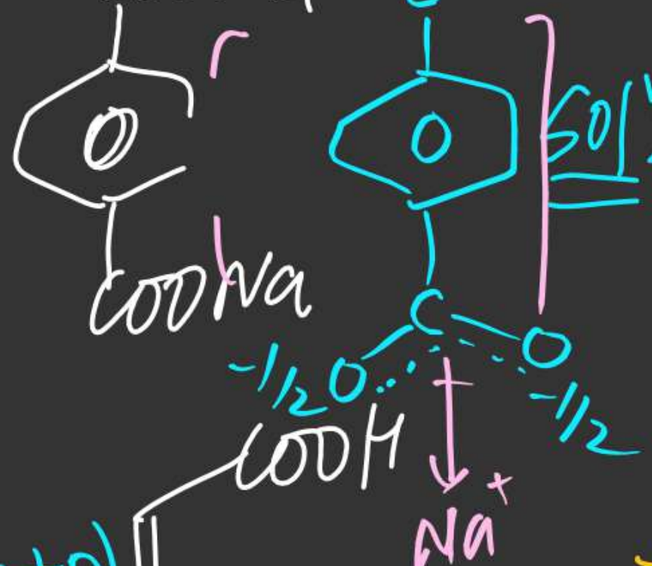
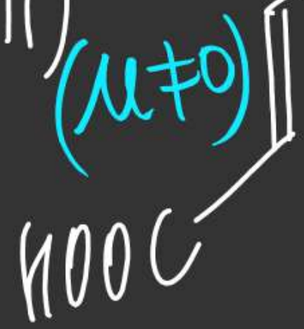
(V) 

$(\mu \neq 0)$

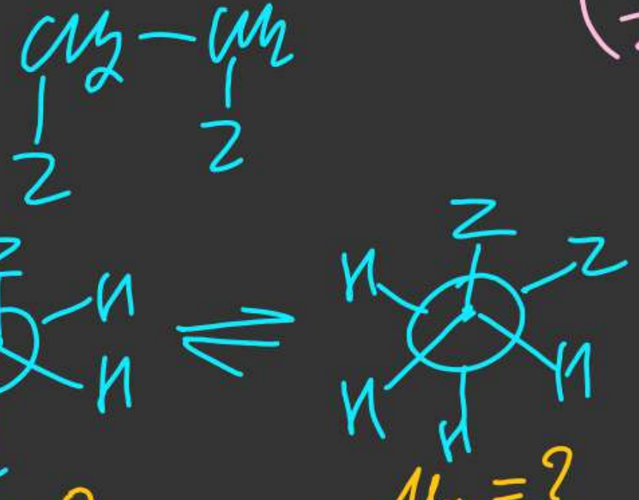
Calculate dipole moment of gauche conformation if net dipole moment is 1 D & mole fraction of o-anti Conformation is 0.82 . Formula can be used

(VI) 

$(\mu = 0)$

(VII) 

