

STEREOISOMERISM

HW (Discussion) Theory Copy:



$n=3$ (odd) & Symmetrical

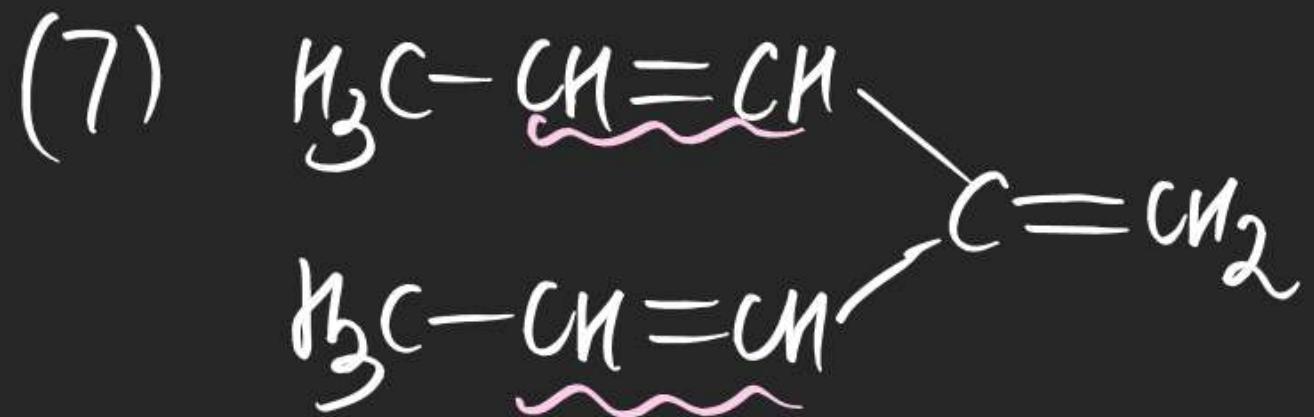
$$TGI = 2^{n-1} + 2^{\frac{n-1}{2}}$$

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

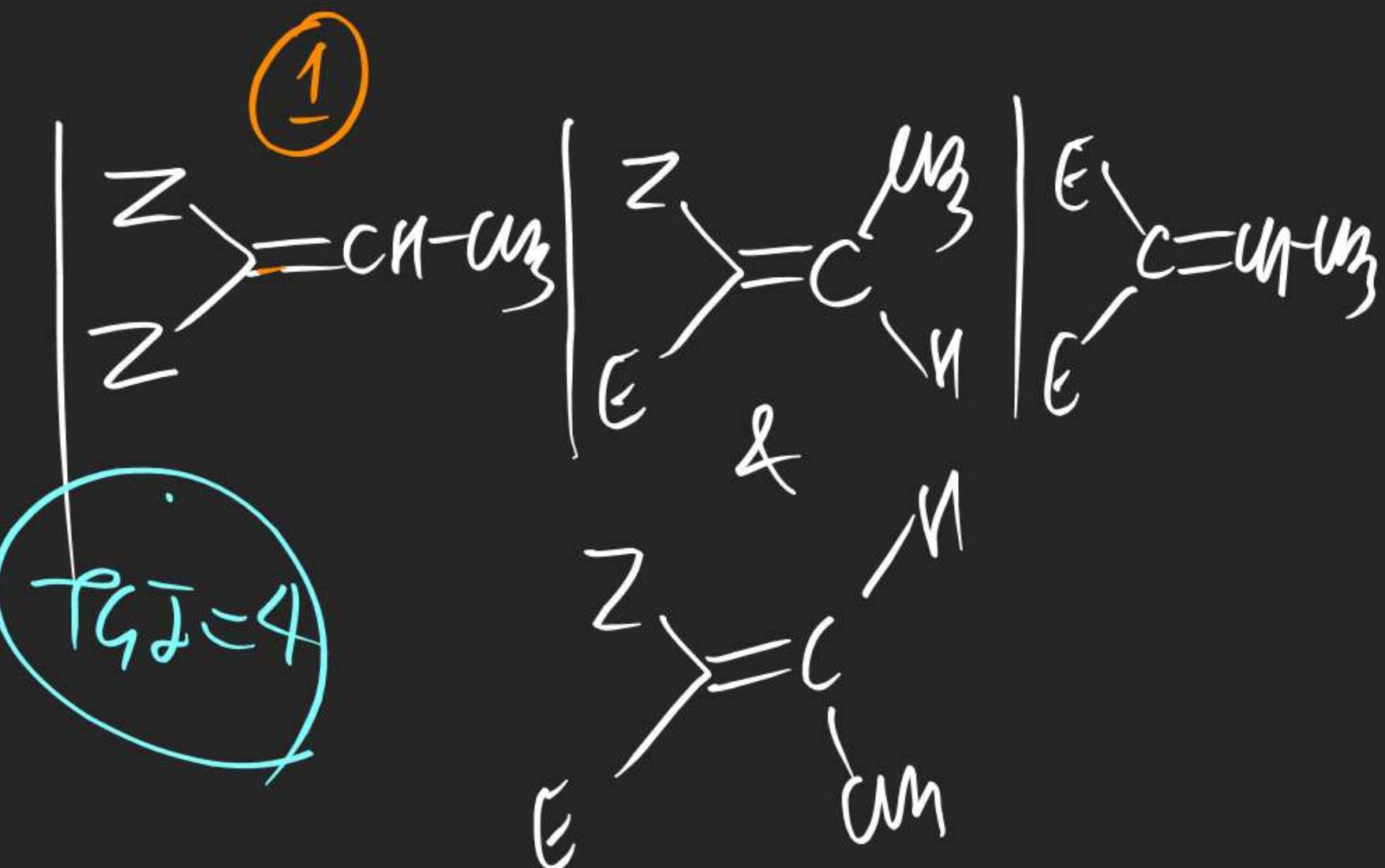
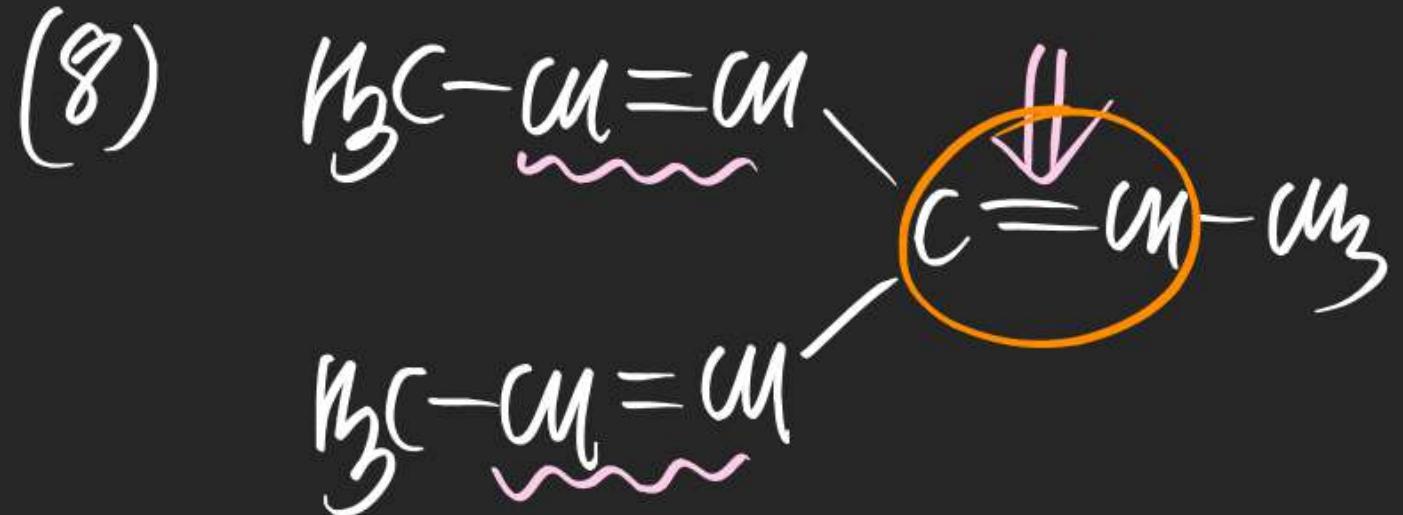


