$\Rightarrow$ Trivalent

$\Rightarrow$ Incomplete octet

$\Rightarrow$ highly Unstable

$\Rightarrow$ highly Reactie

$\Rightarrow$ having VO (vacent orbital)

$\Rightarrow$ lewis Acid

$\Rightarrow$ formed by Hetrolytic fissios

$\Rightarrow$ Usually formed in Polar Solvent

$\Rightarrow$ only 6 electrons.

$\Rightarrow$ BP = 3

UP = 0

LP = 0

MM = 0

SM = $2|S| + 1$

$= \textcircled{1}$

Singlet C

Intermidiate

sp^2 hybrids $\Rightarrow$ only 8 e's

trigonal plaer $\Rightarrow$ BP $\checkmark$

BA = $120°$

$\Rightarrow \checkmark$ Complet Octet

$\Rightarrow \checkmark$

$\Rightarrow \checkmark$

$\Rightarrow$ No V.O

$\Rightarrow$ lewis Base

$\Rightarrow \checkmark$

SM = $2|S| + 1$

$= 1$

$\Rightarrow$ UP = $\checkmark$

$\Rightarrow$ MM = $\checkmark$

$\Rightarrow$ SM = $\checkmark$

LP = 1

$\Rightarrow sp^3$

$\Rightarrow$ pyramidl

$\Rightarrow$ BA = $107°$

Induction

$\Rightarrow$ Permanent displacement of σ e^-s & partial charges induced on carbon of entire carbon chain is due to induction phenomenon of En atom ($-c$) due to its difference in En. with adjacent C atom.

$$H_3C \text{———} CH_2 \text{———} CH_2 \text{———} CH_2 \text{———} H$$

$$\overset{\delta_4+}{H_3C} \text{——} \overset{\delta_3+}{CH_2} \text{——} \overset{\delta_2+}{CH_2} \text{——} \overset{\delta_1+}{CH_2} \text{——} \overset{\delta-}{F}$$

$\Delta x_3 \qquad \Delta x_2 \qquad \underset{\Delta x_1}{\rightarrow} \qquad \underset{\Delta x}{\leftrightarrow}$
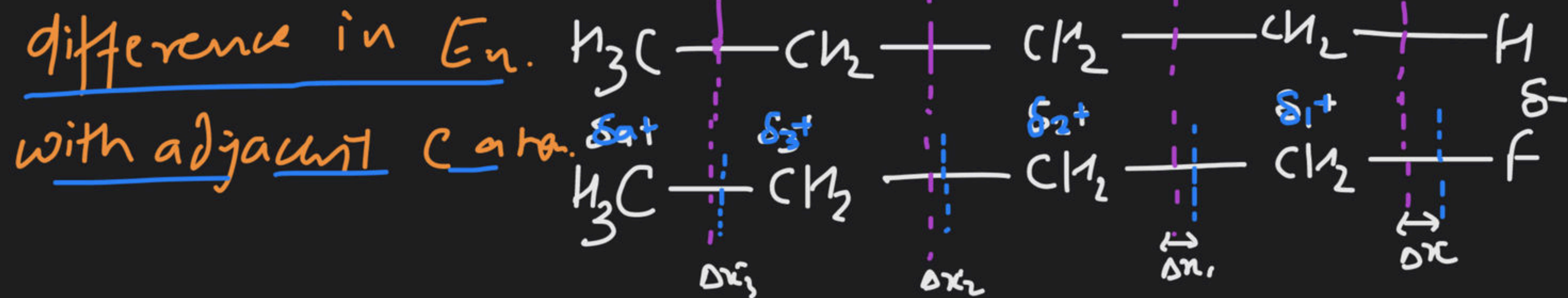
$(*) \quad \Delta x > \Delta x_1 > \Delta x_2 > \Delta x_3$

$(*) \quad \delta > \delta_1 > \delta_2 > \delta_3 > \delta_4$

$(*) \quad \delta = \delta_1 + \delta_2 + \delta_3 + \delta_4$

Effect caused due to induction phenomenon of F in entire Compound is known as Inductive (I) effect of F atom.