$(\mu \neq 0)$



$\Rightarrow \mu_a = 0$

$\Rightarrow \mu_{net} = 1\ D$

$\Rightarrow \chi_a = 0.82$

$\mu_g = ?$

$\chi_g = ?$

$\mu = \sum \mu_i \chi_i$

$\chi_i \Rightarrow$ mole fraction of stable Conformation

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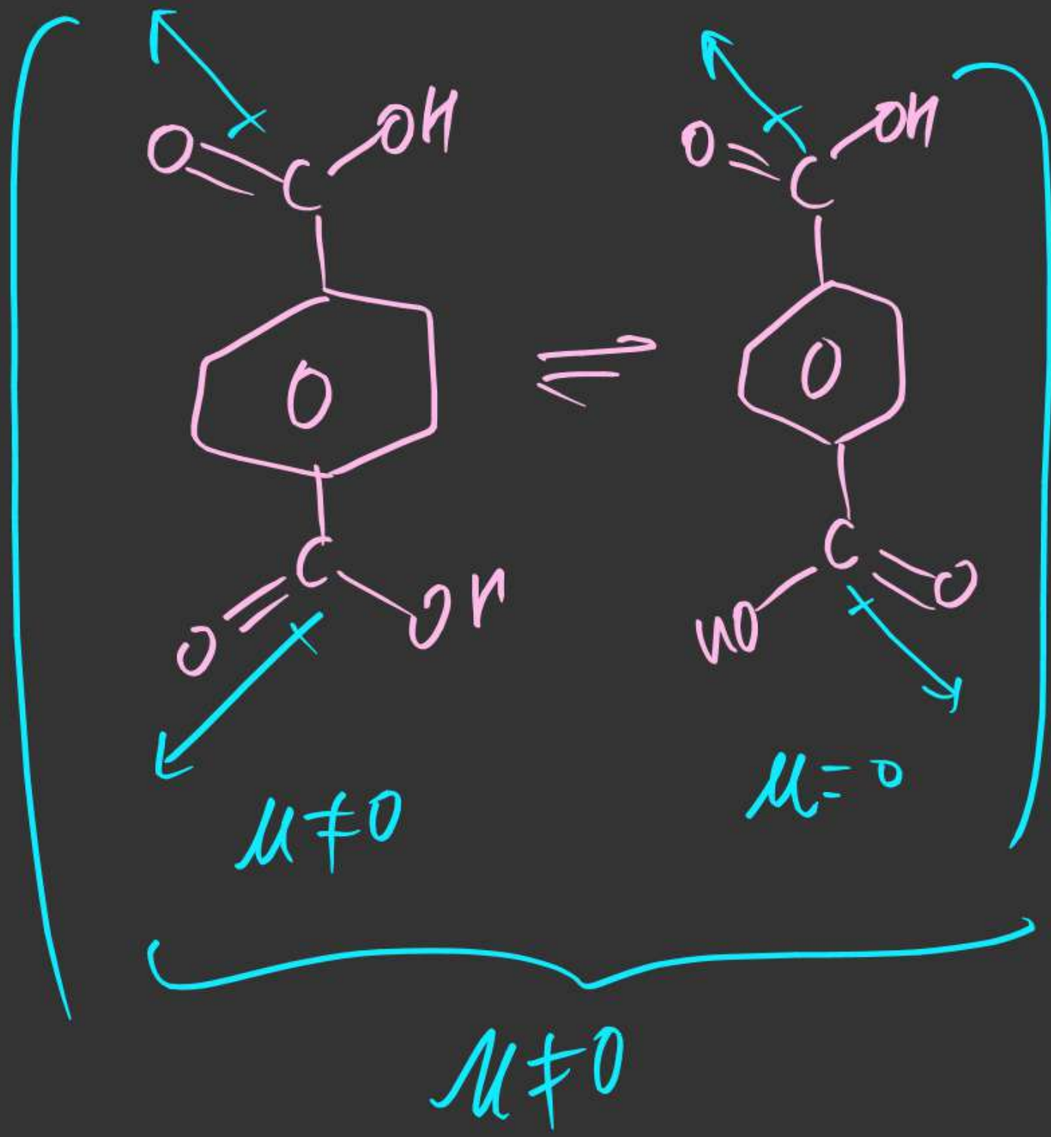
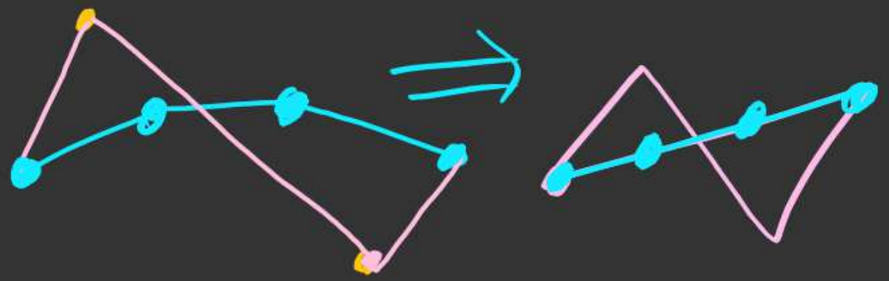
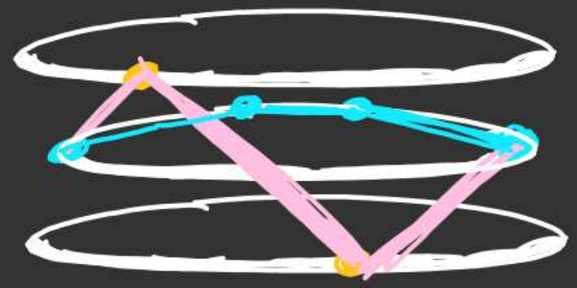


(4) Half Chair Conformation

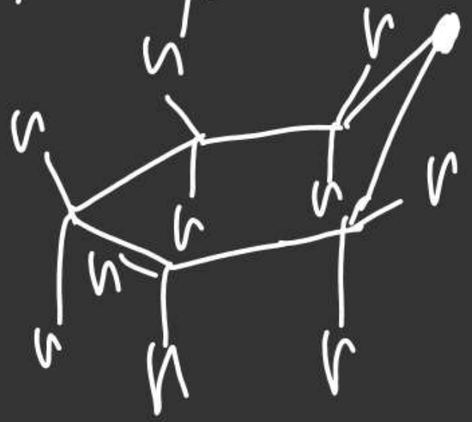




3(C-C) ⇒ gauche

3(C-C) ⇒ Eclipsed.