$$TGI = 2^3 = 8$$

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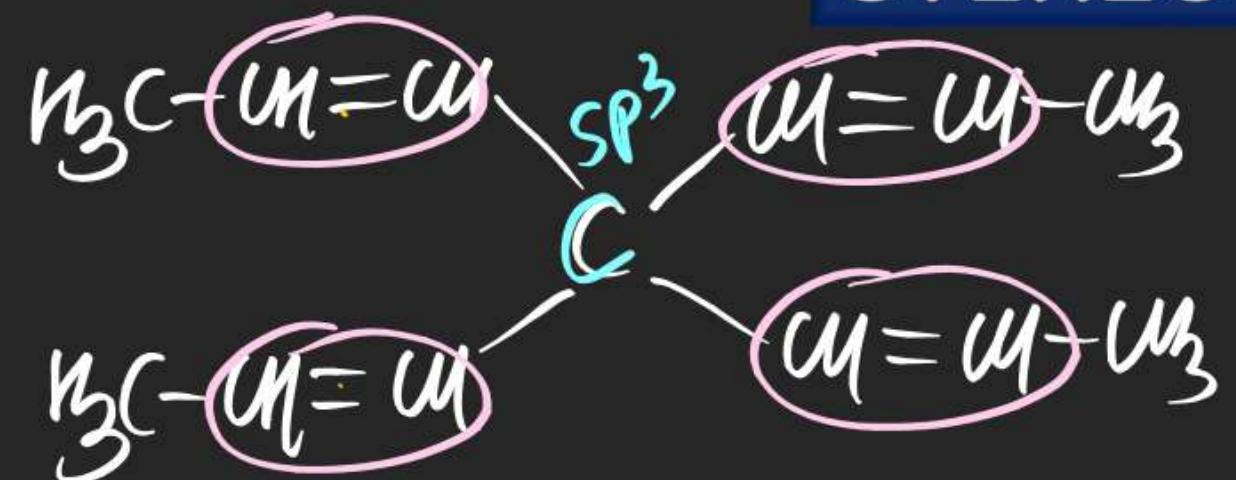


(TGI = 3)

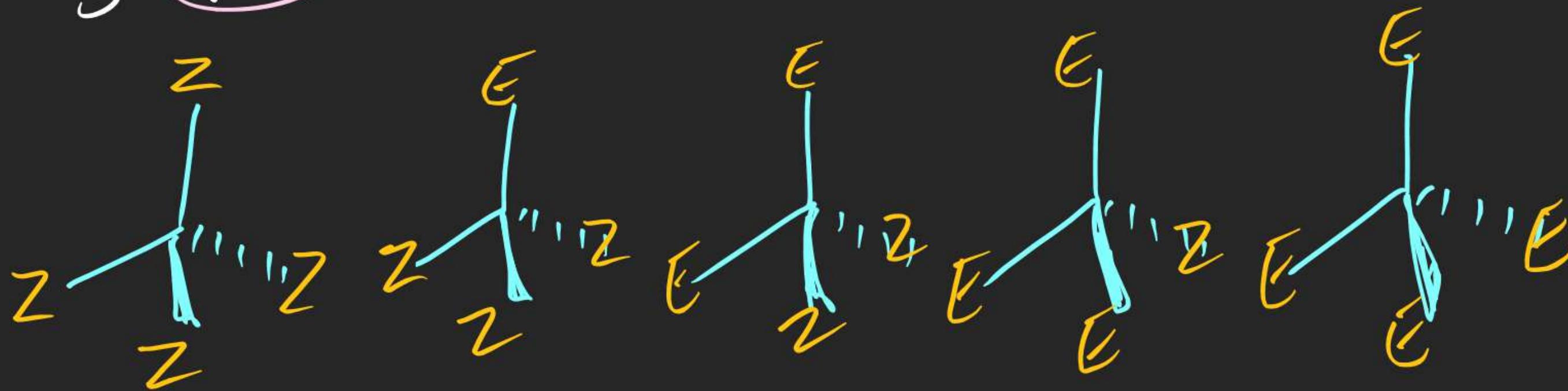


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(10)

