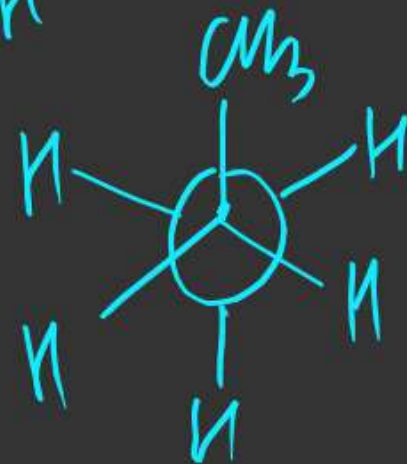
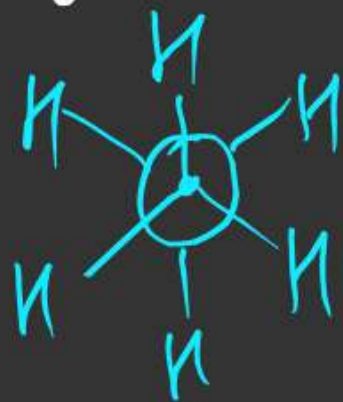
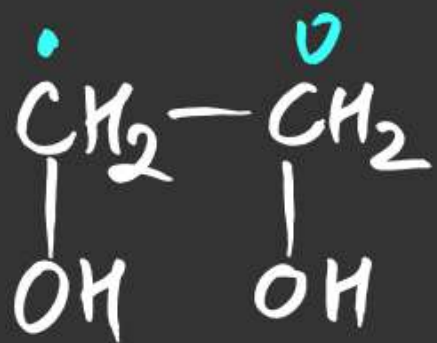


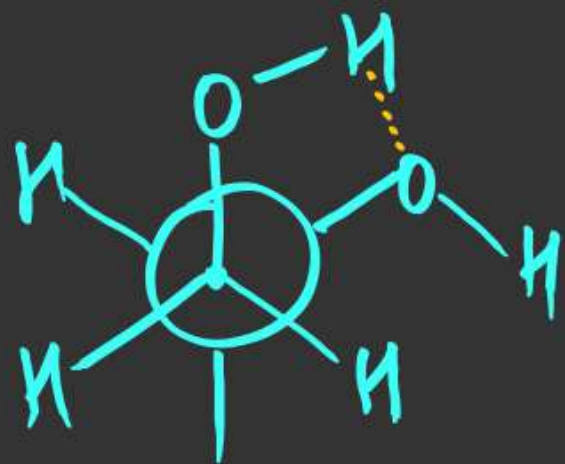
(#) Draw most stable Conformation



~~mif~~
(11)

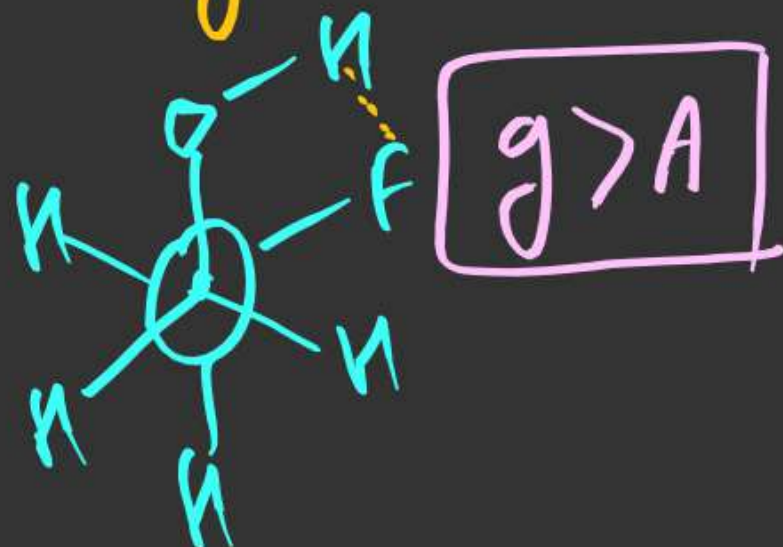
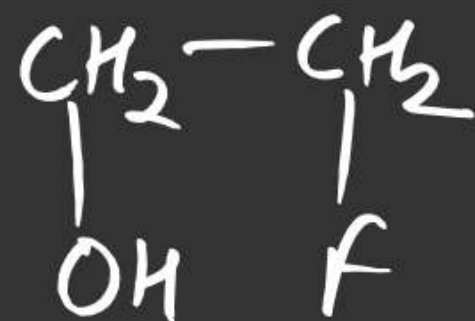


(Ethylene Glycol)



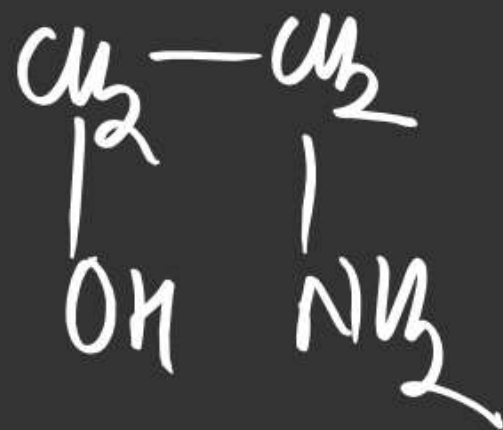
gauche > Anti

(12)



$g > A$

(13)



$g > A$

Note: Presence of intramolecular H-bonding is supporting phenomenon for higher stability.

(14)



$g > A$

(15)