(5) Half Boat Conformation



4(C-C) ⇒ Eclipsed

2(C-C) ⇒ gauche

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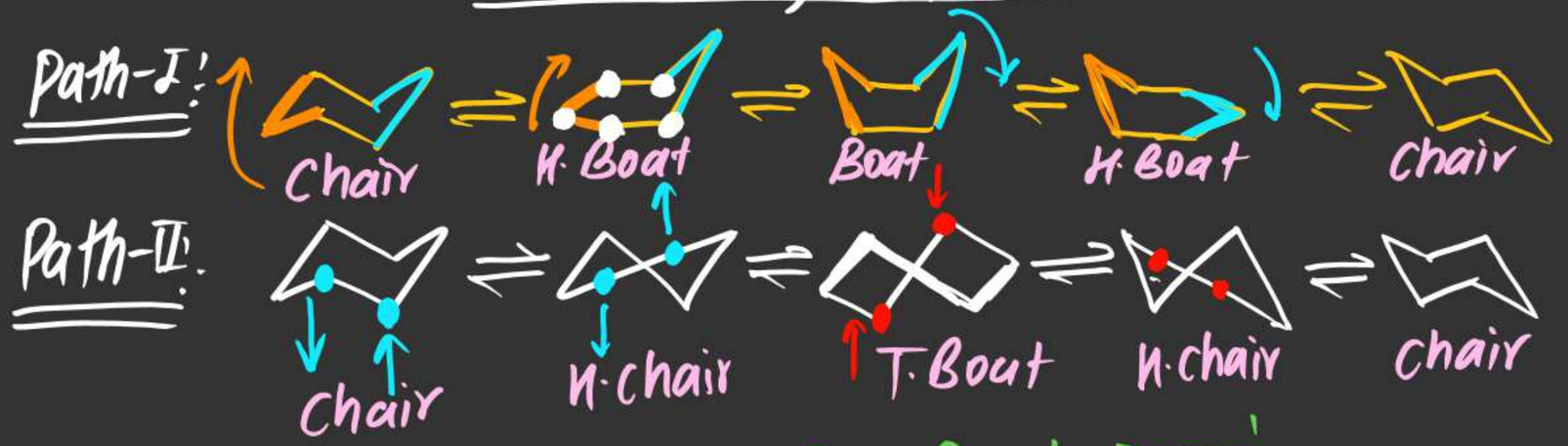
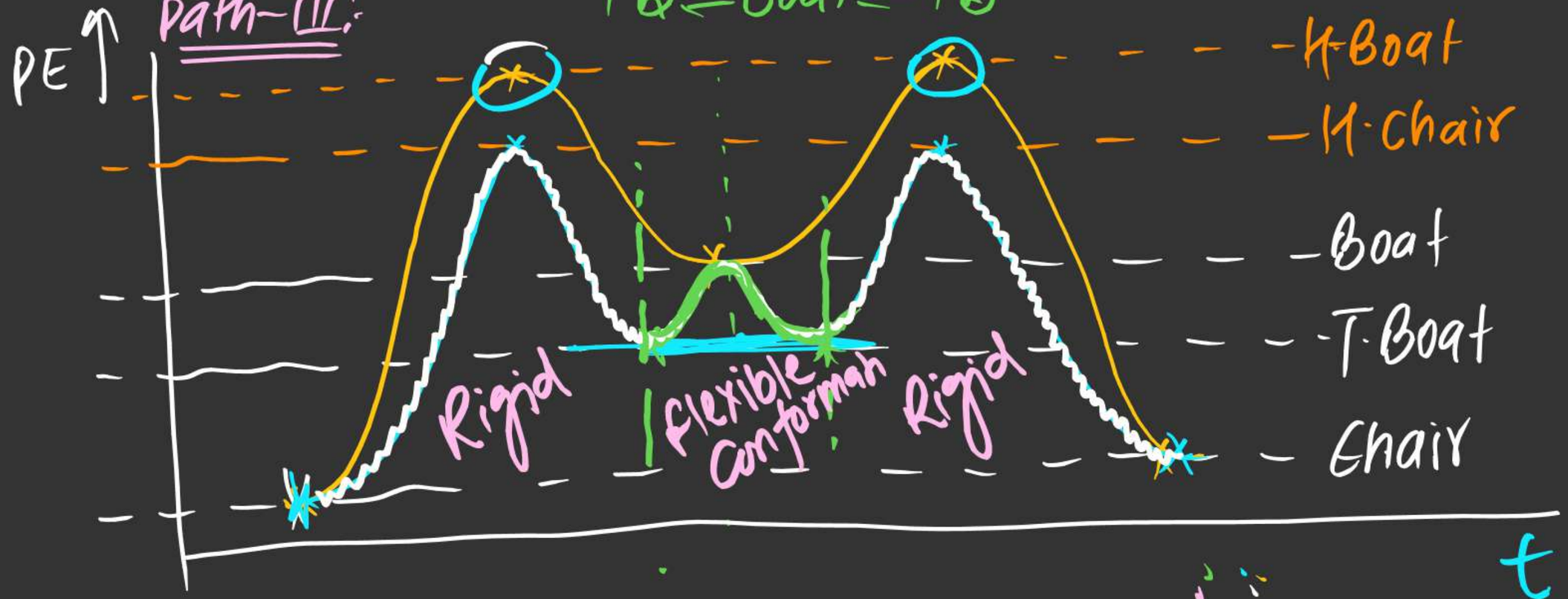
Potential Energy Diagram



TB ⇌ Boat ⇌ TB



⇒ Total possible Conformation for Cyclohexane = ∞

⇒ Total possible stable Conformation of Cyclohexane ≤ 4

= 3 (1 chair + 2 T. Boat)

⇒ Total possible flexible stable Conformation = 2 (2 T. Boat)

⇒ Rigid = 1 (chair)

Ex-1 Which of the following Conformation of cyclohexane is chiral.