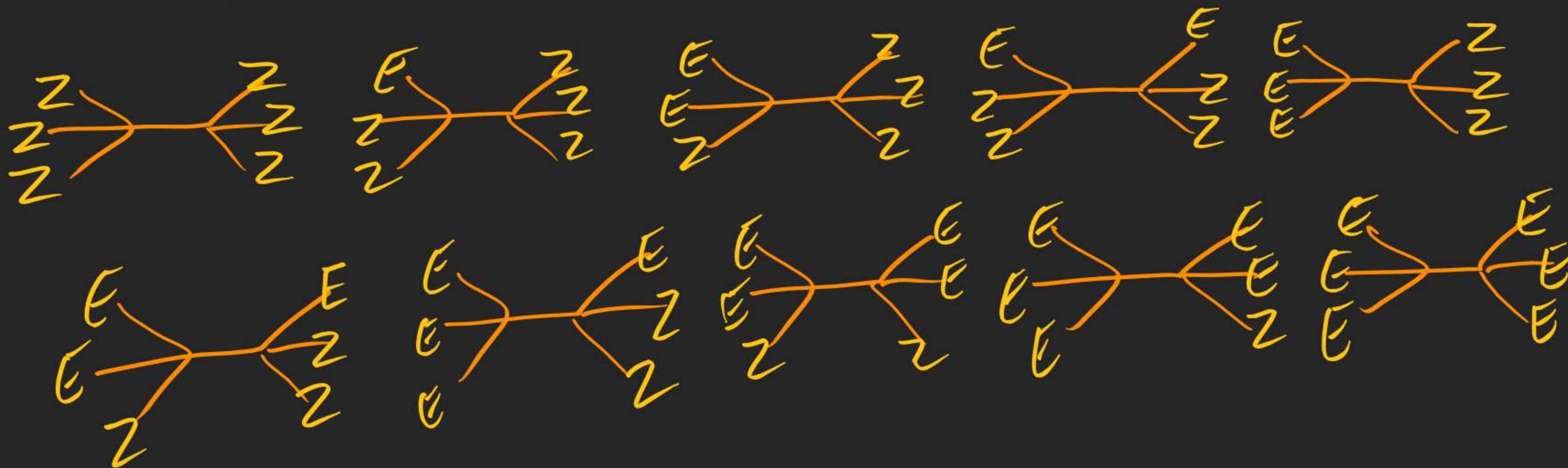
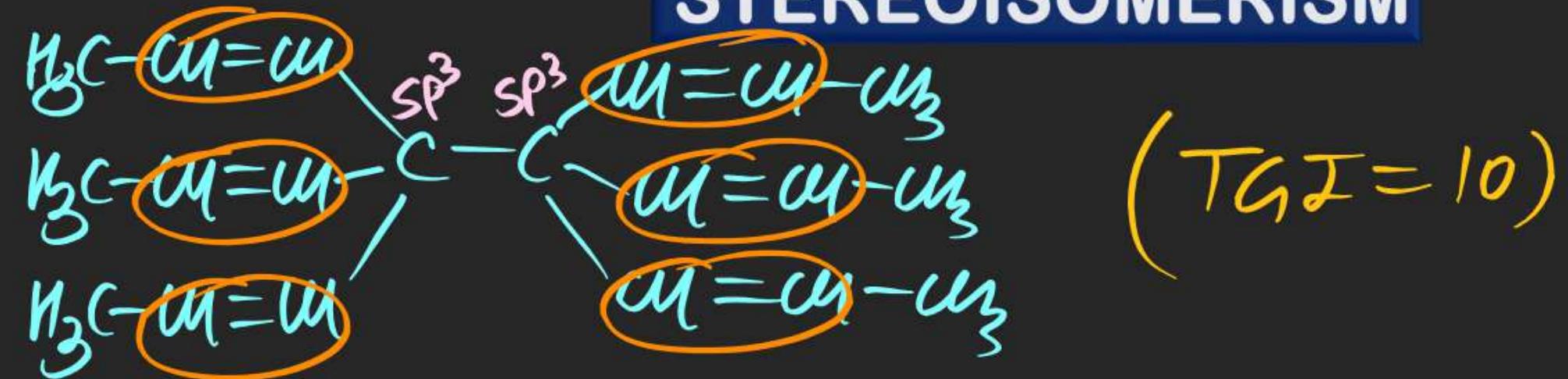