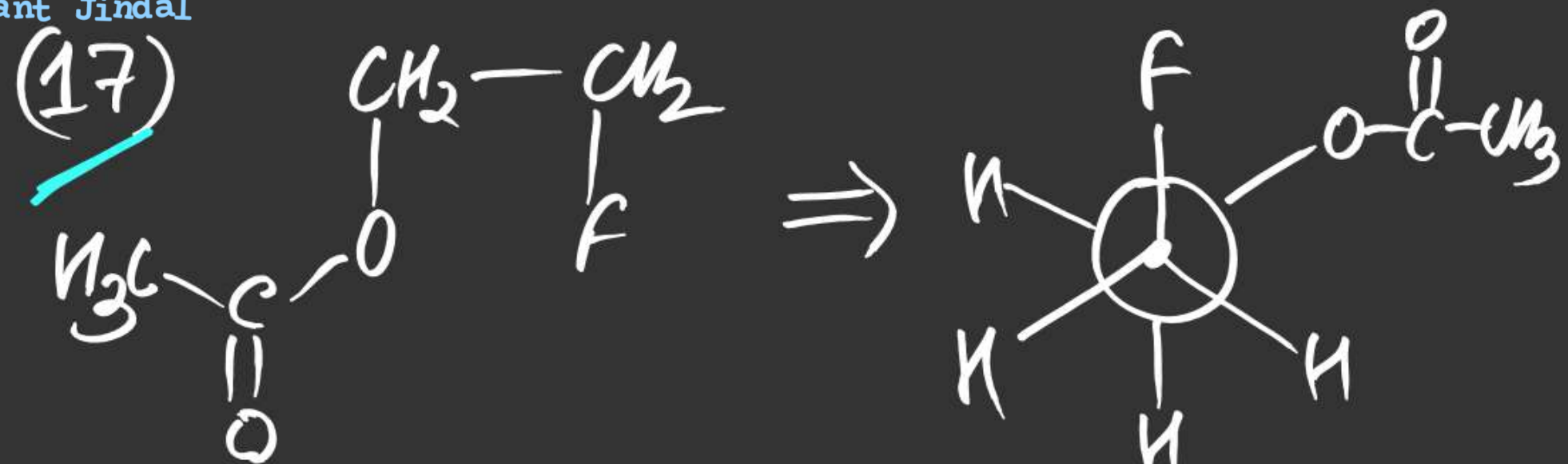
$g > A$

Electrostatic attraction

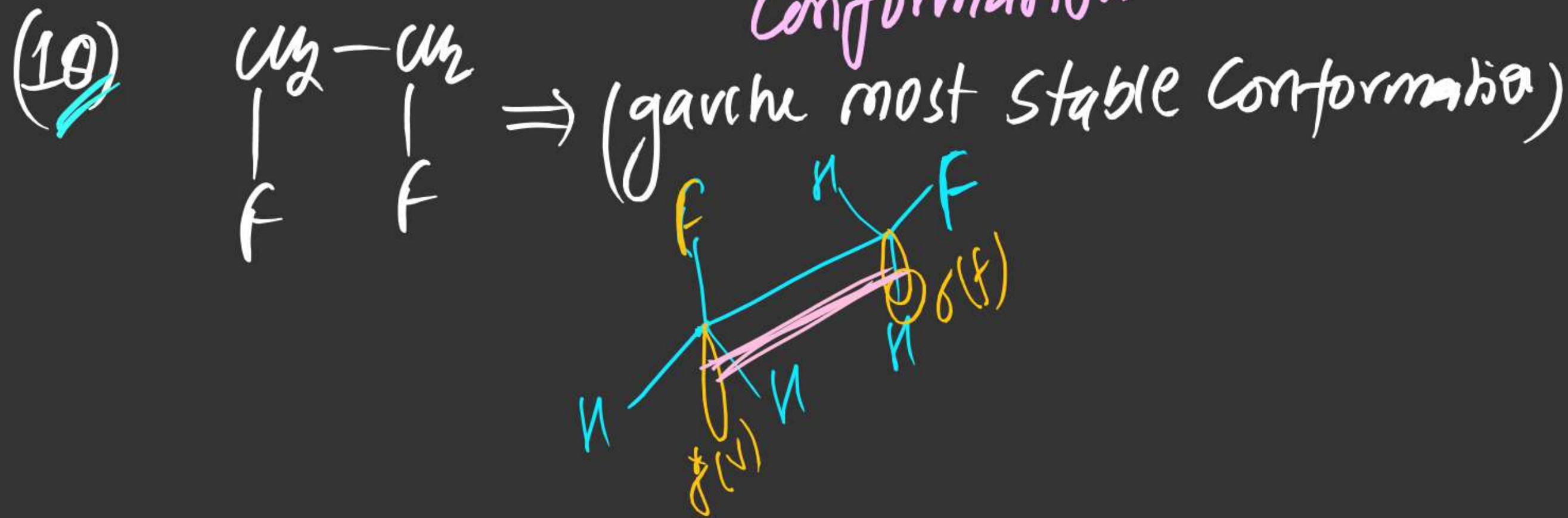
(16)



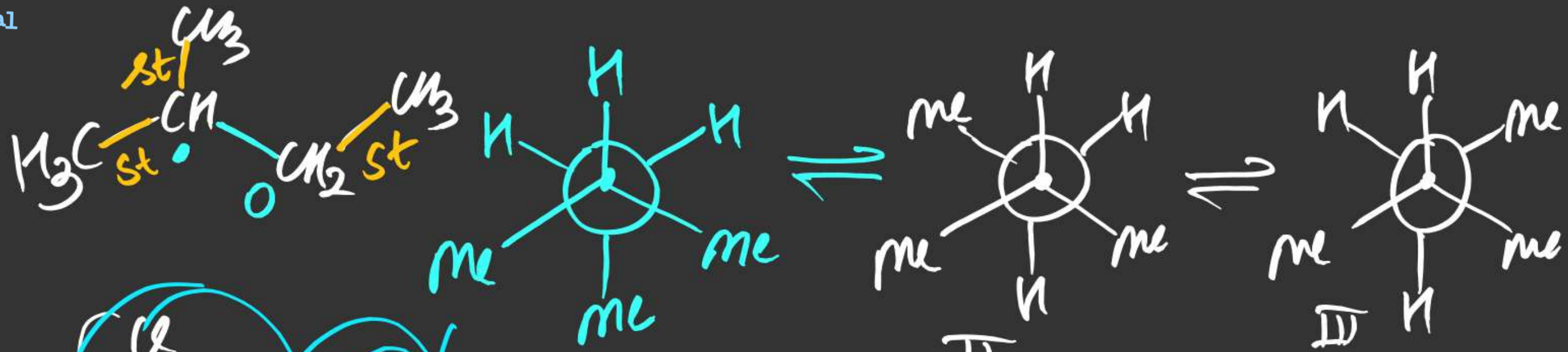
$g > A$



"Gauche" most stable Conformation



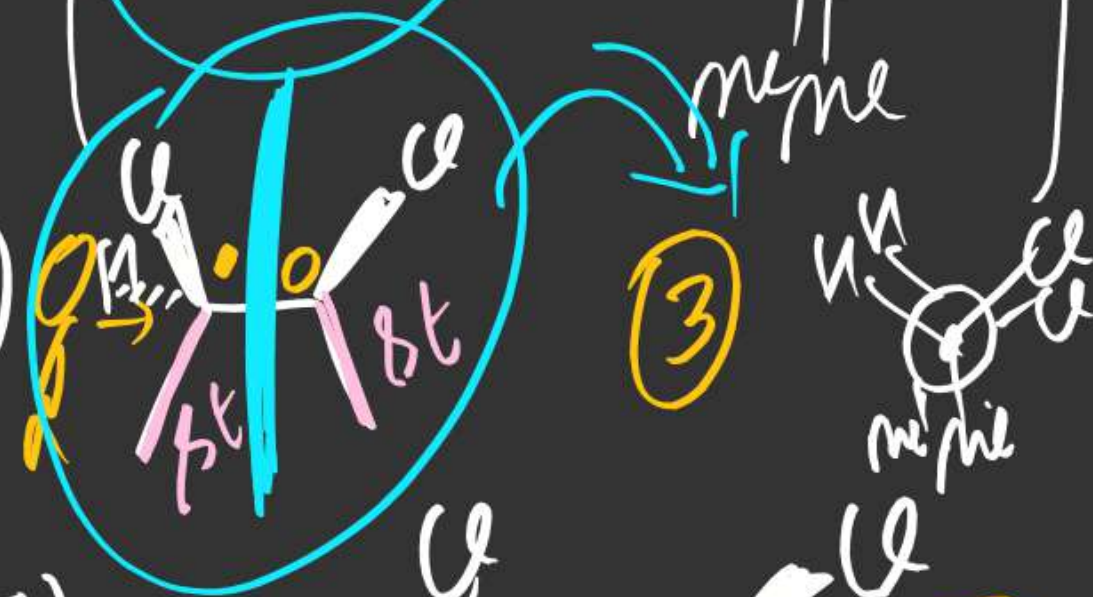
(26)



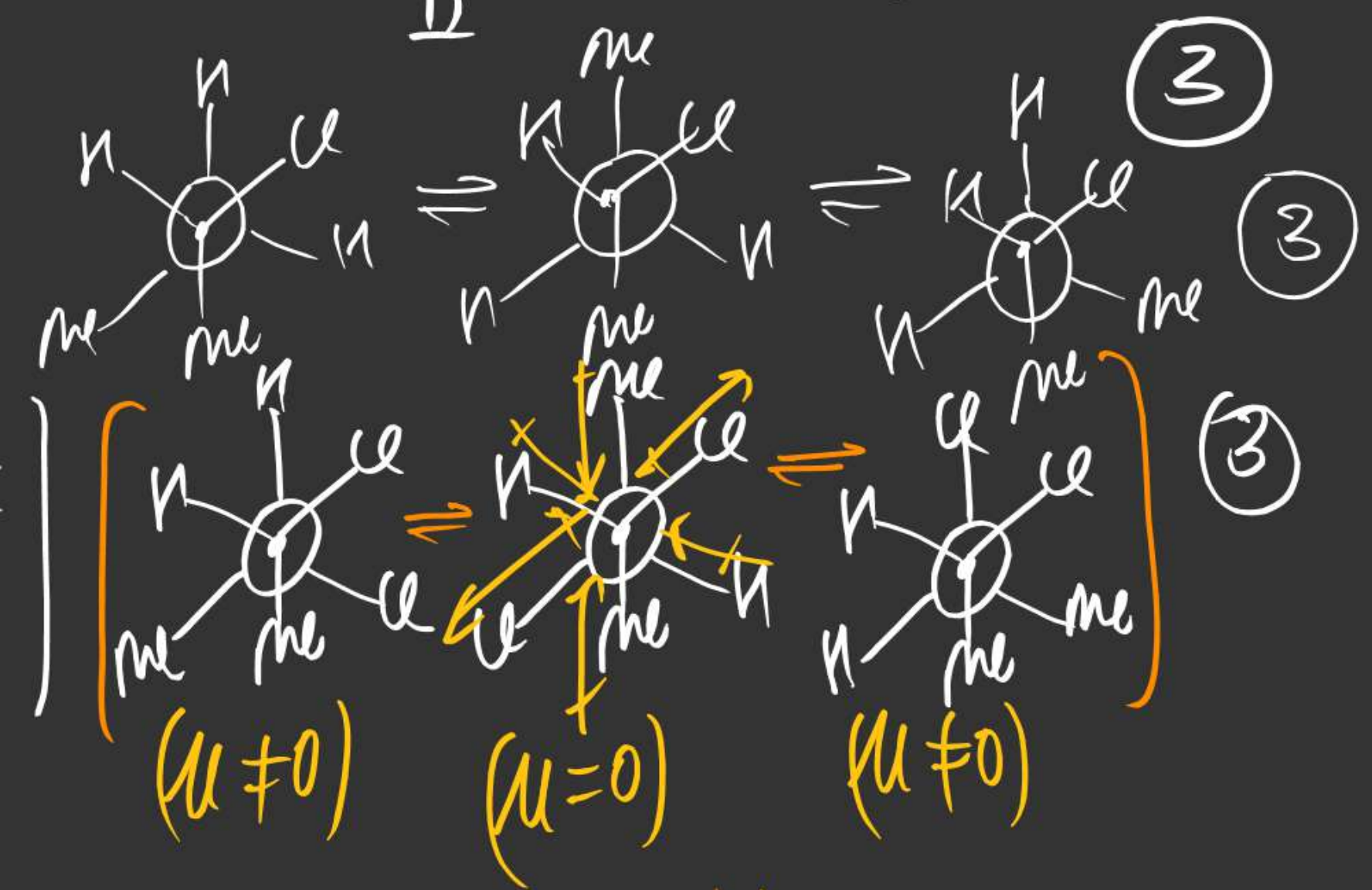
(27)

