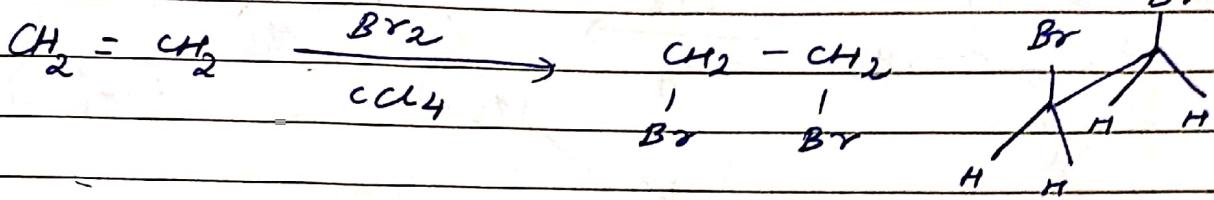
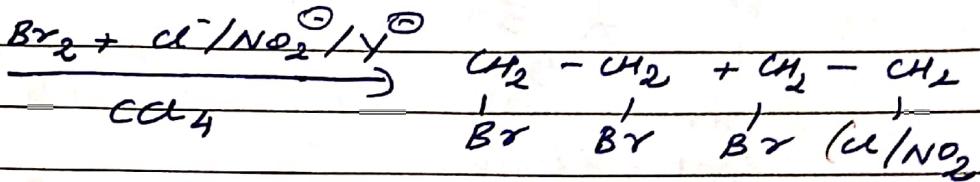


Electrophilic addⁿ to $\text{C}=\text{C}$:

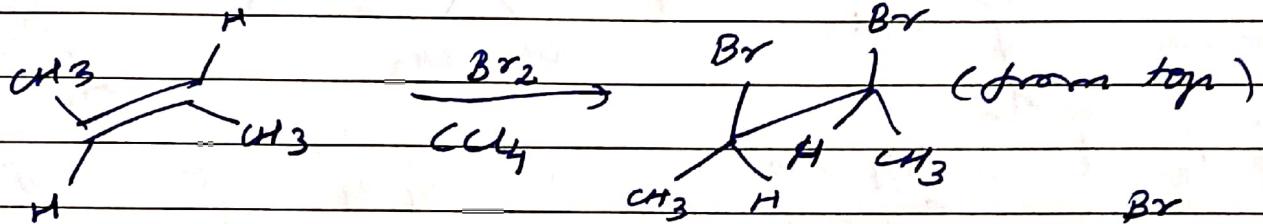
(1)



- Red colour of Bromine disappears when treated with olefin.

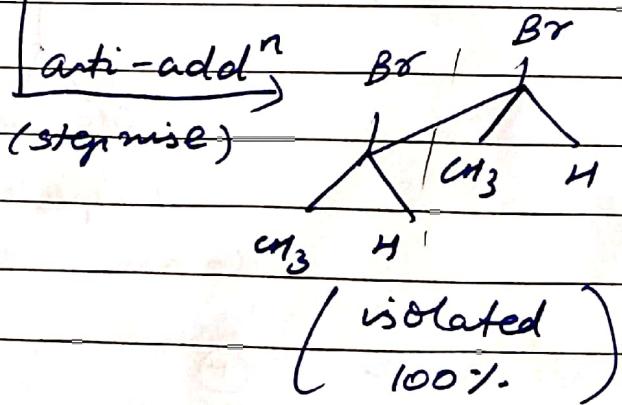
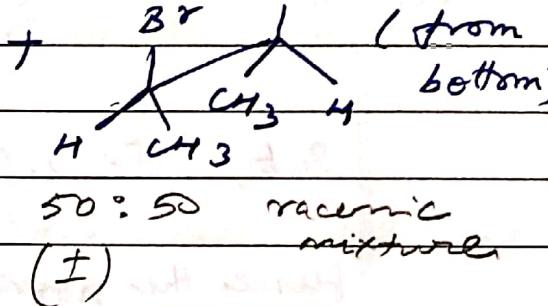


(2) Not a one step rxn, but stepwise (isolated) rxn.