TGF = 5

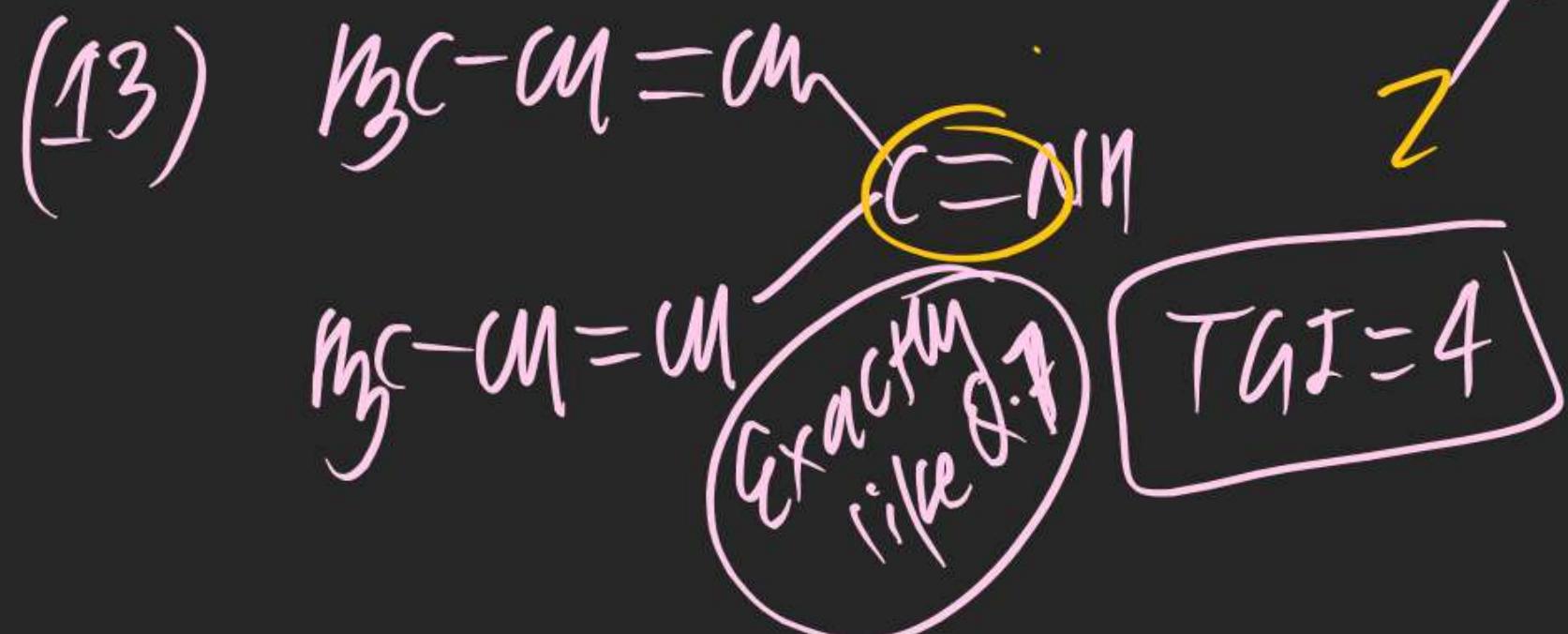
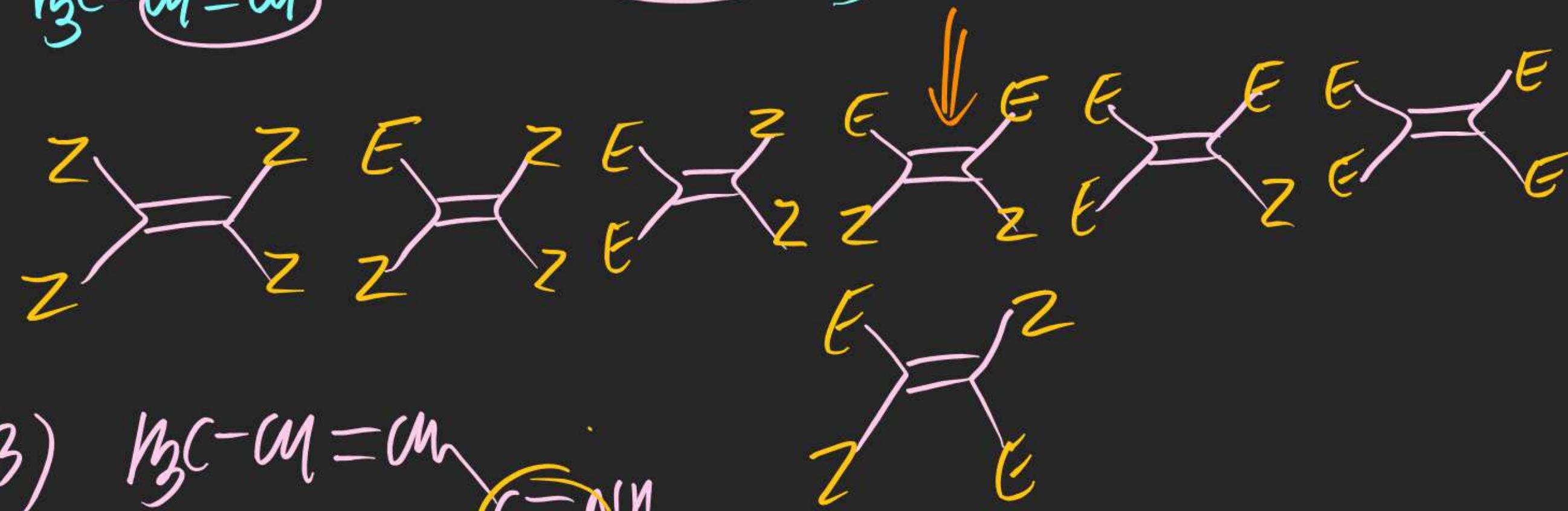
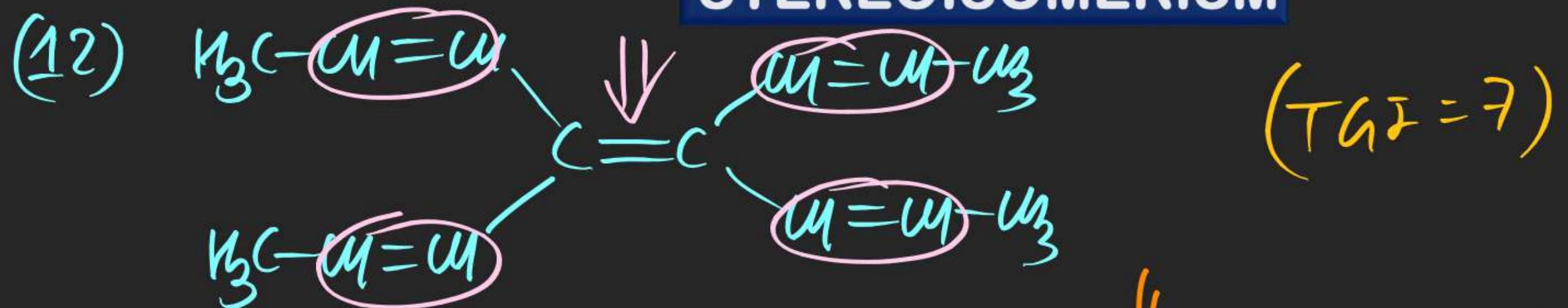