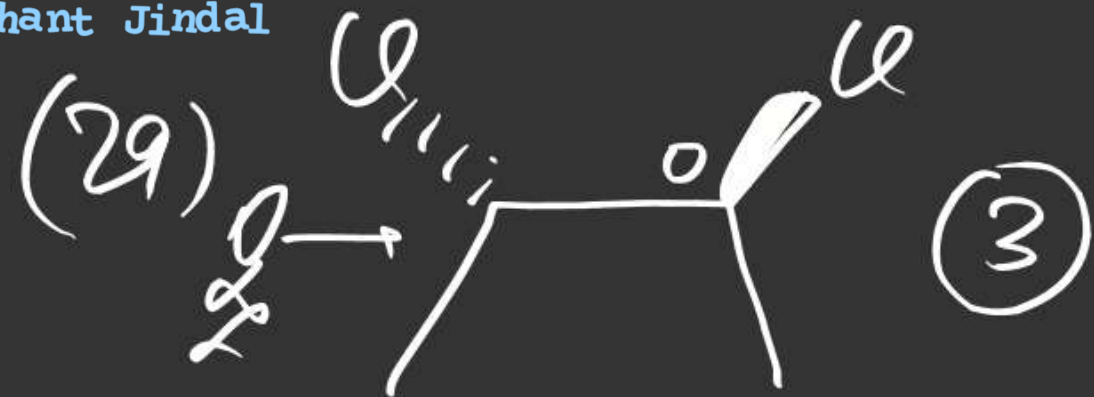


(28)

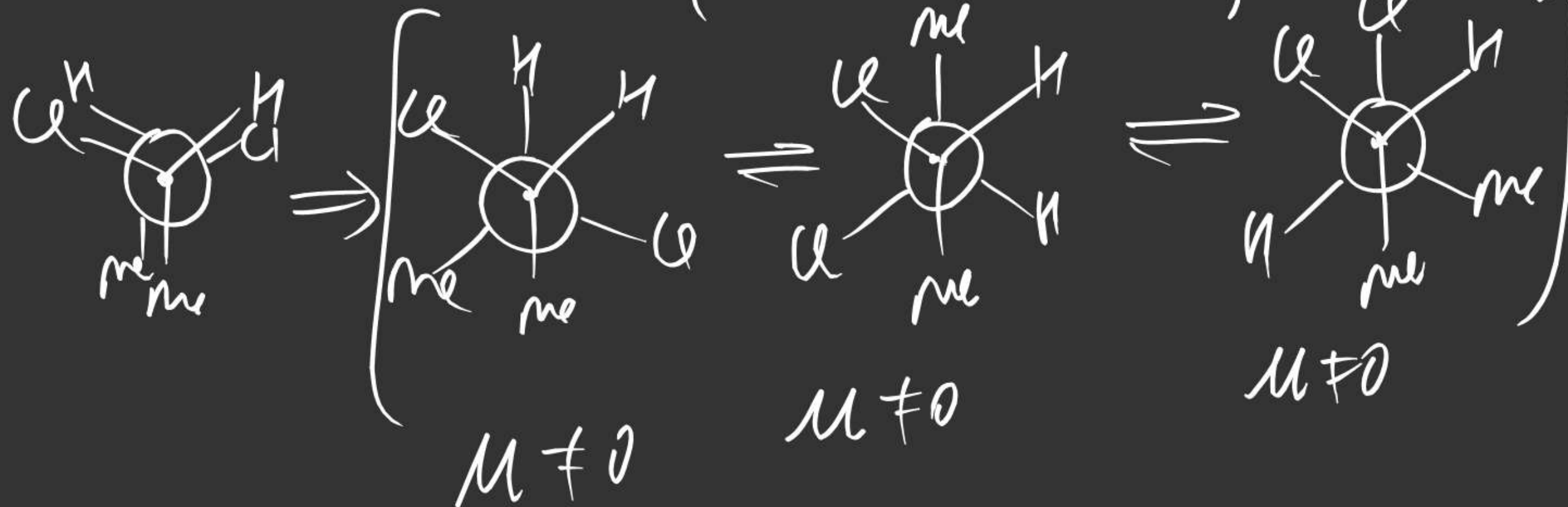


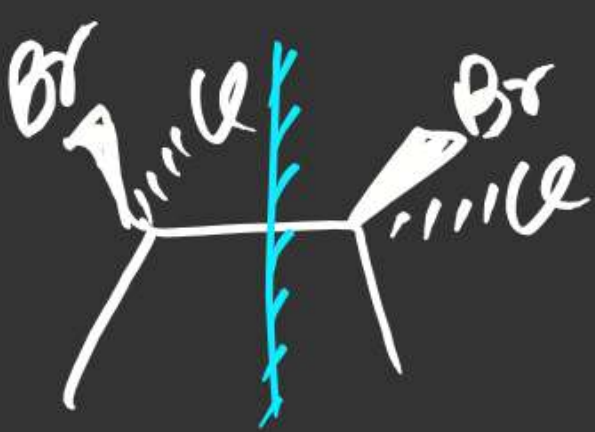
(29)





Total stable Conformation = 3
 [Total stable Conformation = 3
 with $n \neq 0$]