Note (i) Permanent effect

(ii) effect is applicable only on $\sigma\ e^{-}s$

(iii) distance dependent effect

(iv) effect $\downarrow$ as distance increases with A/Group

(v) electron displacement in I effect takes place within Bonding orbital.
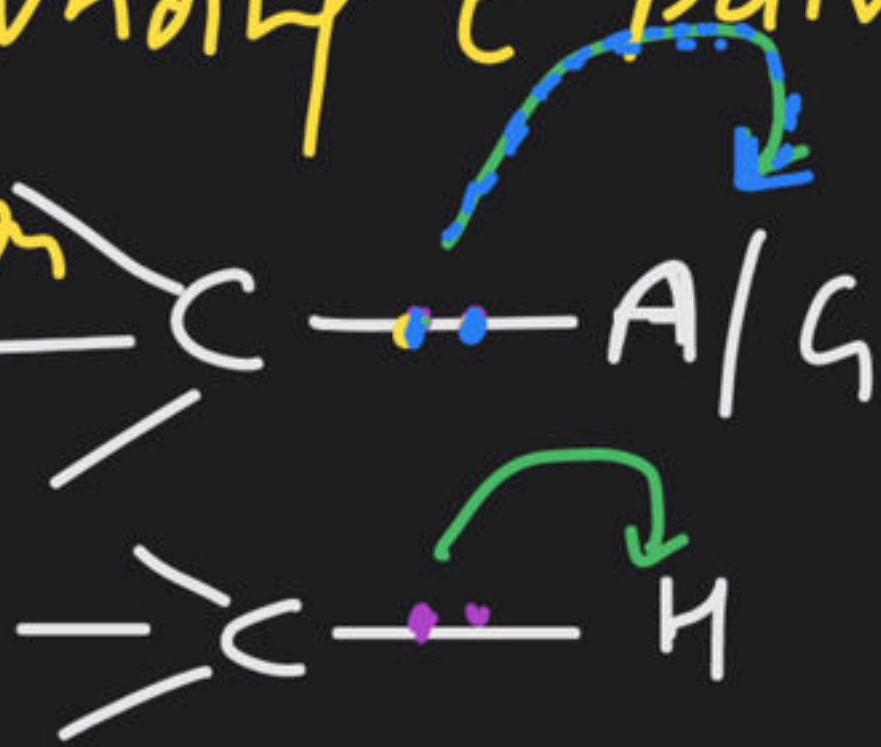
(vi) $>C-M$ Bond is taken as a Reference.

(vii) [I effect is weak effect] because Sigma bonds
are Stronger Bonds.

[Types of I effect]

$\Rightarrow$ There are two types of Inductive (I) effect

(1) −Inductive effect (−I effect). when rate of
attraction of Bonding e^- pair By any A/G is higher than
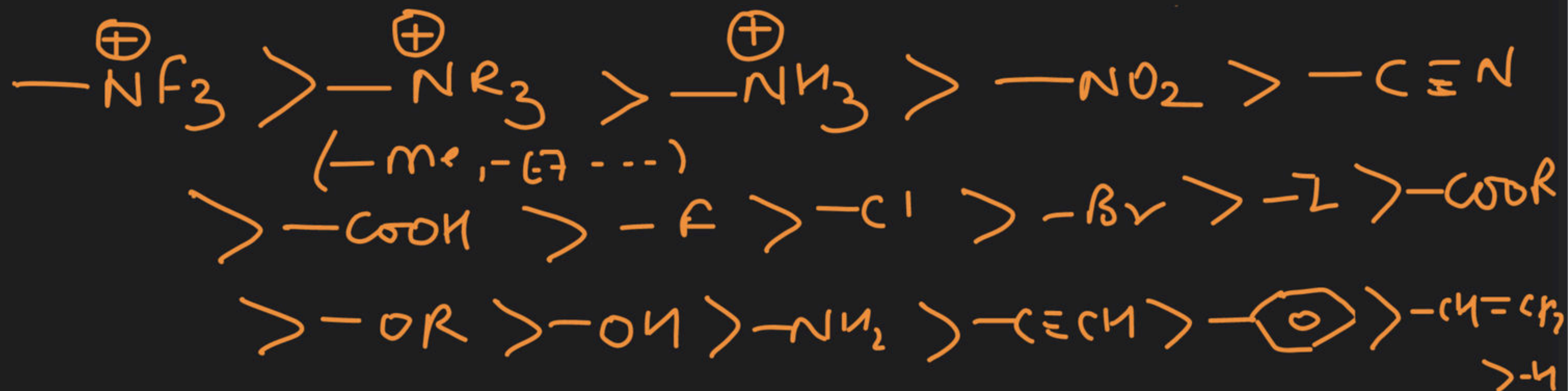rate of attraction
pair electrons
effect shown