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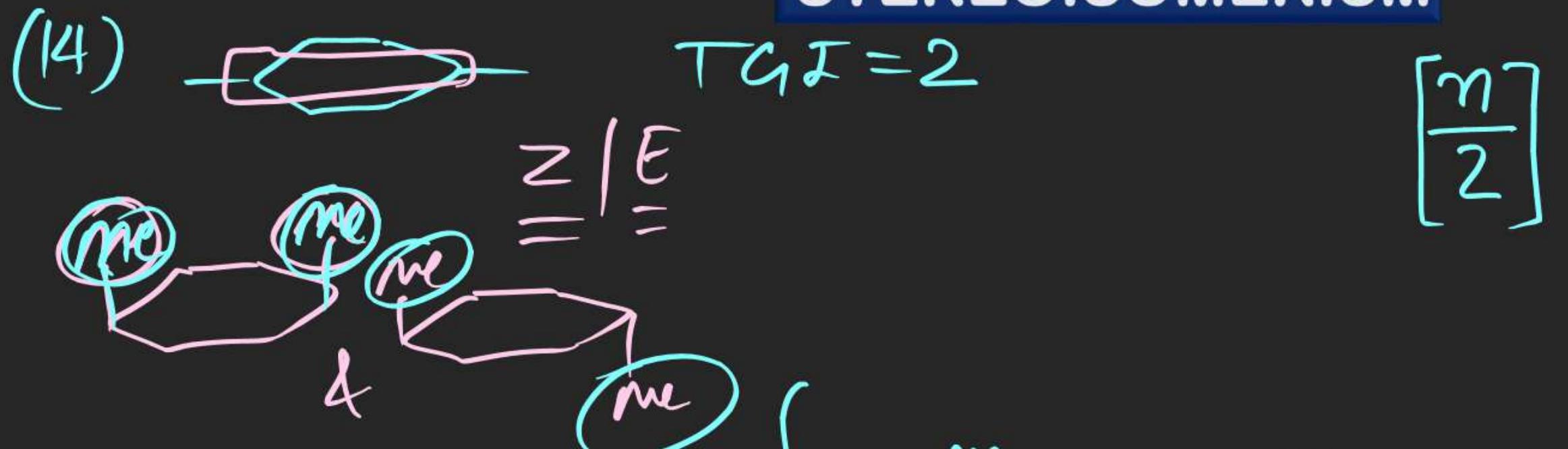
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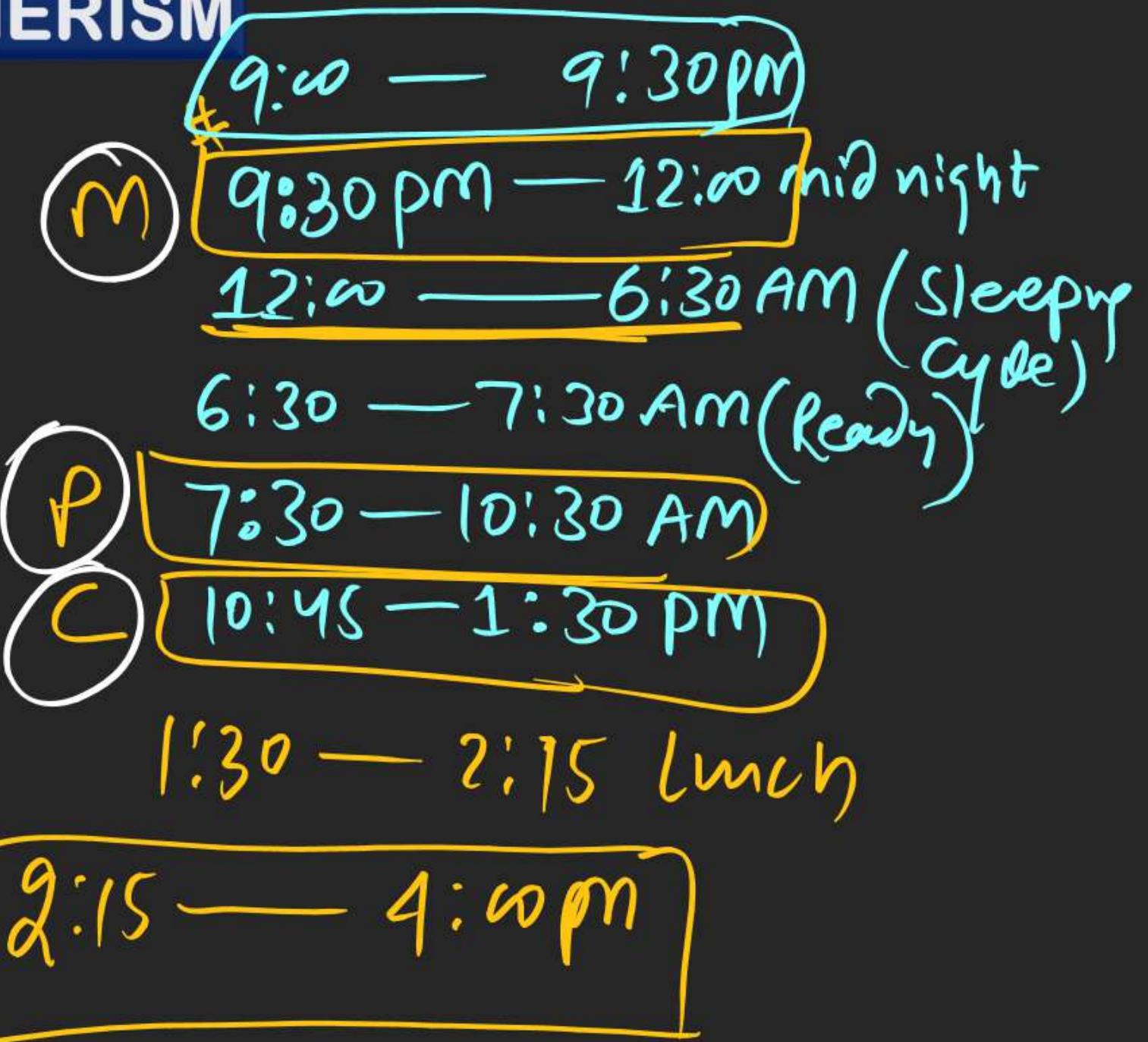


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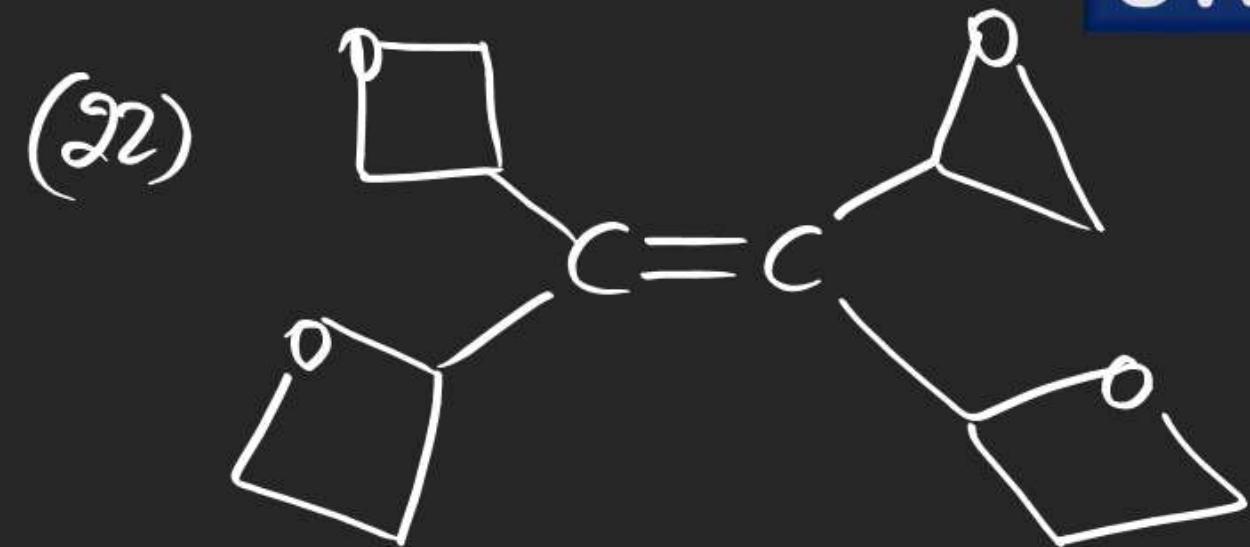


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9^{PM} — 10^{PM} — M
10 — 11 — P
11 — 12 — C



