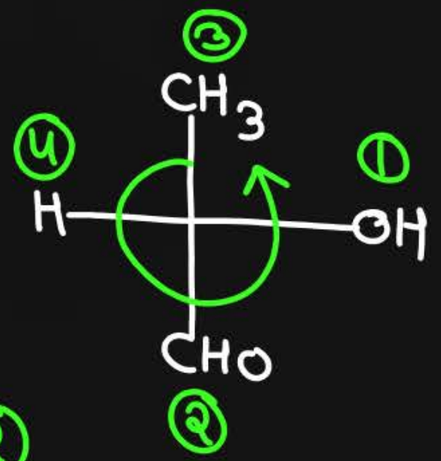
- 180° with in plane → No change in confi
- 180° out of plane → change in confi
- 120° → No change
- 90° and 270° → allowed ही नहीं,

180° in plane ⇒



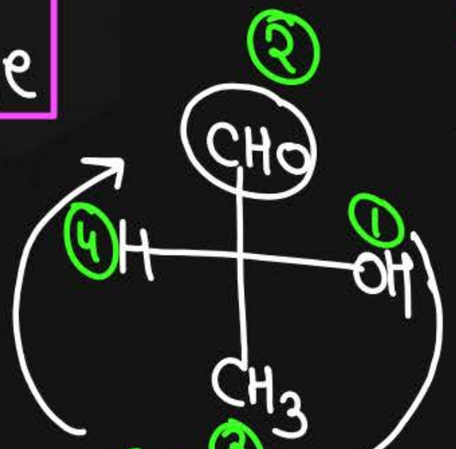
[clockwise]

180° out of plane ⇒



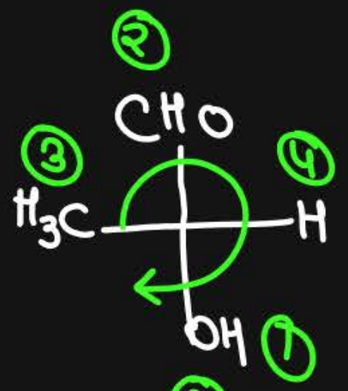
[Anticlockwise]

120° change

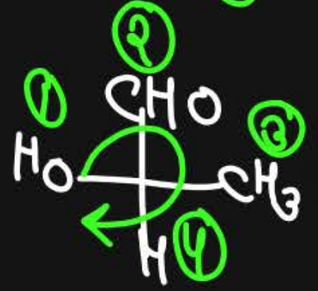


[clockwise]

clockwise



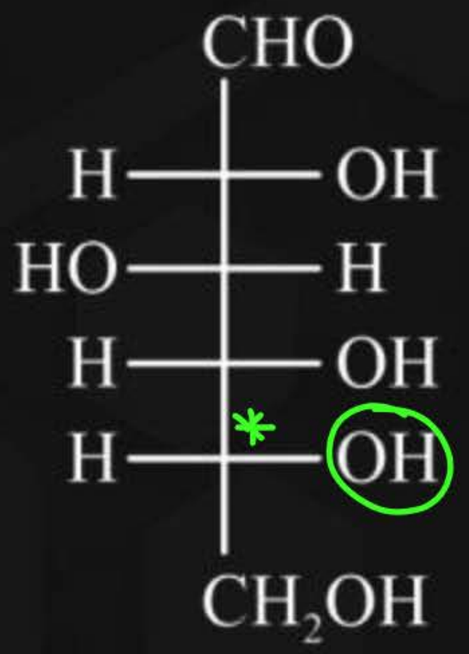
[clockwise]



[clockwise]

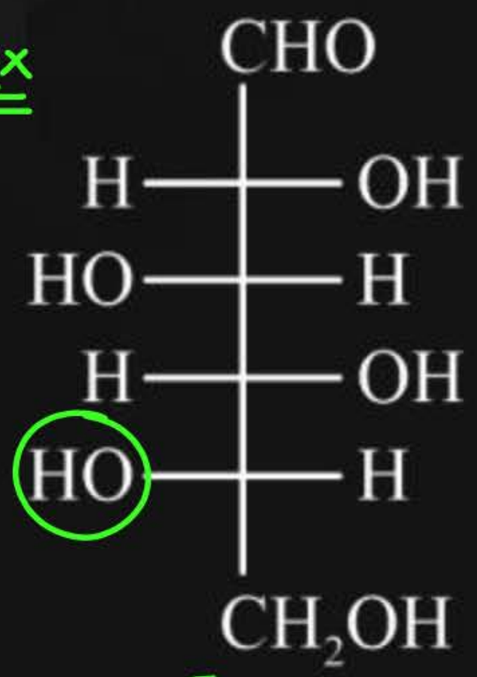
#Q. Find the D and L Configuration.