of Same Bond
By H atom then
is known as −I effect of A/G

$$\boxed{If \ \gamma_{A/G} > \gamma_{H}} \qquad (-I \ effect \ by \ A/G)$$

−I series :-

decreasing Order of Electronegativity of atom/groups..

$$-\overset{\oplus}{N}F_3 > -\overset{\oplus}{N}R_3 > -\overset{\oplus}{N}H_3 > -NO_2 > -C \equiv N$$
$$(-me, -Et \cdots)$$

$$> -COOH > -F > -Cl > -Br > -I > -COOR$$

$$> -OR > -OH > -NH_2 > -C \equiv CH > -\langle O \rangle > -CH=CH_2$$
$$> -H$$

+ I effect!.

If $r_{A/G} < r_H$ (+I effect by A/G)

$(-I)$

DIY!

$$-\overset{\ominus}{C}H_2 > -\overset{\ominus}{N}H > -\overset{\ominus}{O}^{\ominus} > -C\overset{\overset{O}{\|}}{\underset{O_{\ominus}}{}} >$$

$$-C\underset{CH_3}{\overset{CH_3}{<}}_{CH_3} > -CH\underset{CH_3}{\overset{CH_3}{<}} > -CH_2-CH_3 > -CH_3 > -T > -D > -H$$
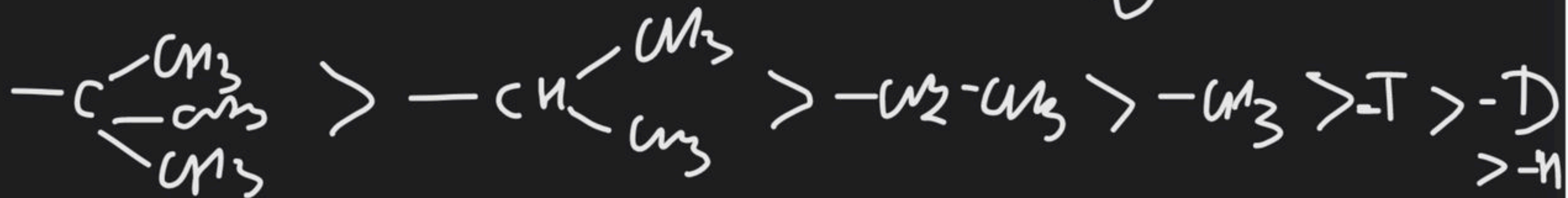
Note (i) $-I$ atoms / groups are Electron withdrawing in nature.
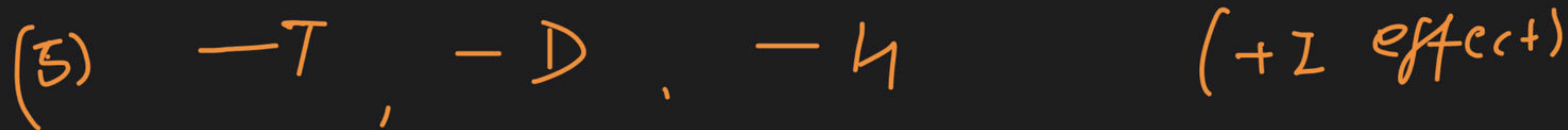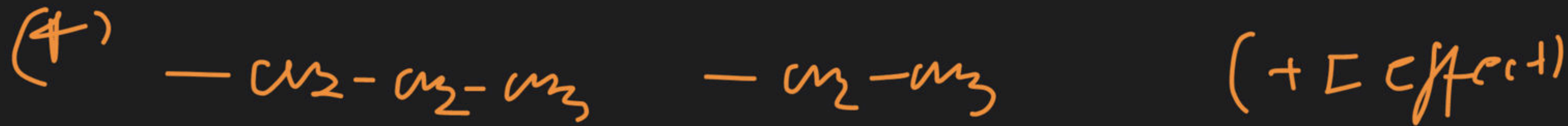
(ii) $+I$ _____ _____ $-I$ donating in nature.