Total stable Conformation = 3

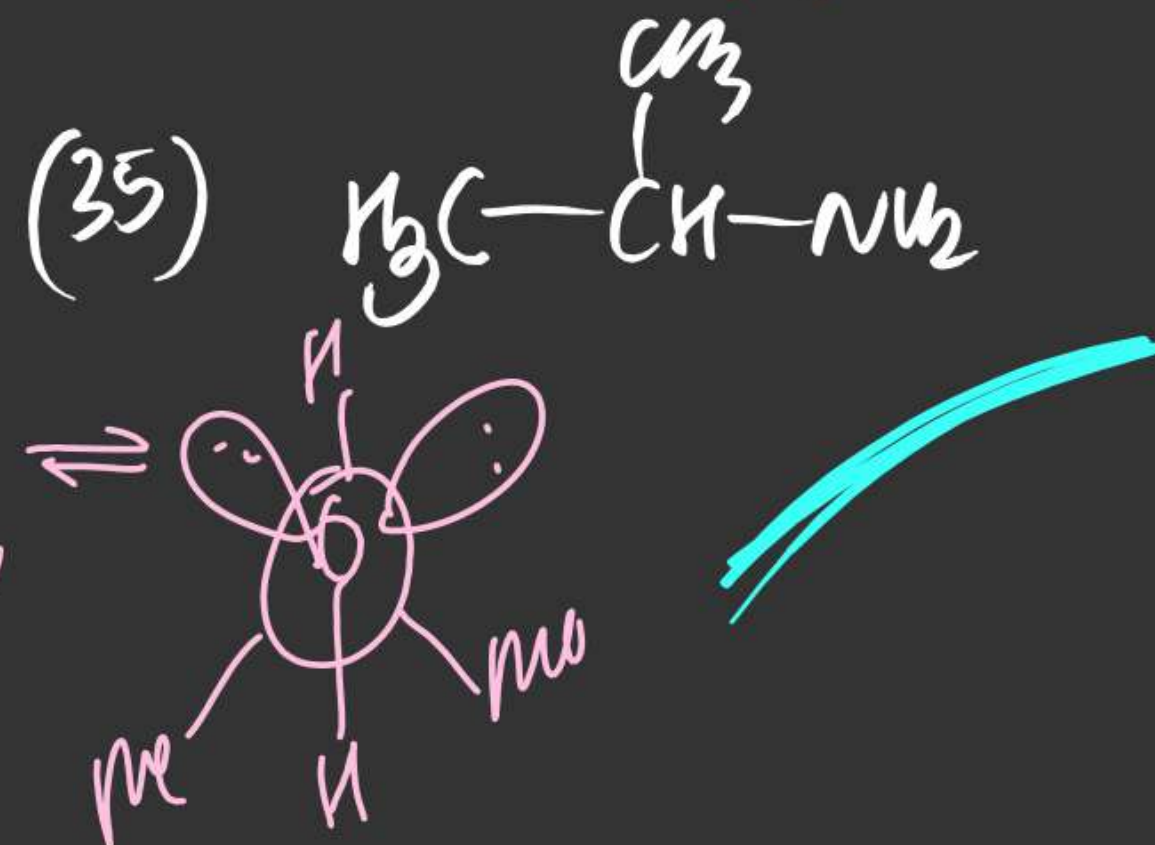
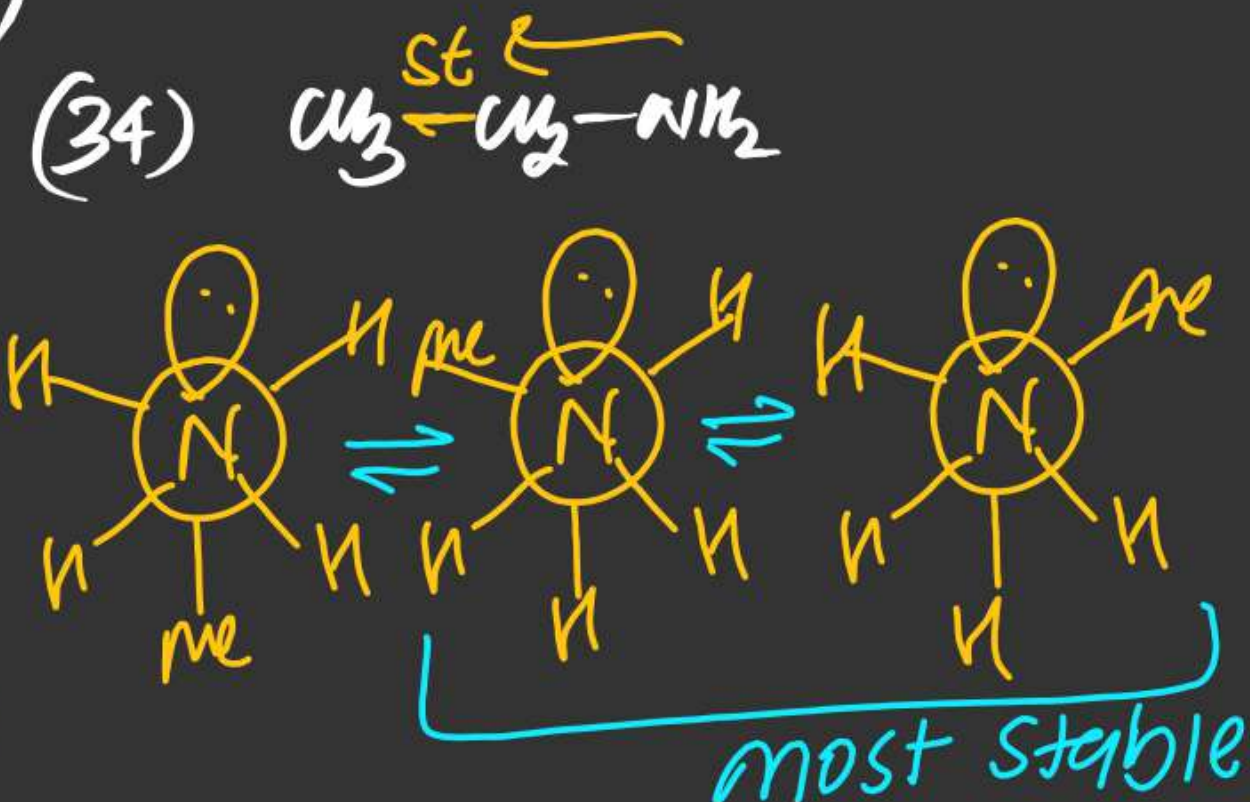
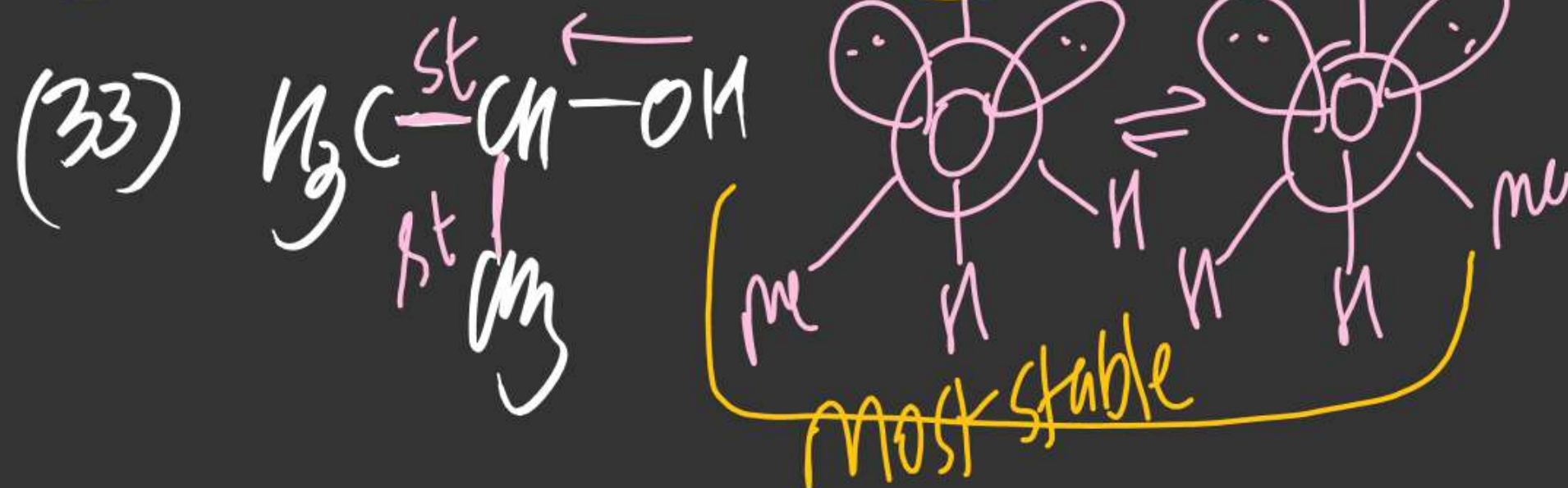
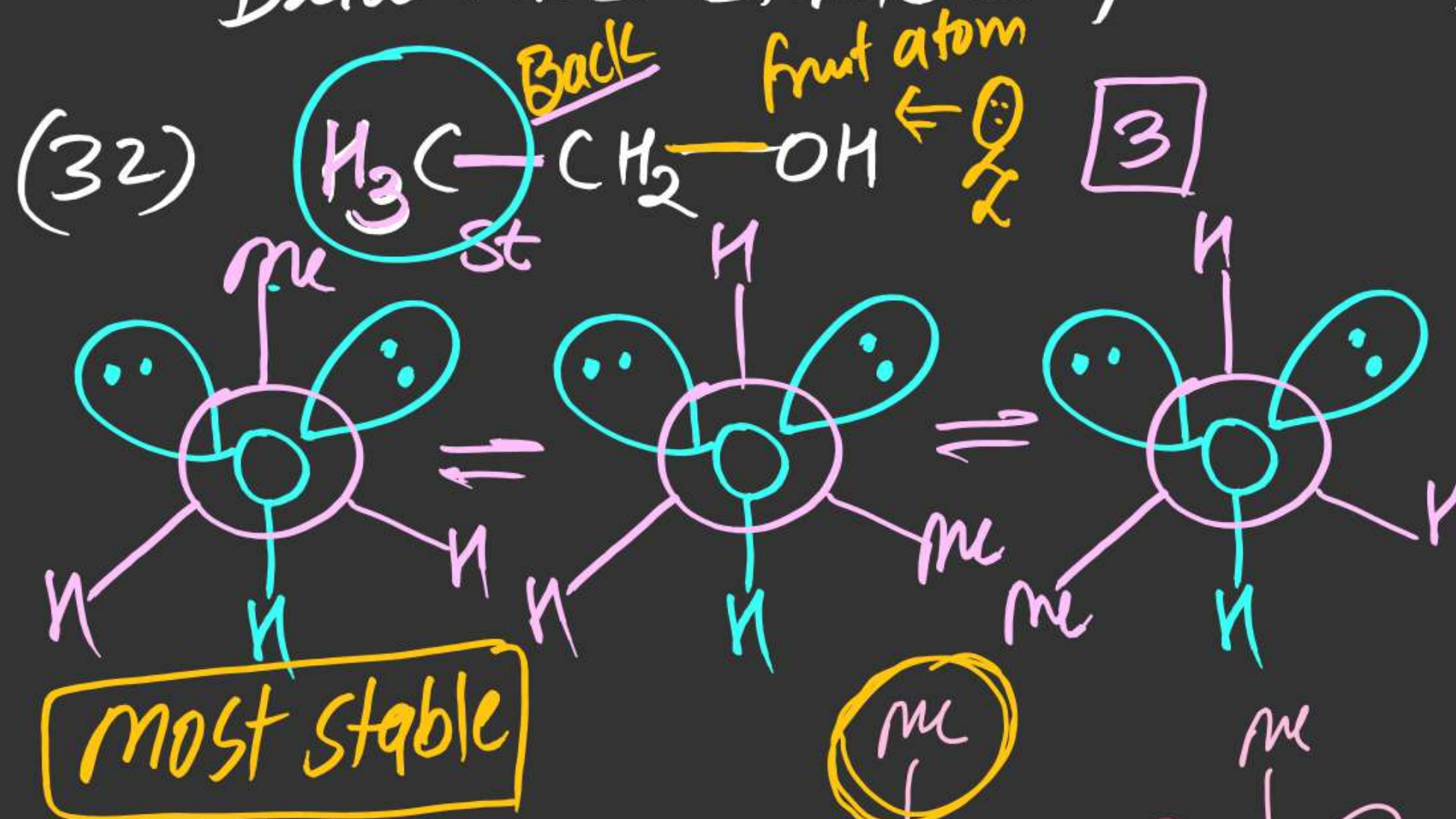
Total stable Conformation with $\mu \neq 0 = 2$