(A) Chair (B) Boat (C) Twist Boat (D) Rigid

(A) Chair — POS, COS present

(B) Boat — POS present

(C) Twist Boat — chiral ✓

(D) Rigid → Chair — Achiral; H-chair — chiral

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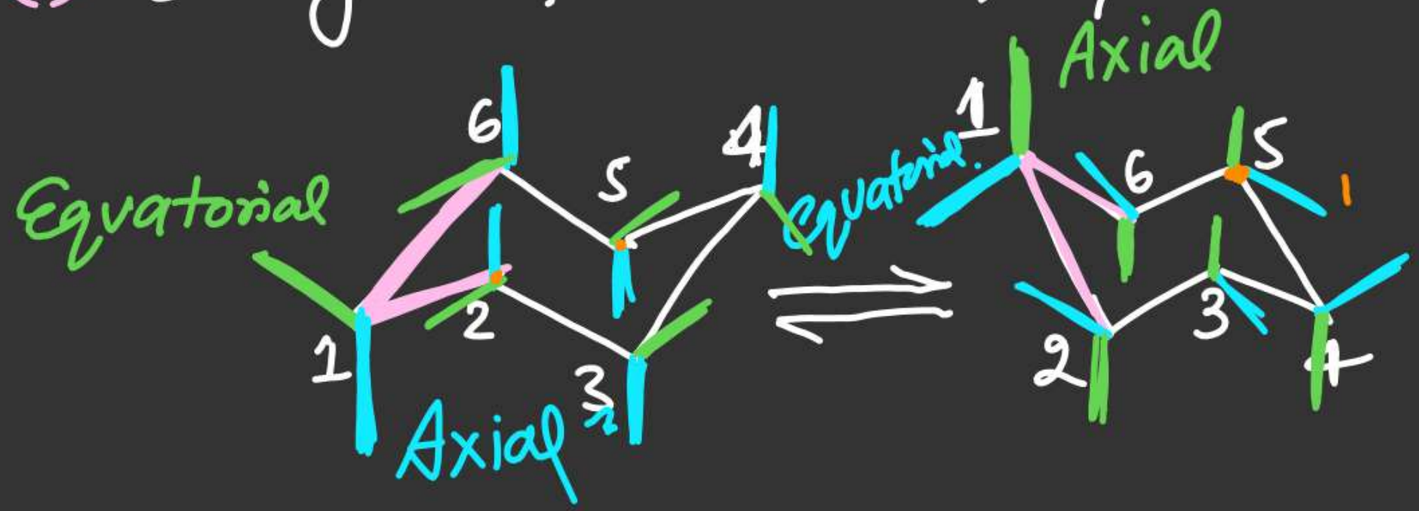
Note: (i) During Conformation of Cyclohexane Each Axial Bond Converts in to Equatorial Bond & vice-versa



(ii) Configuration never changes during Conformation.