Ex: Arrange following in ↓ order of I effect

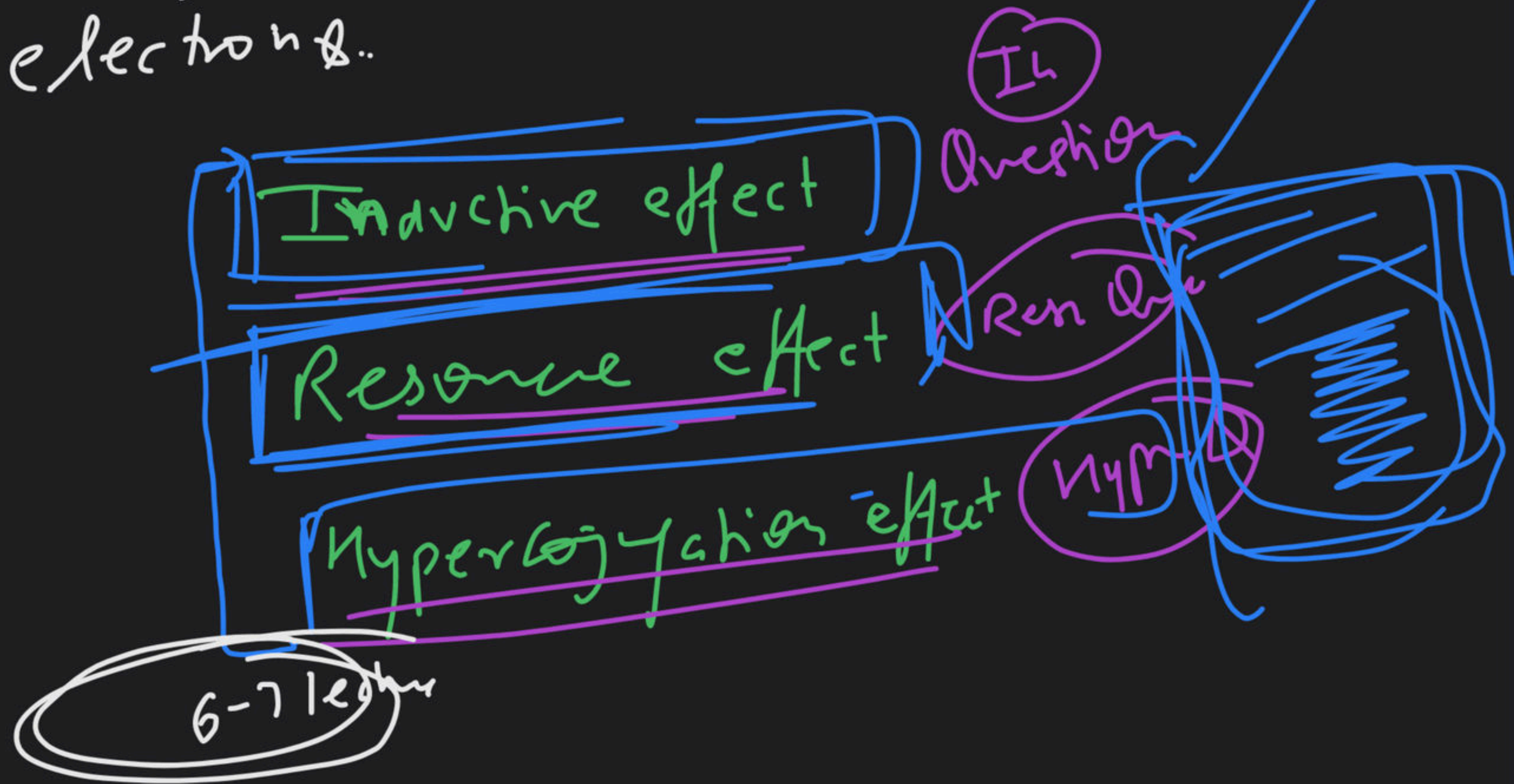(1) $-F$, $-Cl$, $-Br$, $-I$ ($-I$ effect)