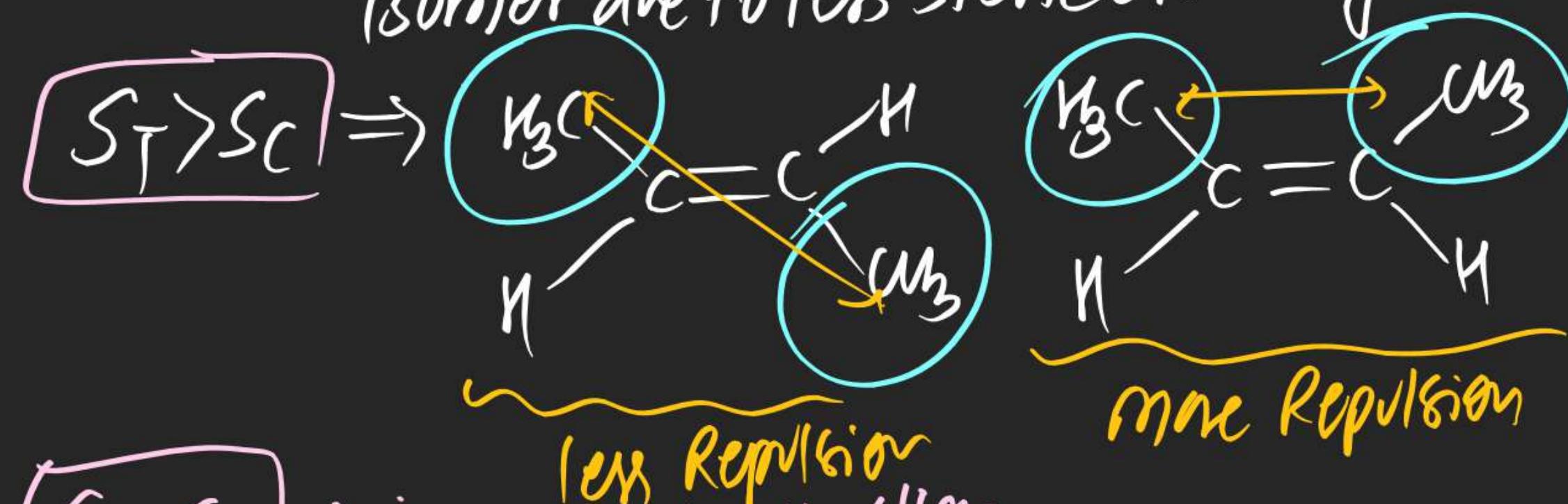
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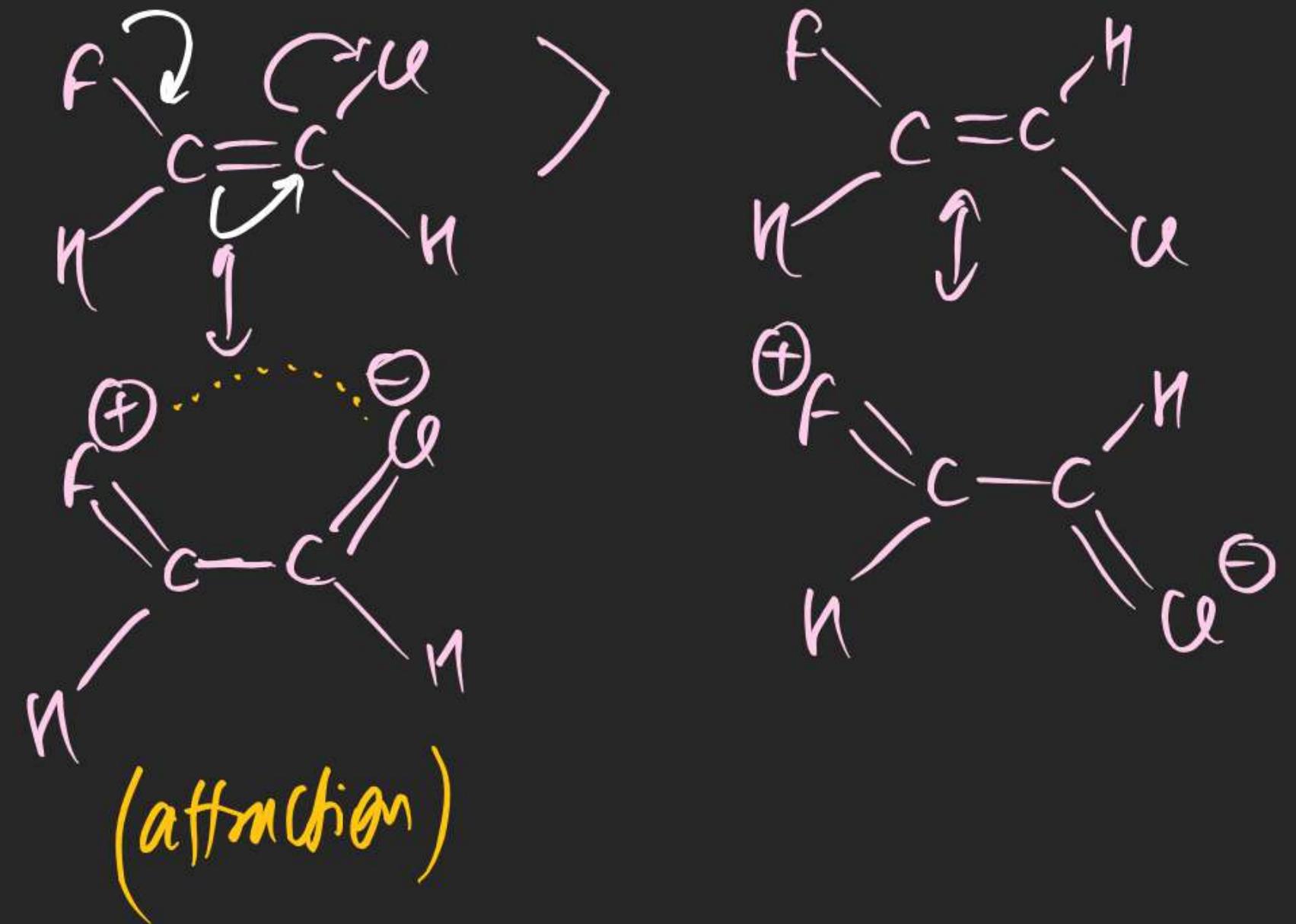
(#) Properties of Geometrical Isomers:

(1) Stability: usually **T** isomer is more stable than **cis** isomer due to less steric crowding