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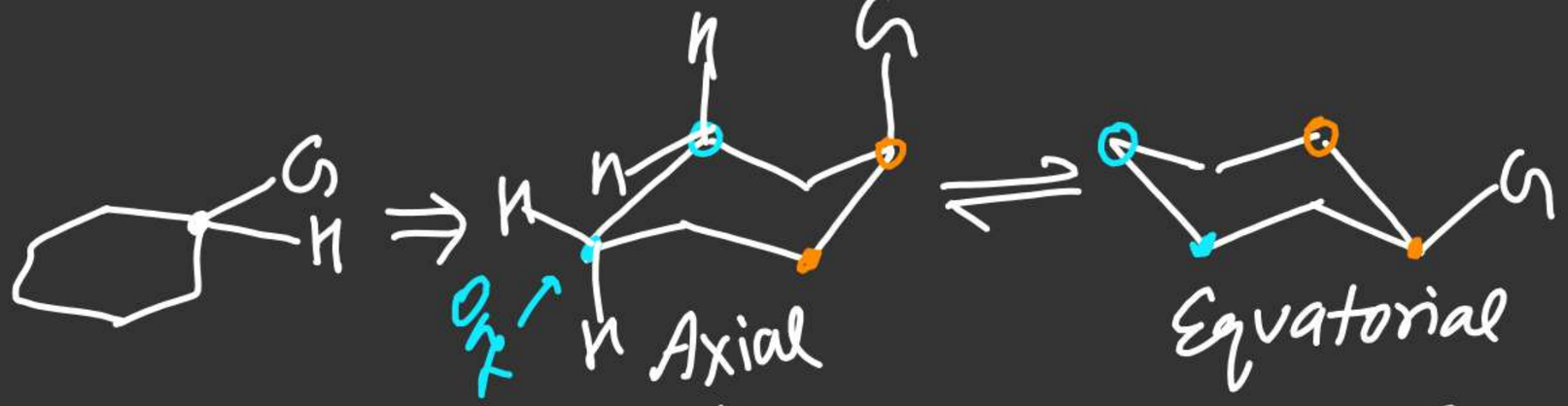
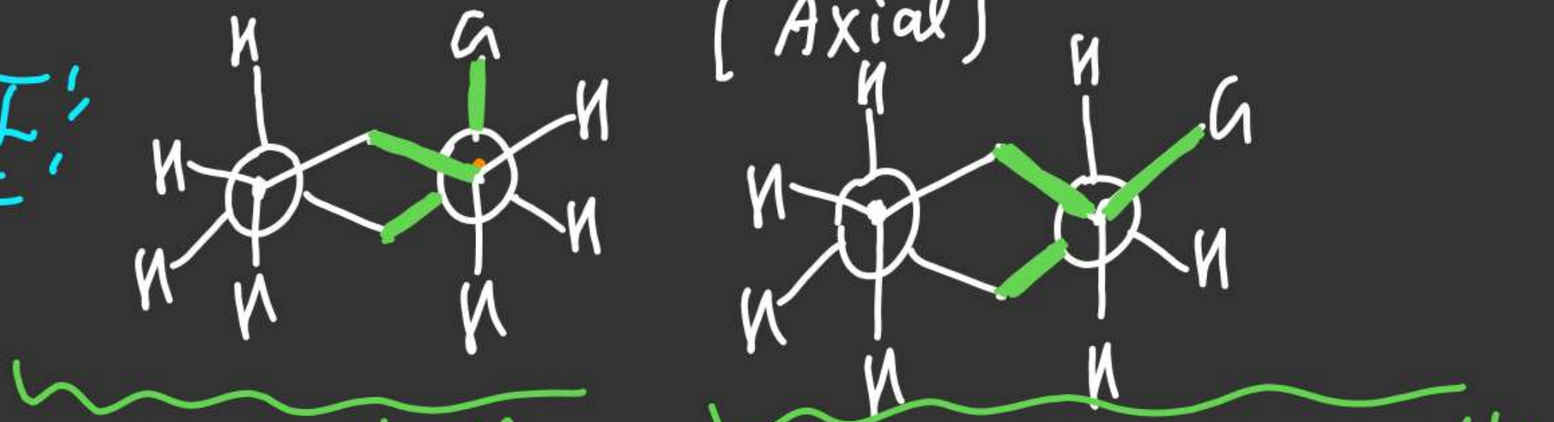
(#) Conformation of Substituted Cyclohexane :-



$$K_{eq} = \frac{[\text{Equatorial}]}{[\text{Axial}]}$$

Method-I :-



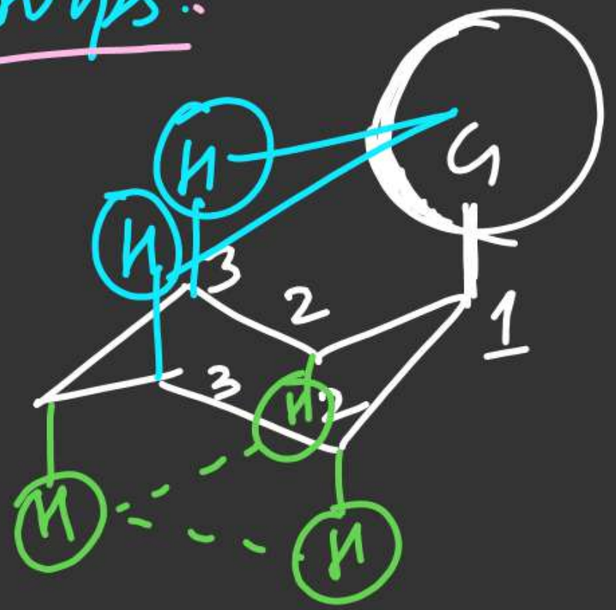
More Repulsion
less stable

less repulsion, more stable

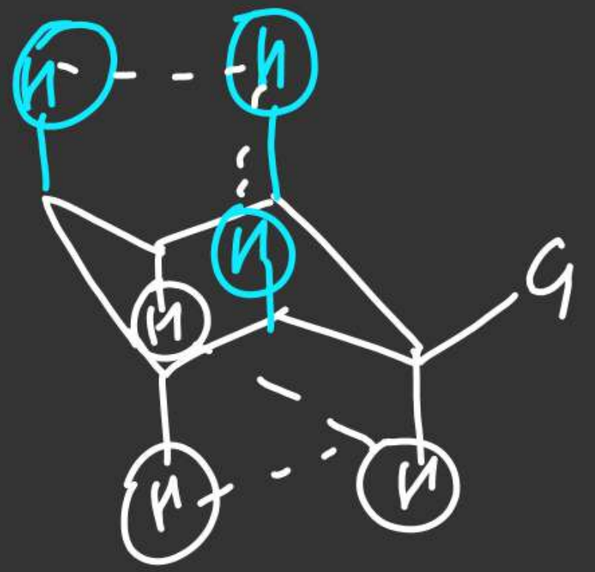
...