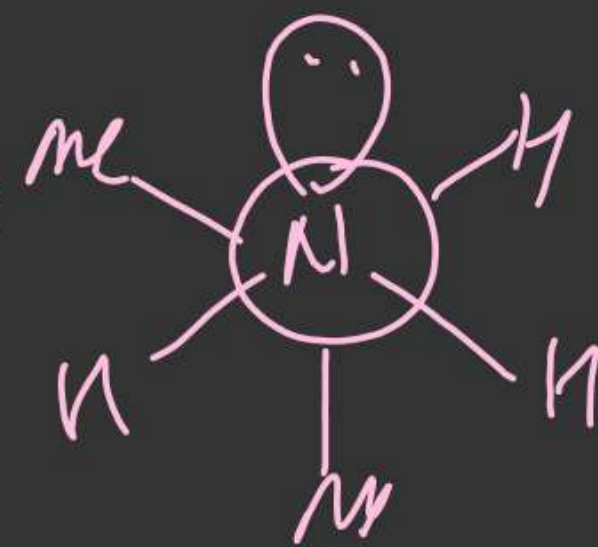
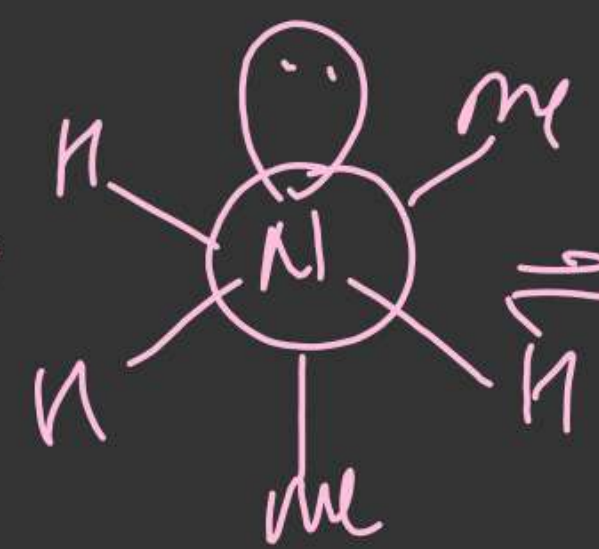
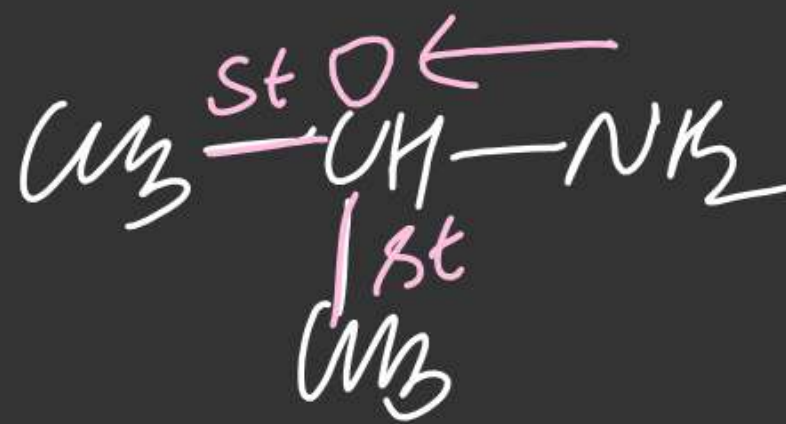
Total stable Conformation = 3

Total stable Conformation with $\mu \neq 0 = 3$

Draw most stable Conformation



(35)

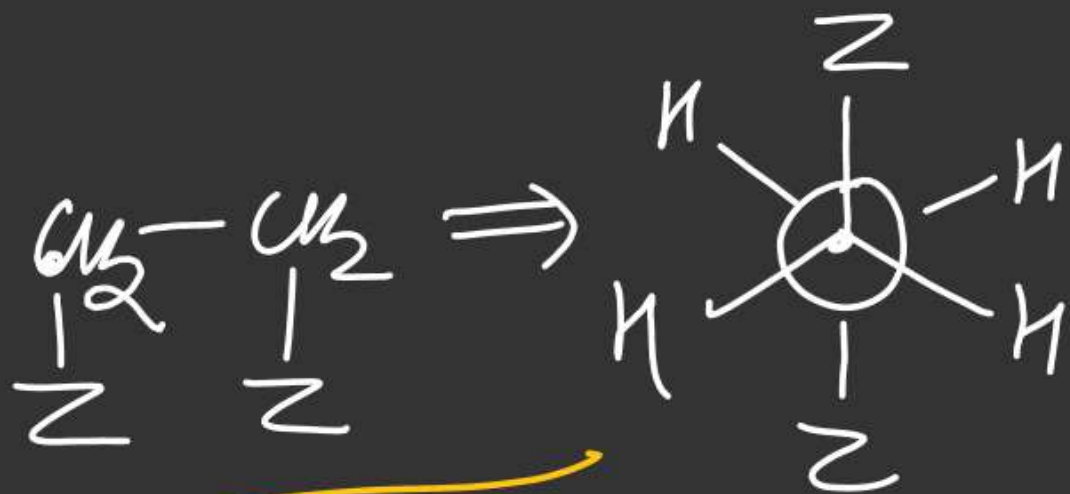


most stable

(#) Dipole moment for Compound showing!

Conformation

Ex-1!



$(\mu_{\text{net}} \neq 0)$

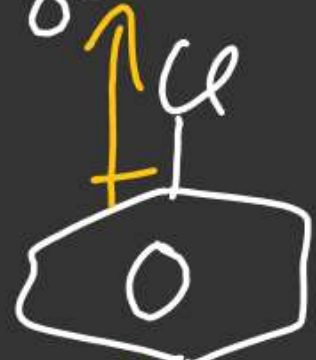
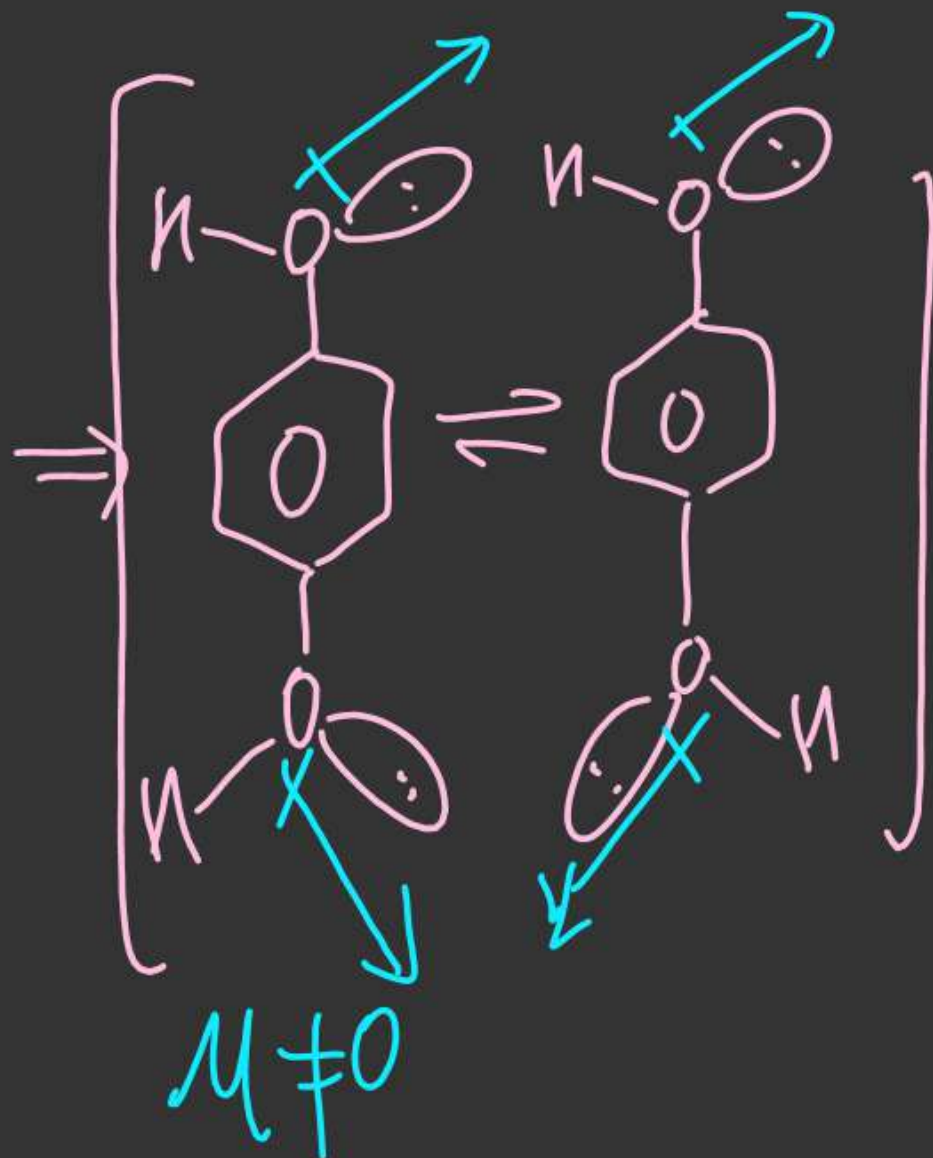
$(\mu = 0)$
Anti