$S_c > S_T \Rightarrow$ in case of attraction

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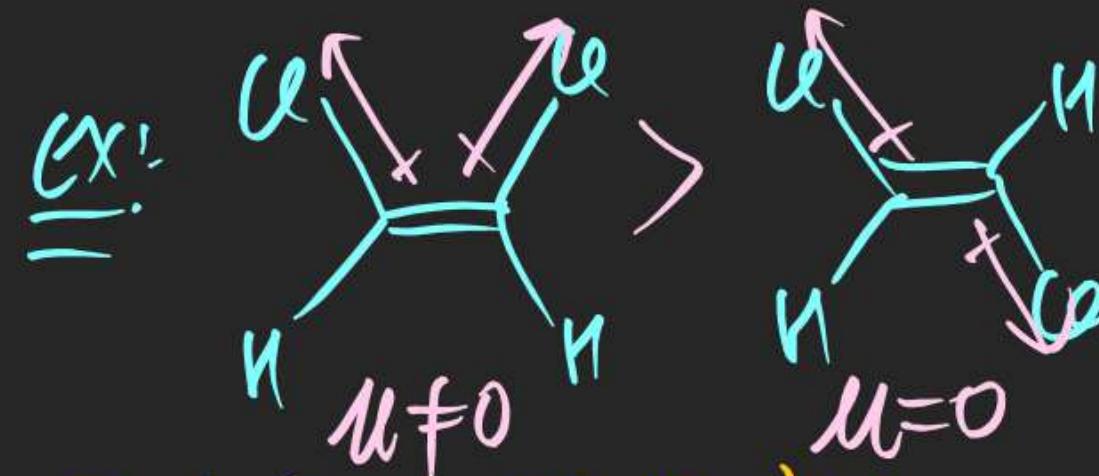
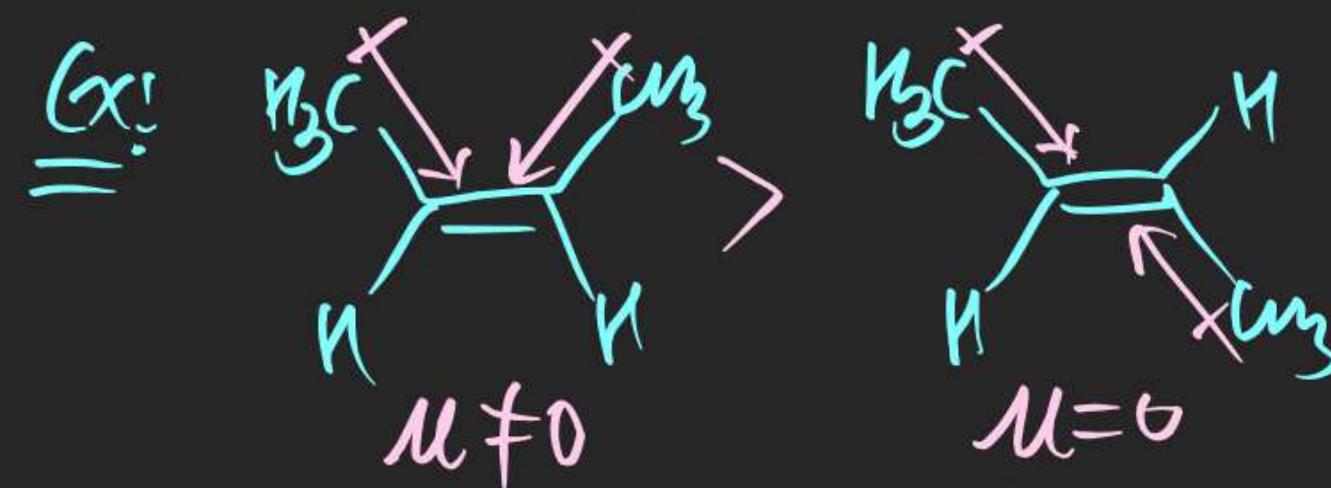


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4am - 11am
gam - 11am

(2) Dipole moment:

$\mu_c > \mu_T \Rightarrow$ If attached groups contain same nature



$\mu_T > \mu_c \Rightarrow$ If attached groups contain opp. nature.



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(3) Boiling Point:

Boiling point $\propto \mu$

Ex:



$$BP_c > BP_T$$

(4) Melting point:

Melting point \propto packing fraction

$MP_T > MP_c$

\Rightarrow Since Trans isomer has
highly packing fraction
than Cis isomer.

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OPTICAL ISOMERISM

Symmetry in Organic Compounds:

(1) Alternating Axis of Symmetry (AAS) / S_n

or
Improper Axis of Symmetry

or
 n -fold Alternating Axis of Symmetry

(2) Axis of Symmetry (AOS) / C_n

or
 n -fold Axis of Symmetry

There are Two type of Symmetry

$n=1 \rightarrow S_1$ Plane of Symmetry

(POS) / σ_n

$n=2 \rightarrow S_2$ Centre of Symmetry

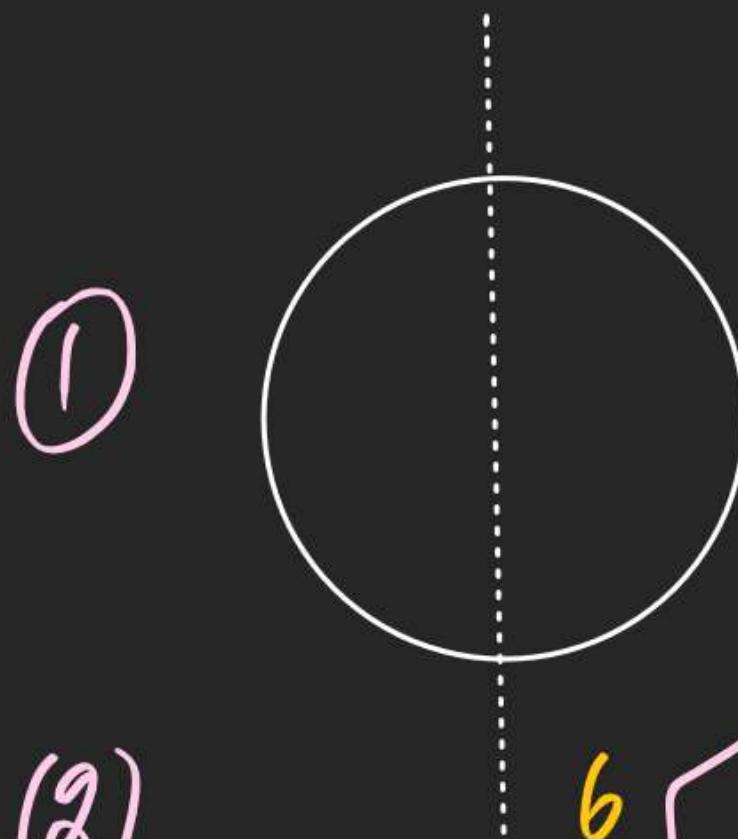
(COS)
OR

Centre of Inversion
(Ci)

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(1) Plane of Symmetry:

It is defined as a Imaginary Plane, across which when a object a molecule is divided into two halves then these halves must be exact mirror images of each other.