Note :- Equatorial site is more stable site for Bulkier groups..

Method - II:



More 1,3-diaxial Repulsion
⇒ hence less stable.



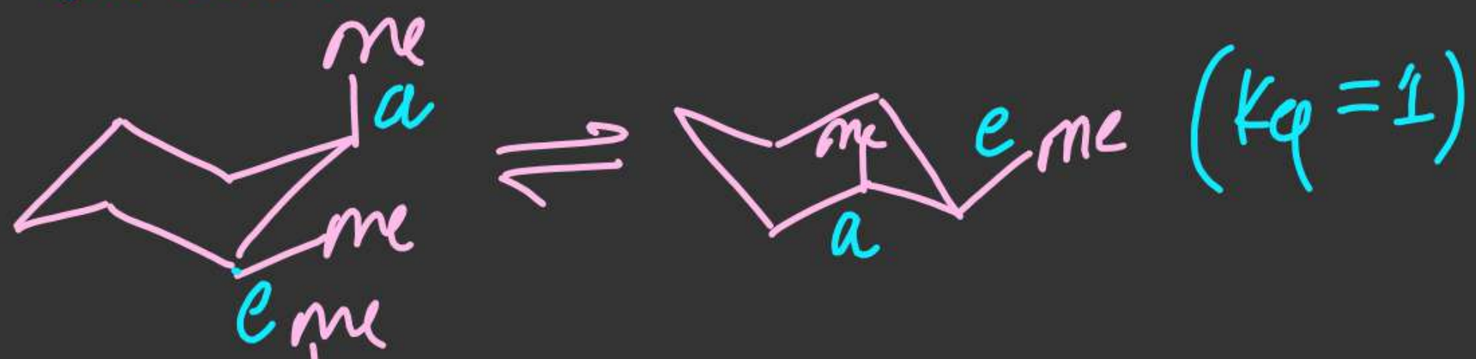
less diaxial Repulsion
⇒ hence more stable

Ex! Complete following & Predict Keq

(1)  $K_{eq} = 1$

(2) 

less stable more stable ($K_{eq} > 1$)

(3) 

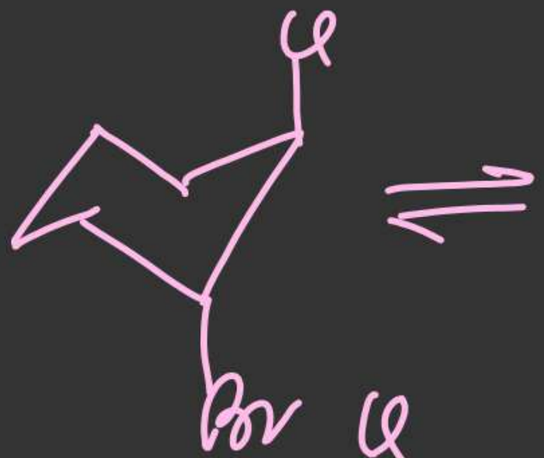
($K_{eq} = 1$)

(4) 

(5)

(6)

(7)



(8)

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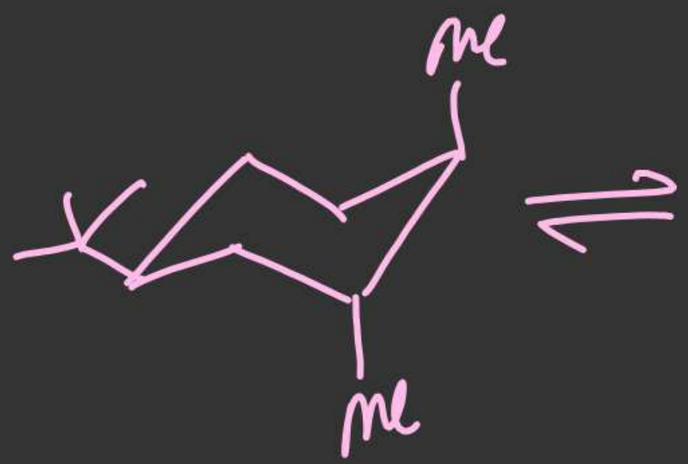
(9)

(10)

(11)