ex



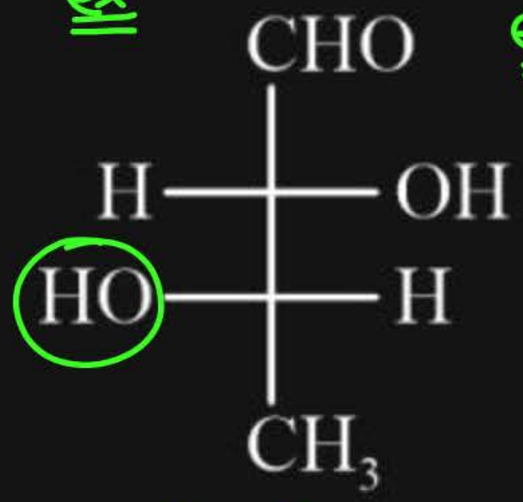
[D-]

ex



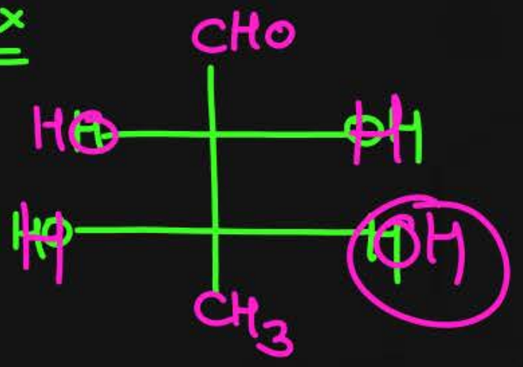
[L-]

ex



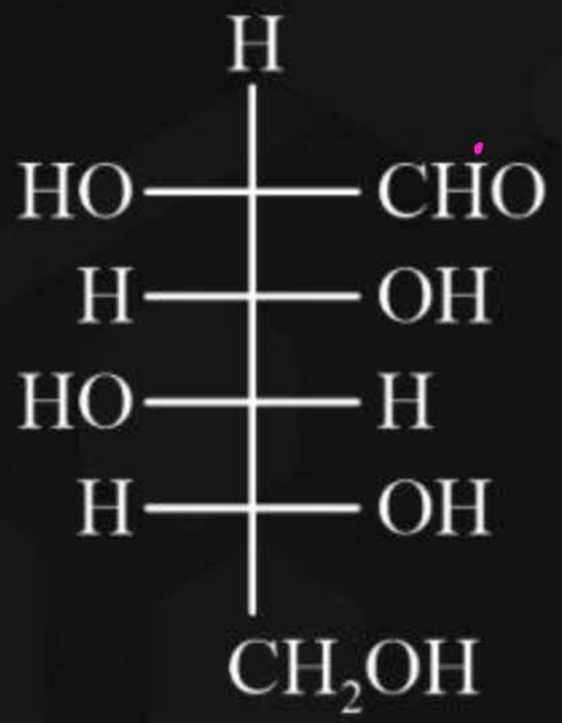
[L-]

ex

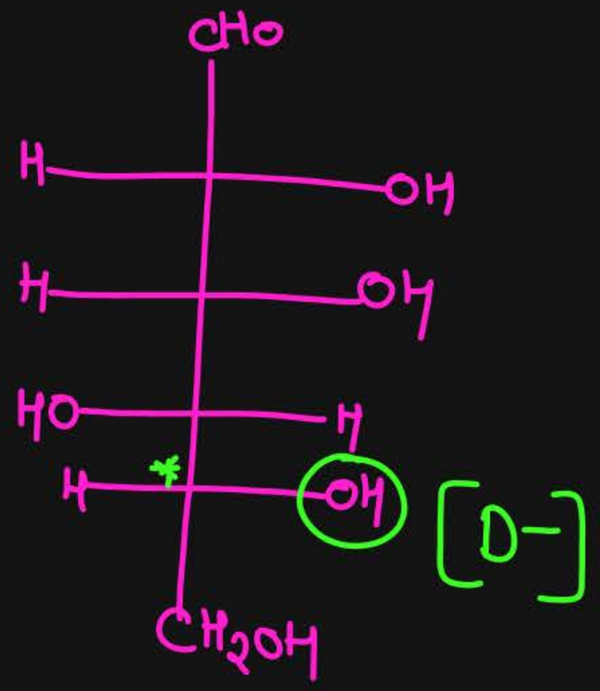


[D-]