(2) $-CF_3$, $-CH_3$, $-CBr_3$, $-CI_3$ ($-I$ effect)

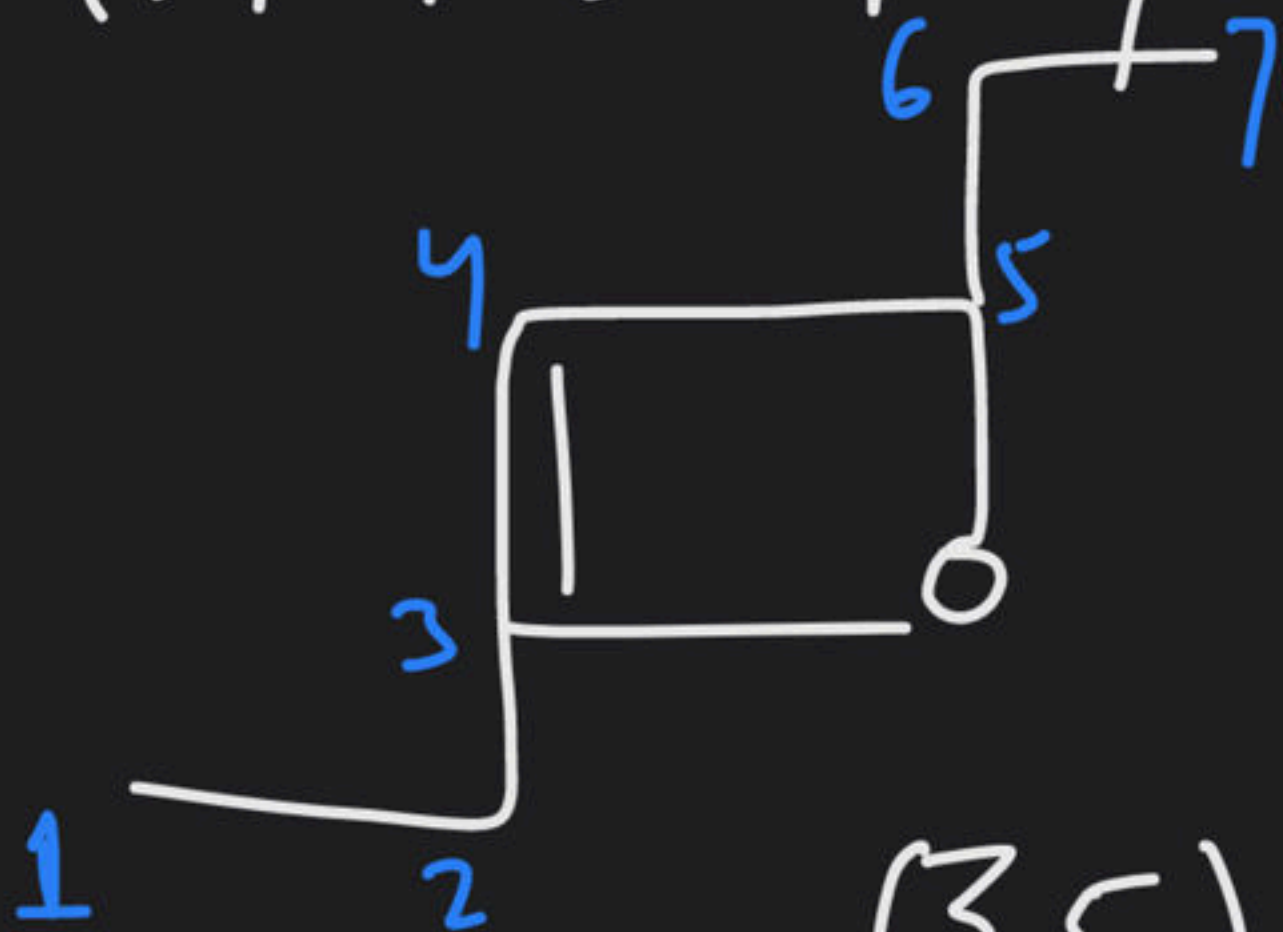(3) $-CH_2-CH_3$ $-CH_3$ ($+I$ effect)