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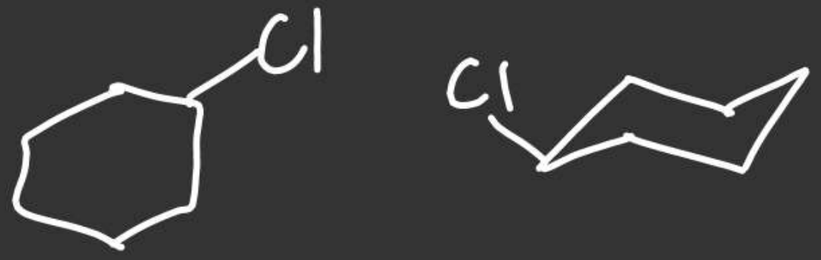
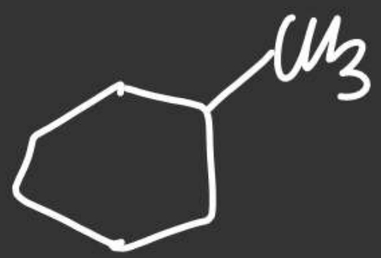
(#) Draw most stable Conformation

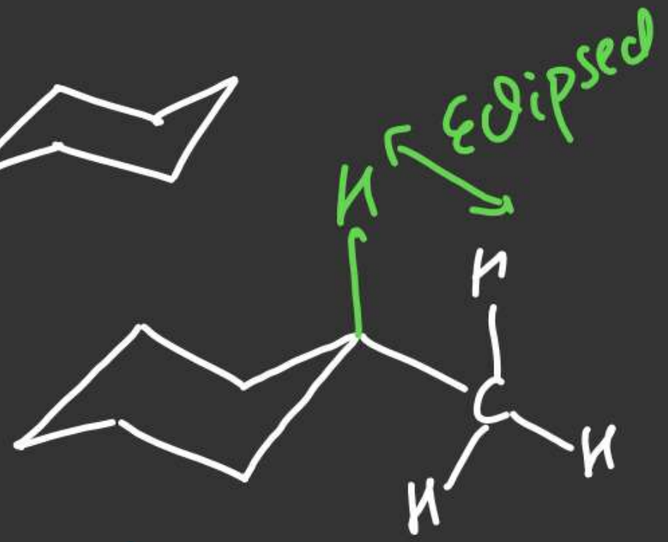
(1)

(2)



(3)



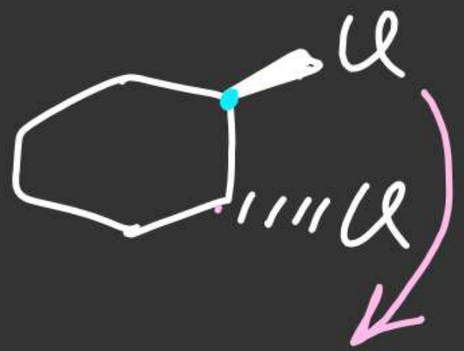


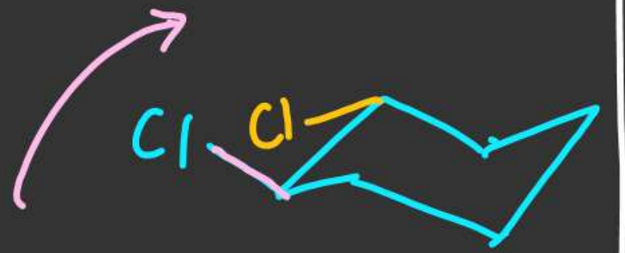
~~most stable~~

(most stable conformation)

(4)

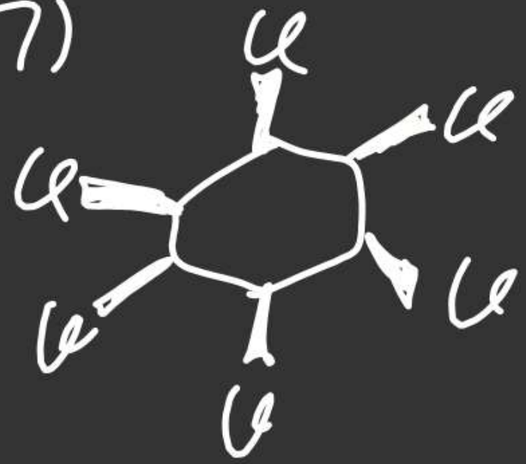
(5)



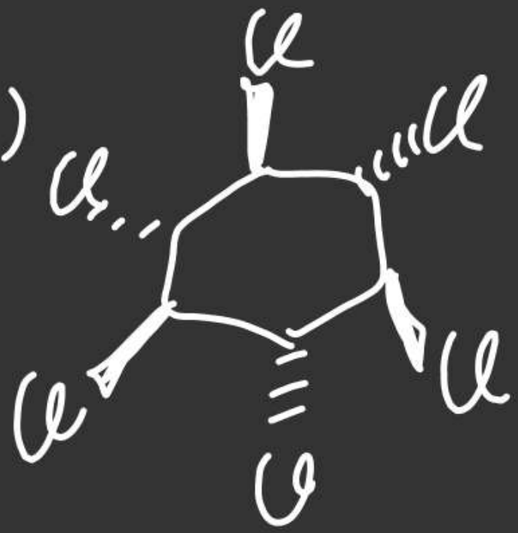


(6)

(7)



(8)