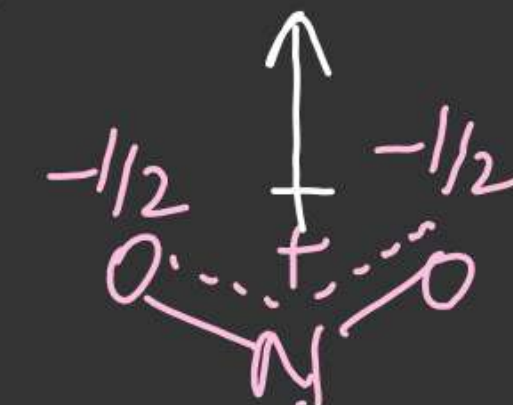
$(\mu \neq 0)$
Gauche

Q-2! Find Compounds with Non zero dipole moment.

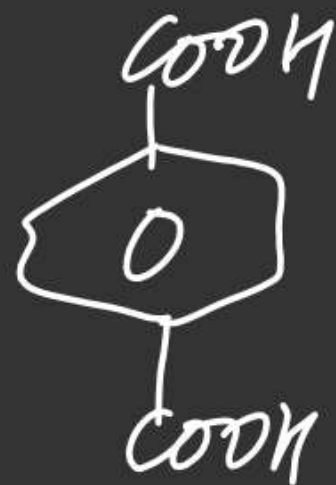
(i)

 $(\mu=0)$  $(\mu \neq 0)$  $\mu \neq 0$ 

(iii)

 $\mu \neq 0$  $\mu \neq 0$ 

(V)

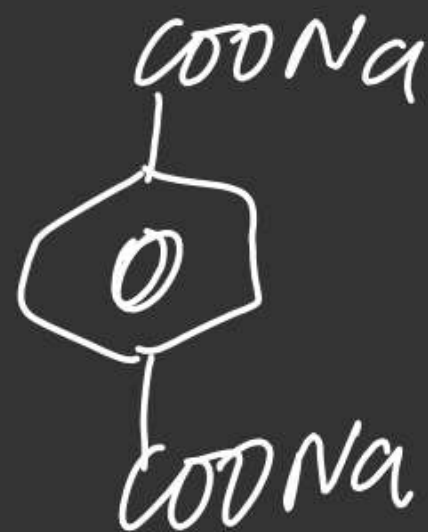


~~Ex-31~~
~~Adv~~

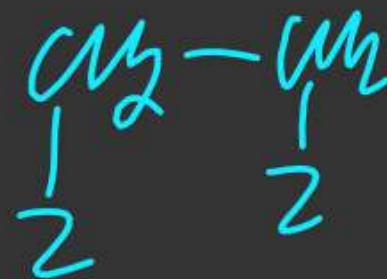
Calculate dipole moment of gauche conformation if net dipole moment is 1 D & mole fraction of anti

Conformation is $0.82 \left(\frac{\mu_a}{2} - \frac{\mu_g}{2} \right)$. Formula can be used

(VI)



Soln



$$\mu_a = 0$$

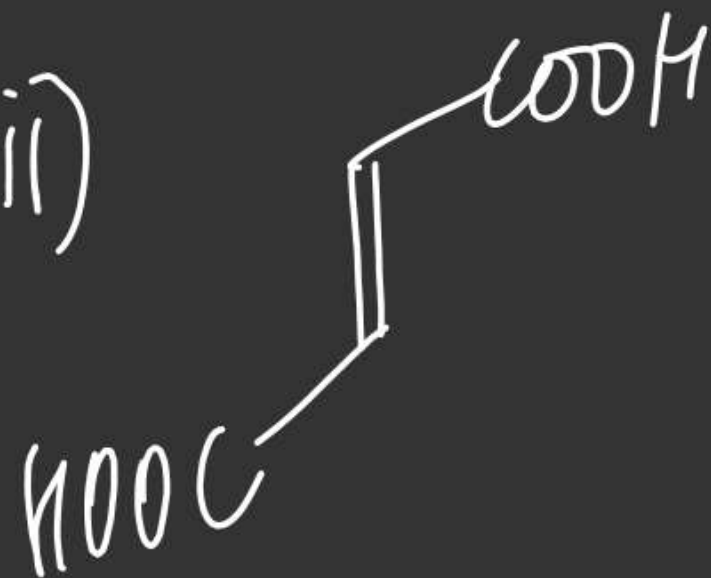
$$\mu_{net} = 1 \text{ D}$$

$$x_a = 0.82$$

$$\mu_g = ?$$

$$x_g = ?$$

(VII)



$$\mu = \sum \mu_i x_i$$

$x_i \Rightarrow$ mole fraction of stable conformation

$$\mu_{net} = \mu_a x_a + \mu_g x_g$$

$$\Rightarrow 1 = 0 \times (0.82) + \mu_g (1 - 0.82)$$

$$\Rightarrow 1 = 0.18 \mu_g \Rightarrow \boxed{\mu_g = \frac{1}{0.18} = 5.55 \text{ D}}$$

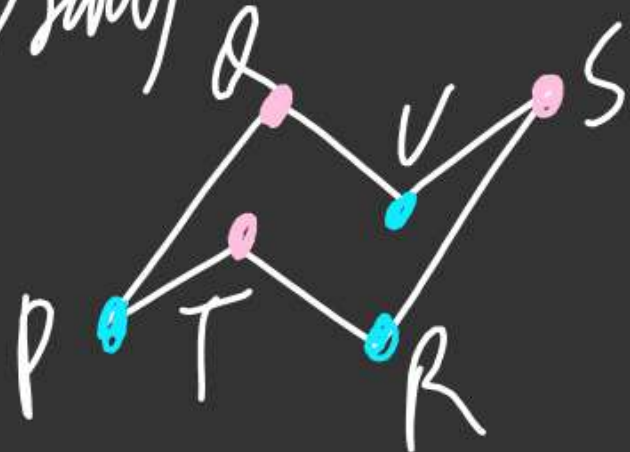
Conformations of Cyclic Compound:

⇒ Cycloalkanes are not planar (except cyclopropane) & exist in various non planar conformational forms.

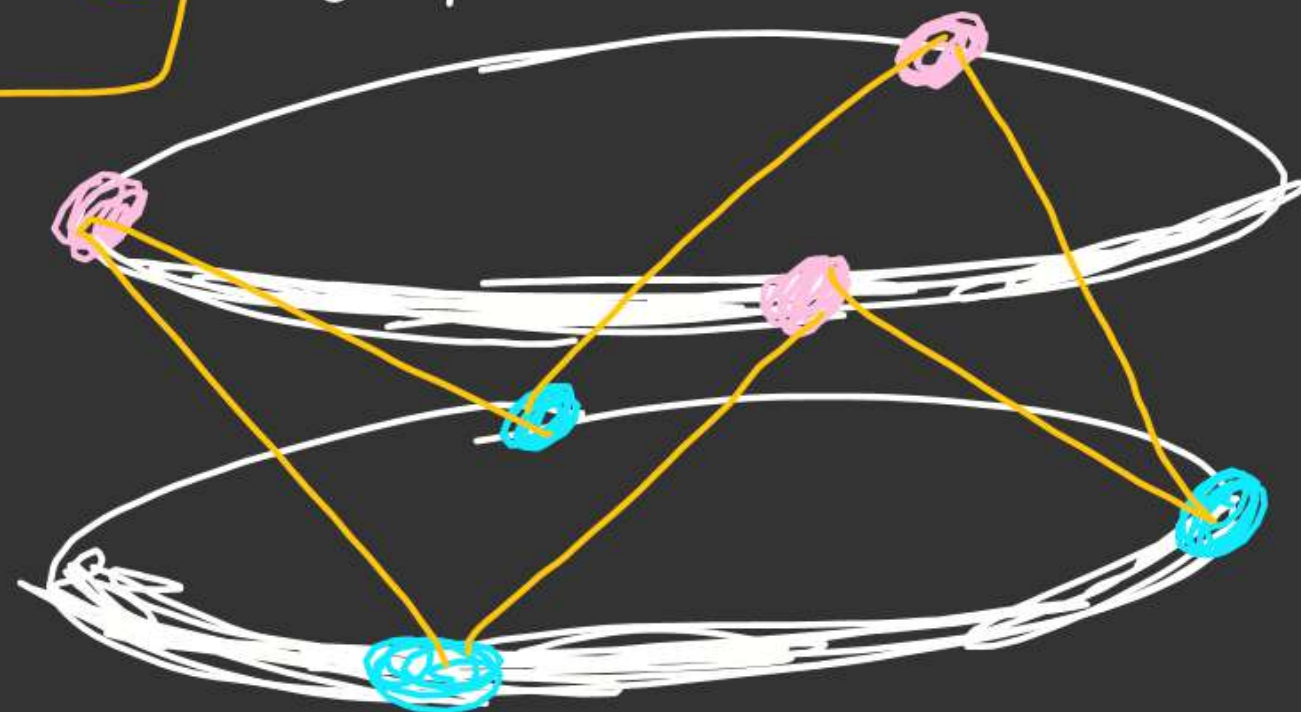
Conformations of Cyclohexane C_6H_{12}

(1) Chair Conformation:

(How to Draw)

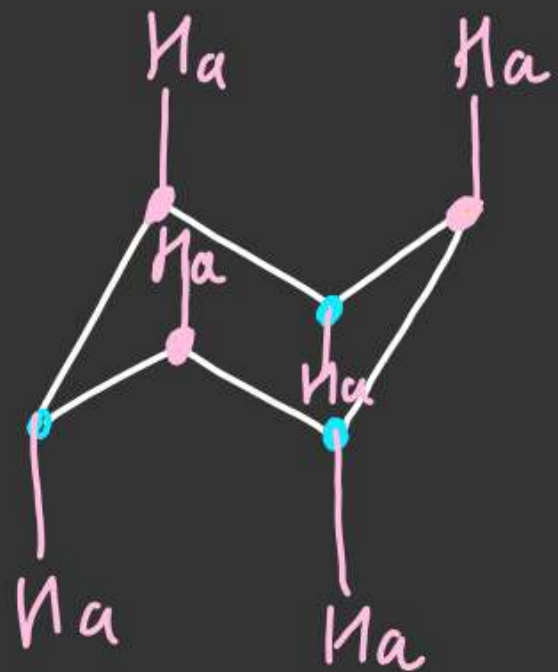


$PQ \parallel RS$
 $QV \parallel TR$
 $VS \parallel PT$

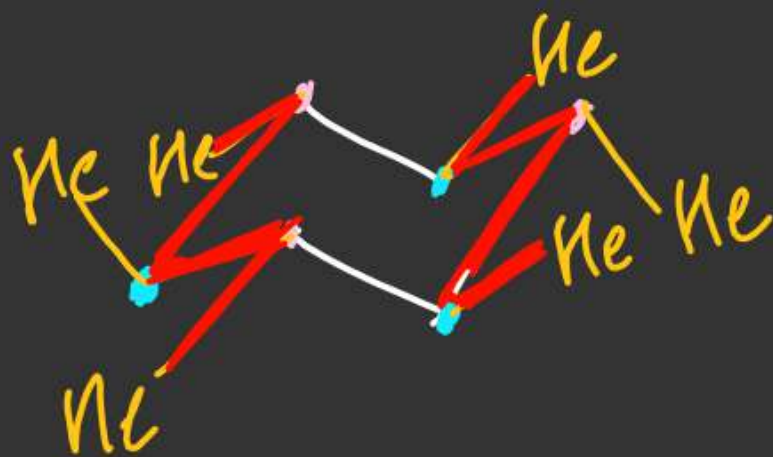


Bonding pattern:-

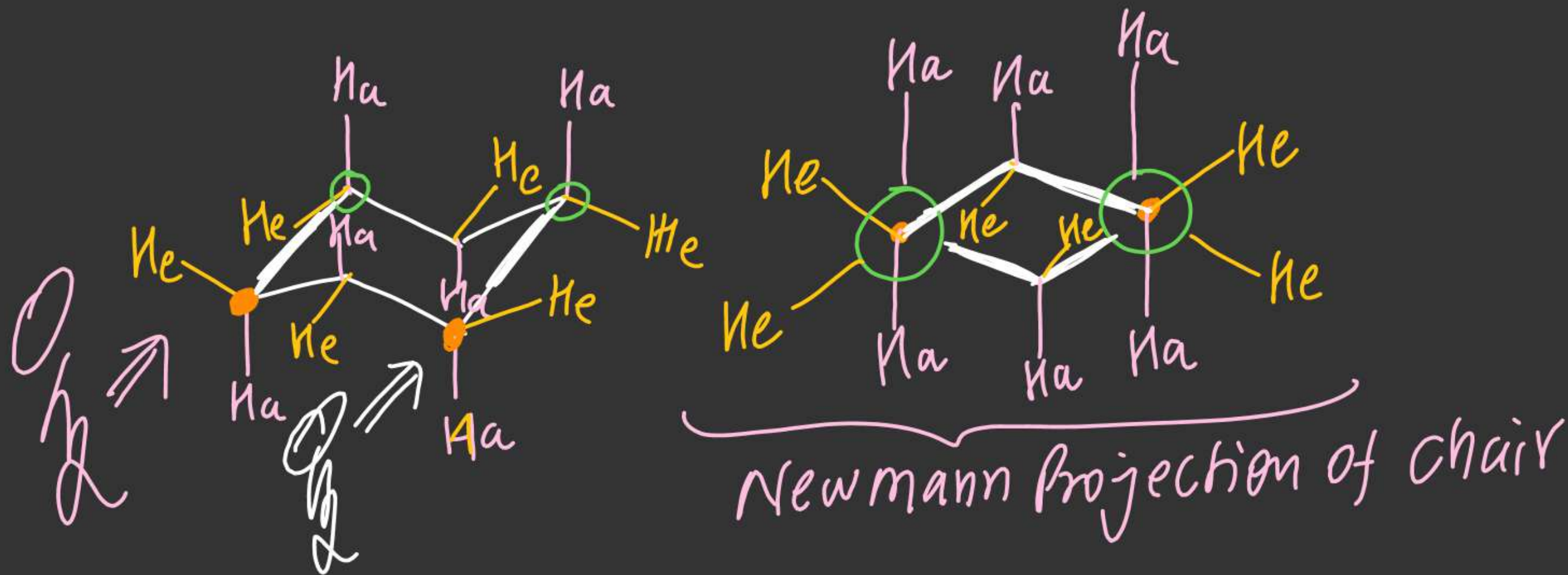
(a) Axial Bond (a)



(b) Equatorial Bond (e)