(4) $-CH_2-CH_2-CH_3$ $-CH_2-CH_3$ $(+I \ effect)$

(5) $-T$, $-D$, $-H$ $(+I \ effect)$

(6) $-CT_3$, $-CD_3$, $-CH_3$ $(+I \ effect)$

(7) $-CD_3$ $-CHD_2$ $-CH_2D$ $-CH_3$ $(+I \ effect)$

(8)

$$-\overset{\overset{\displaystyle CH_2-CH_3}{|}}{\underset{\underset{\displaystyle CH_2-CH_3}{|}}{C}}-CH_2-CH_3 \qquad -\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}}-CH_3 \qquad -\overset{\overset{\displaystyle H}{|}}{\underset{\underset{\displaystyle H}{|}}{C}}-H \quad (+I \ effect)$$
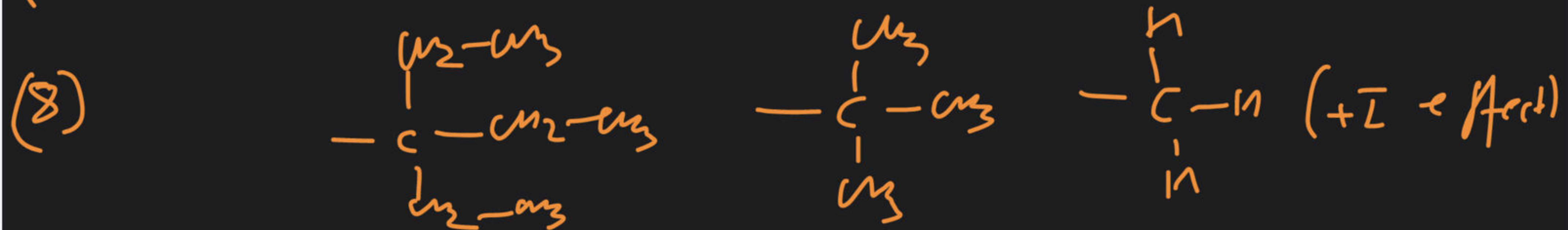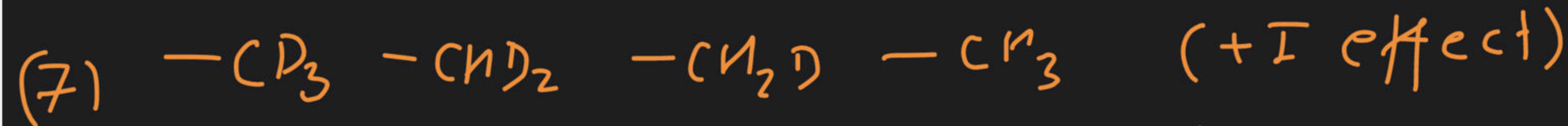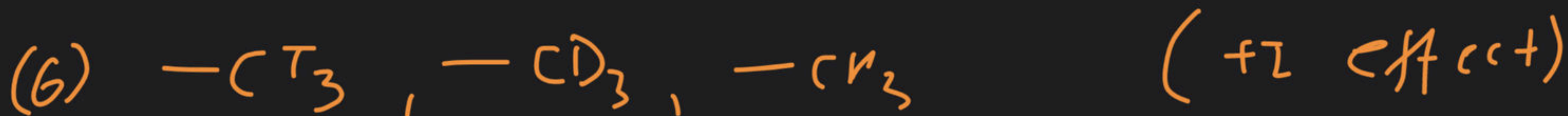
(9) Explain why I effect is applicable on σ Bond electrons..