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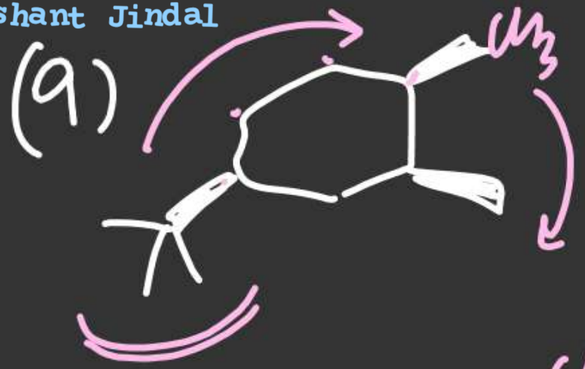
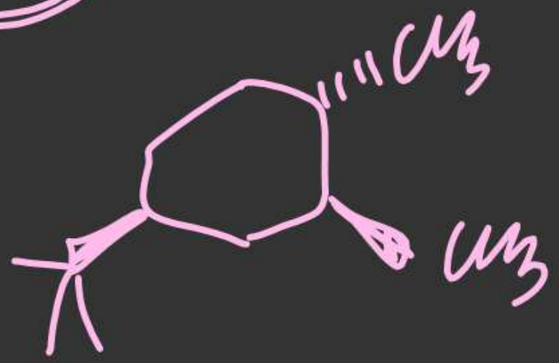
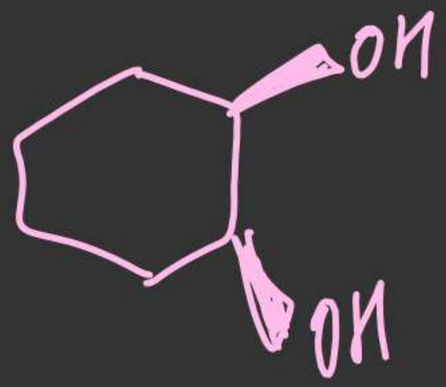
(9)



(10)



(11)



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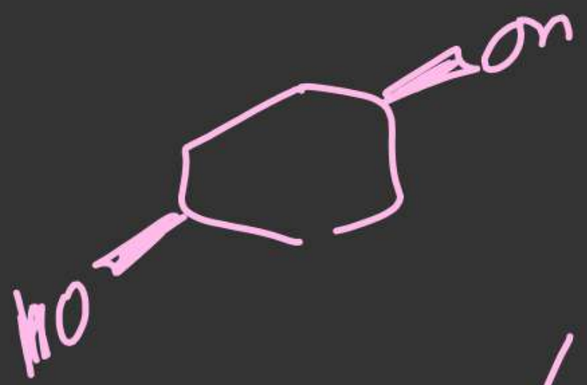
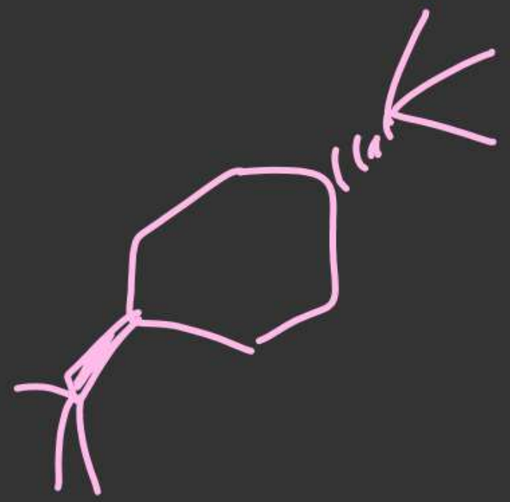
(12)

(13)



(14)



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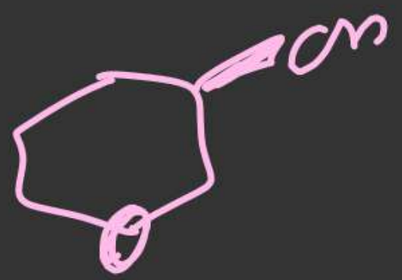
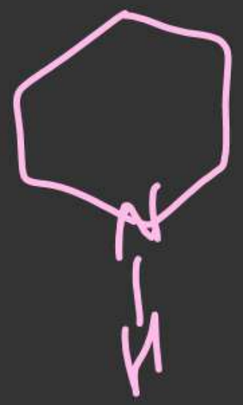
(15)

(16)



(17)



(#)

(18) 1,2-dimethyl cyclohexane

Stability T(aa) < C(ae) = C(ea) < T(ee)

(19) 1,3-dimethyl cyclohexane

(20) 1,4-Dimethyl cyclohexane

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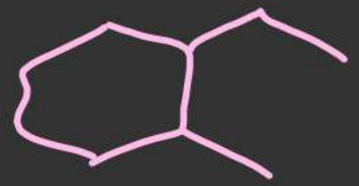
(21) 1-Ethyl-2-methyl cyclohexane



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Reaction mechⁿ

First 6 lecture (No Previous Concept is Req)

Optical Requirm