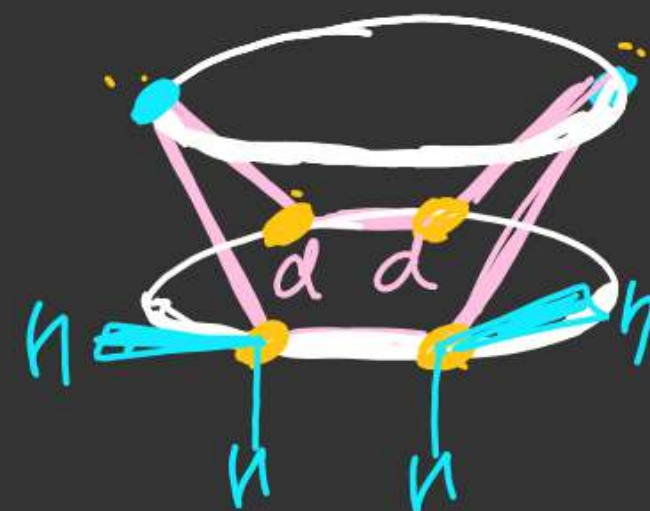
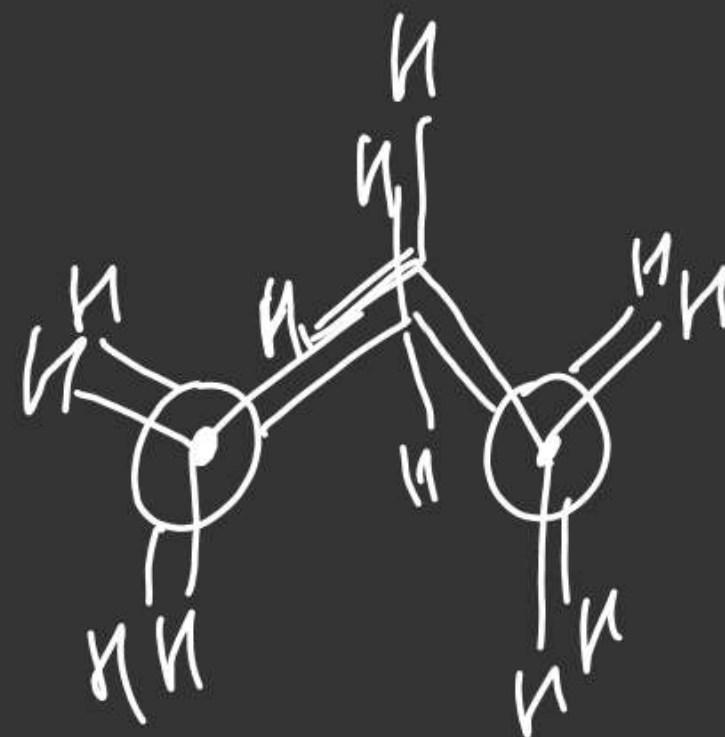
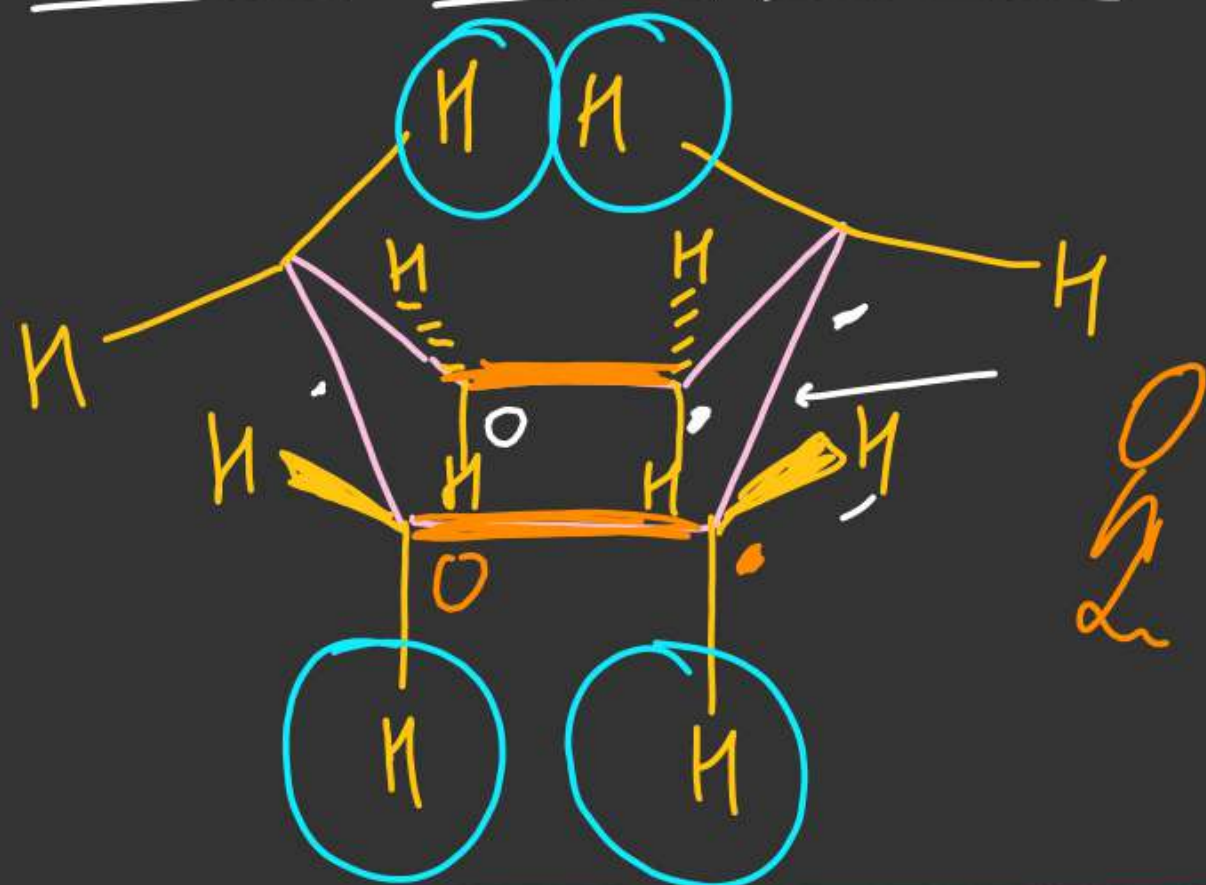


Complete chair Conformation



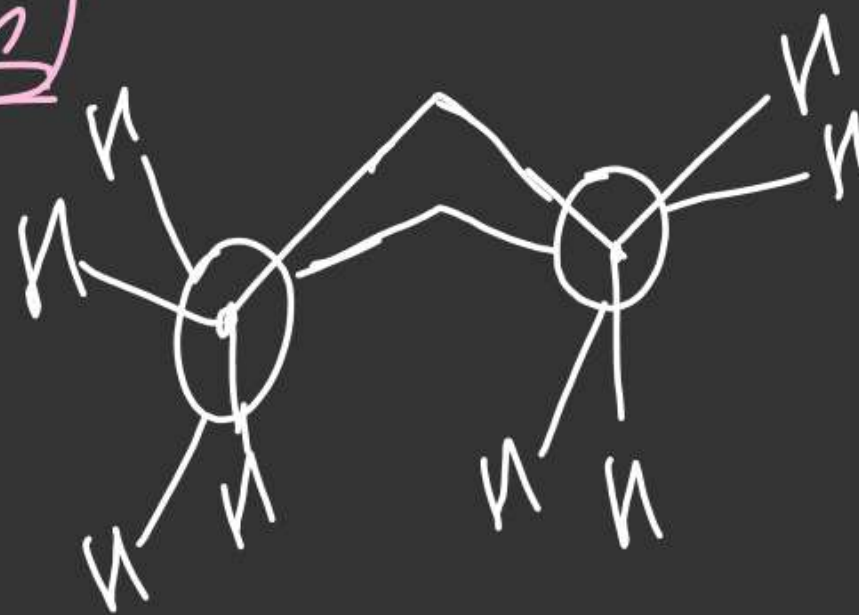
All 6 (C-C) Bond \Rightarrow Gauche Conformation

(2) Boat Conformation!

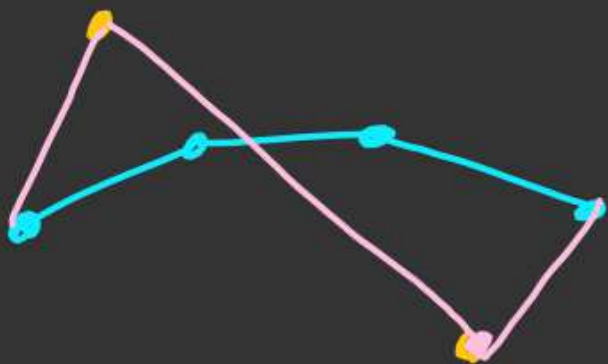


4(C-C) Bond \Rightarrow Gauche
2(C-C) Bond \Rightarrow Eclipsed

(3) Twist Boat Conformation

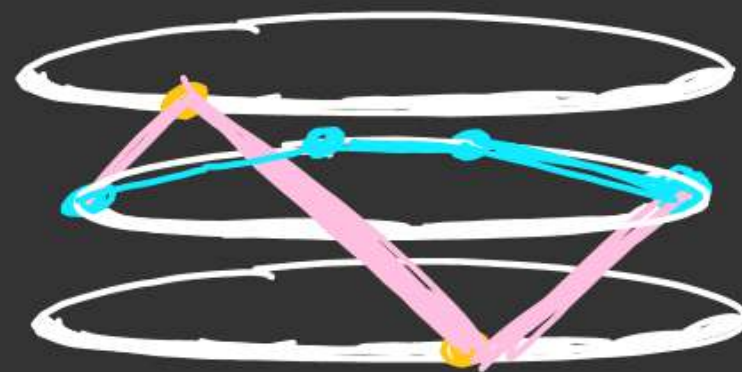


(4) Half chair Conformation

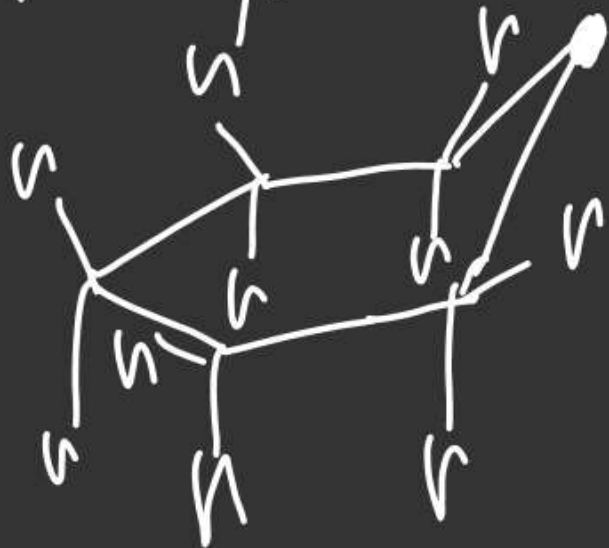


$3(C-C) \Rightarrow$ gauche

$3(C-C) \Rightarrow$ eclipsed.



(5) Half Boat Conformation



$4(C-C) \Rightarrow$ eclipsed

$2(C-C) \Rightarrow$ gauche

Stability order:

chair > T. Boat > Boat > H-chair > H-Boat

Potential Energy order:

H-Boat > H-chair > Boat > T-Boat > chair

Potential Energy Diagram