Inductive effect

Resonace effect

Hyperconjuation effect
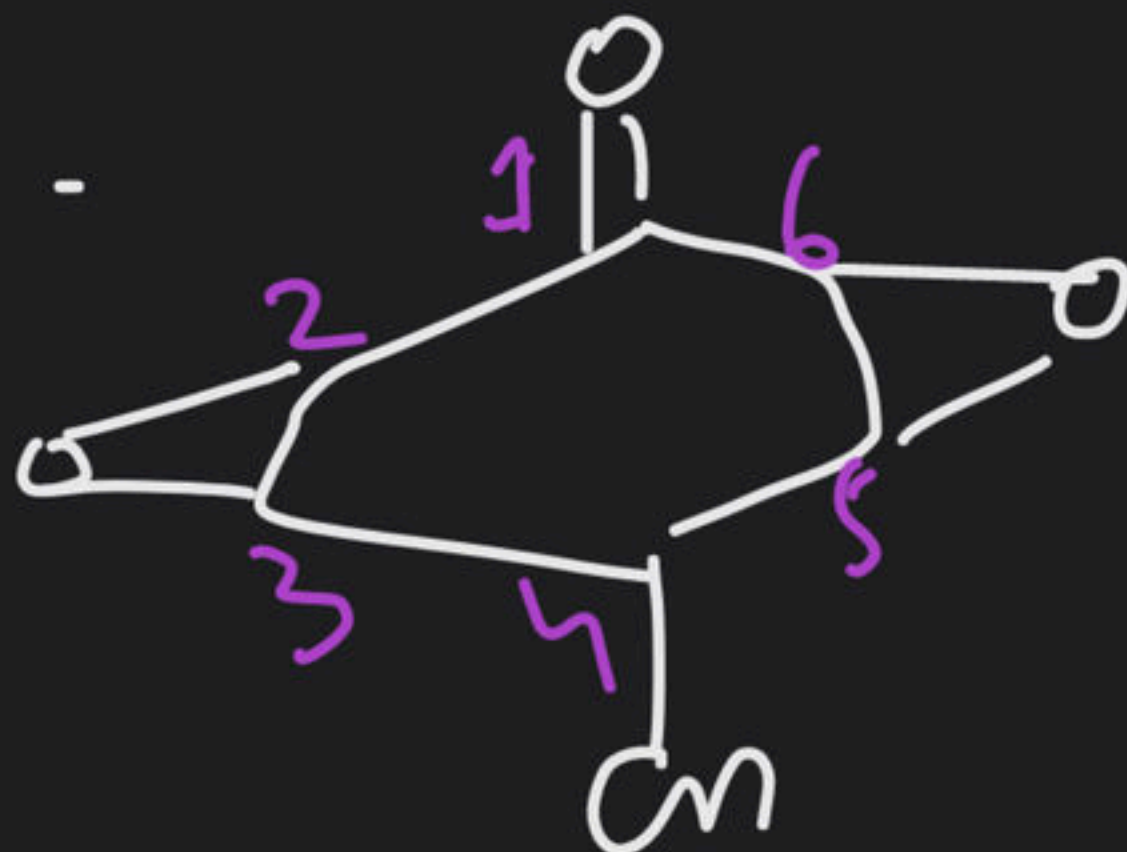
Question

Ren Que

Hyp

Ih

6-7 lega

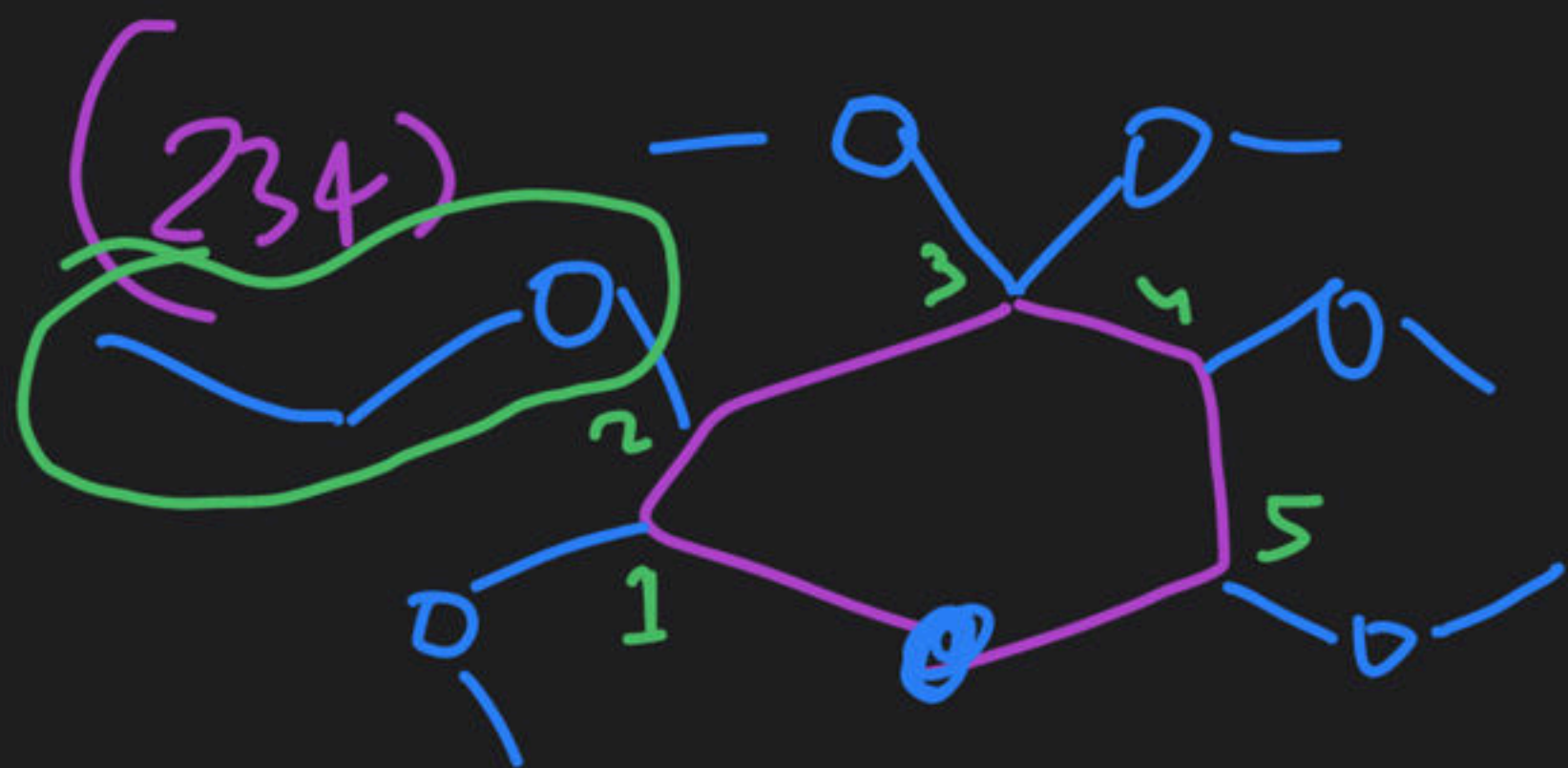(231) (1,2)(3,4) Diepoxy Cyclohexane

(232)

(3,5) Epoxy hept-3-ene

(233)

(2,3)(5,6) Di Epoxy-4-hydroxy Cyclohexanone.

(235) Propane - 1,2,3 - Tri Carboxylic Acid

(236) _____ Carbonitrile

(237) _____ Carbaldeh

(230) _____ Carboxyl chloride

(239) _____ Carboxamide

(1,5) Epoxy - 2 - Ethoxy - 1,33,4,5 - pentamethoxy

pentane.

(24)