ex

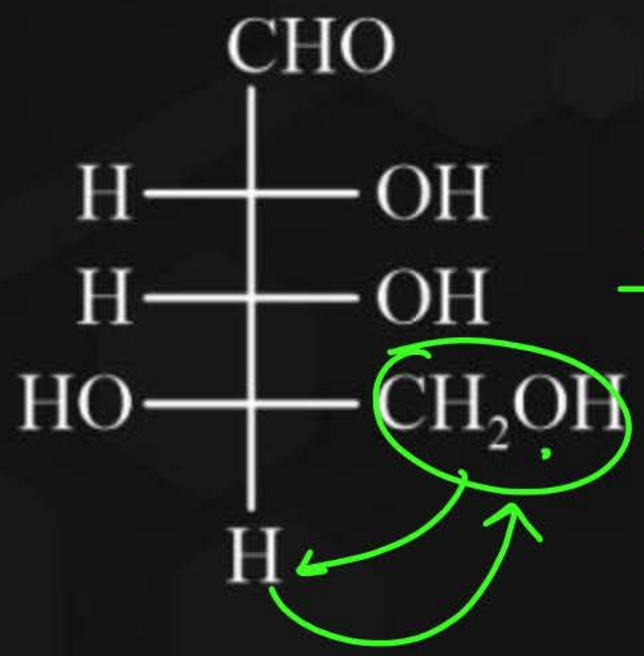


even change →

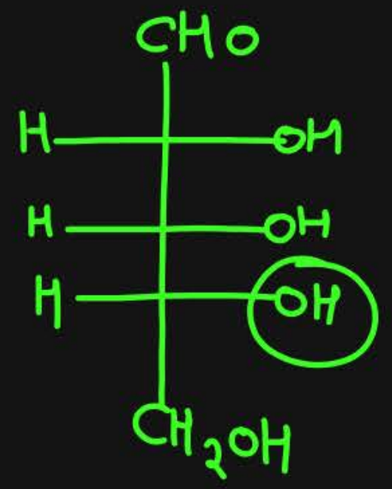


[D−]

ex

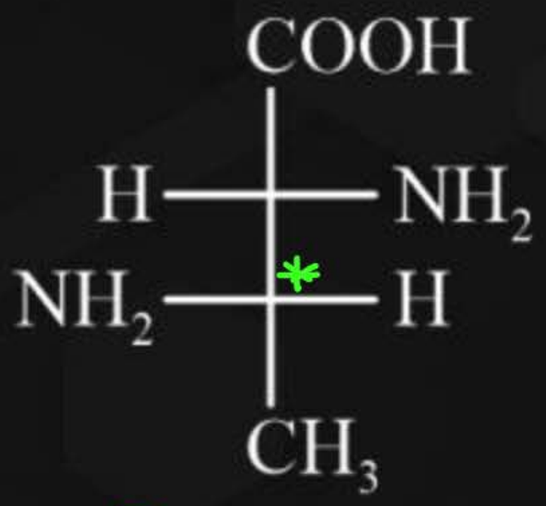


even change



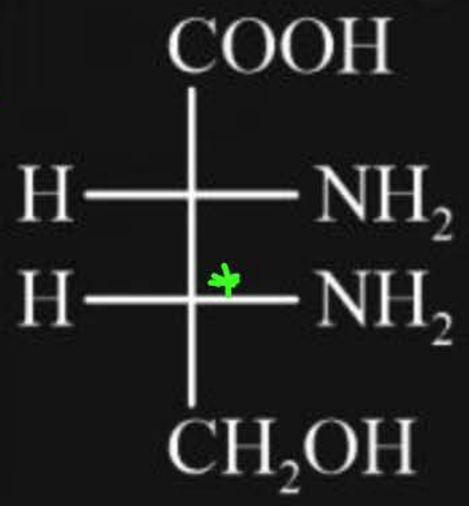
[D-]

ex



[L-]