①

(2)



$POS = \infty$

molecular plane
 POS

1,4
2,5
3,6

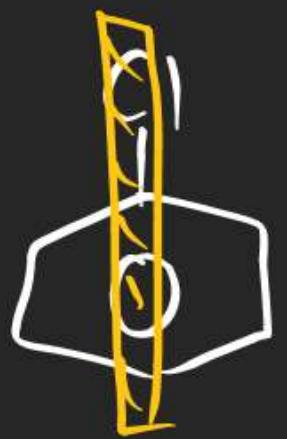
12-45
23-56
16-34



$(POS=7)$

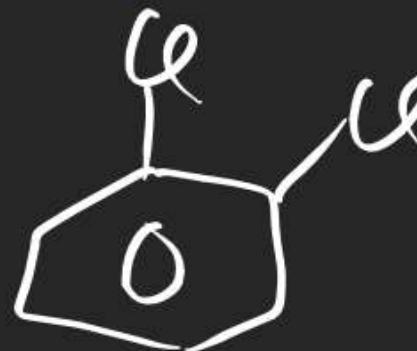
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(3)

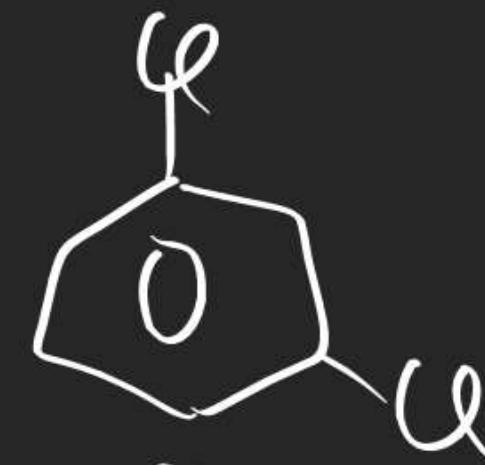


(pos=2)

(4)



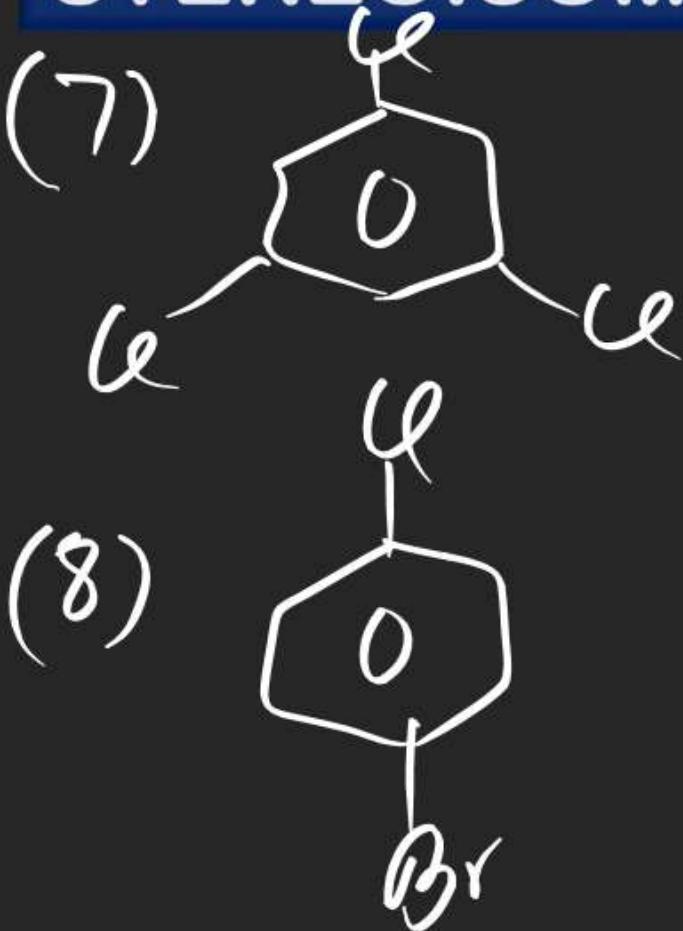
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(6)



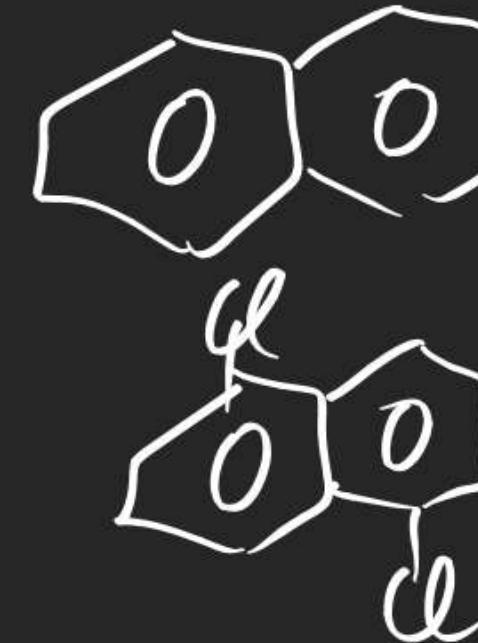
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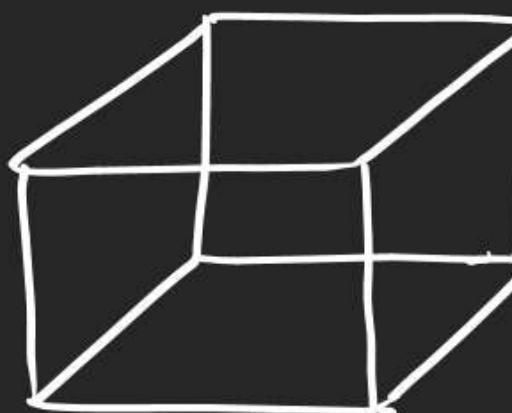
(8)

(9)

(10)

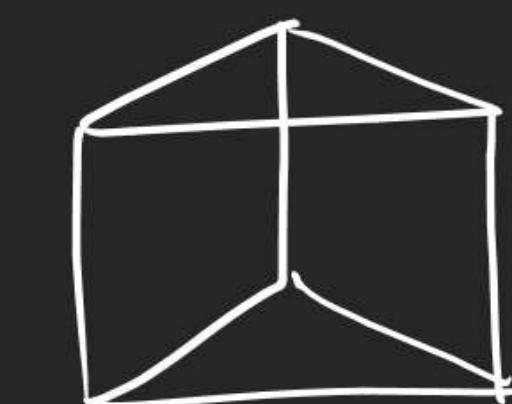


(11)



Cube

(12)



Prism



STEREOISOMERISM