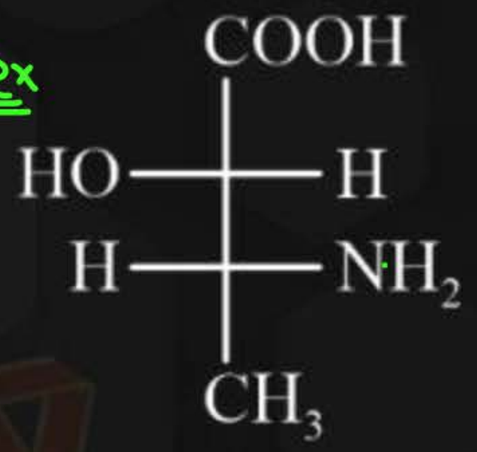
ex



[D-]

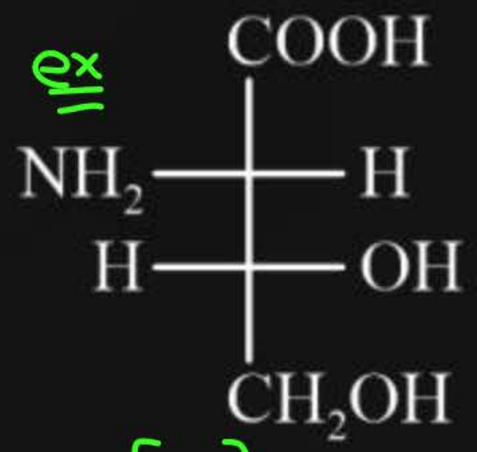
Note : If OH and NH_2 both are present in same molecule then position of NH_2 consider whenever it is present.

ex



[D-]

ex



[L-]

2 mins Summary

D-L system

Homework

Revise notes

Next Class Target

Topic R – S नामकरण

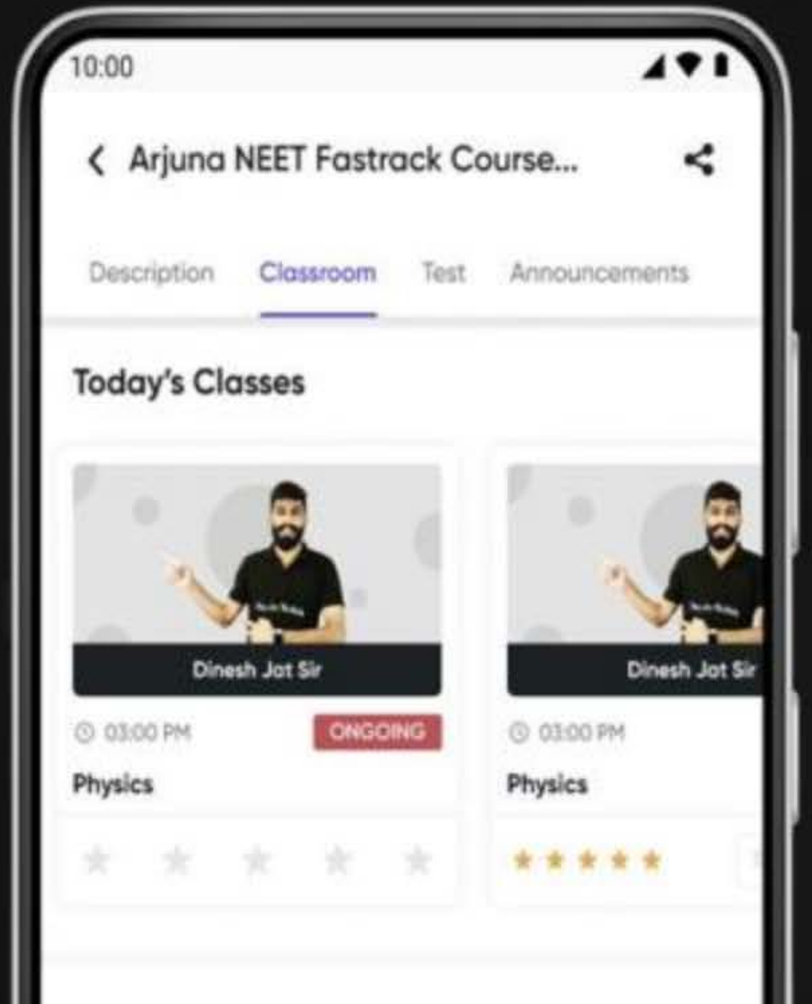
Topic

Topic

Topic

Thank You...

Rate your today's class in the Batch



Your Feedback is Valuable to us