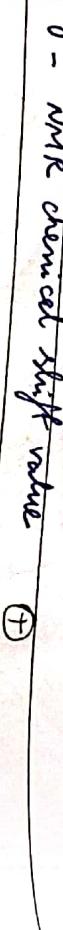
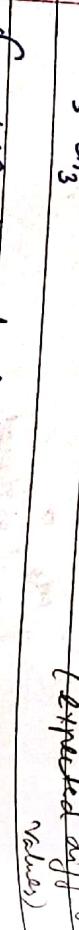
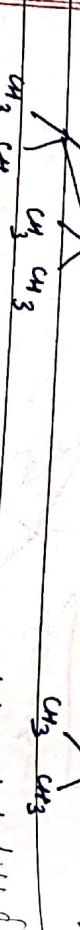
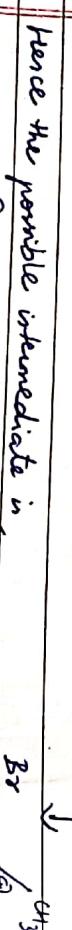
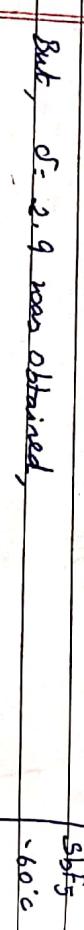
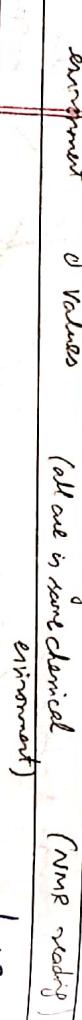
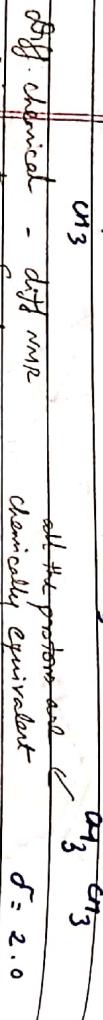
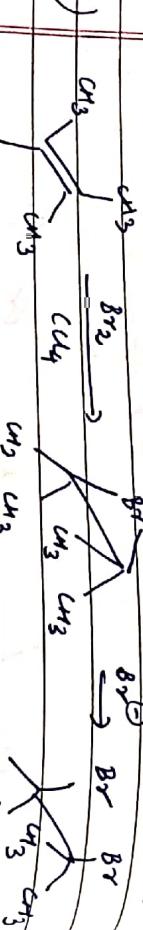
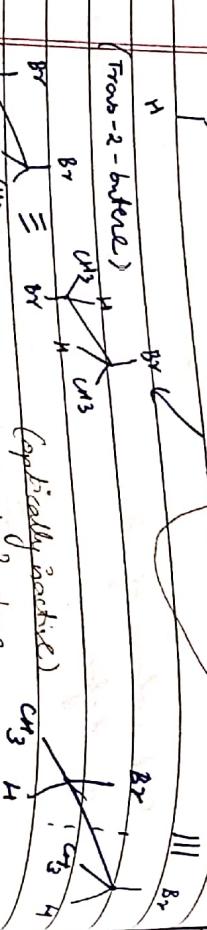
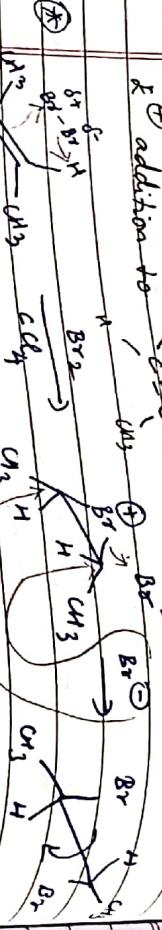
(trans-2-butene) Syn-addⁿ
(cyclic pathway)

optically inactive



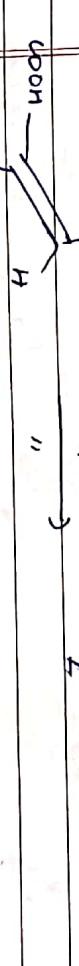
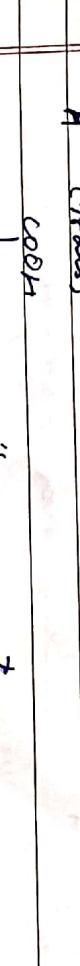
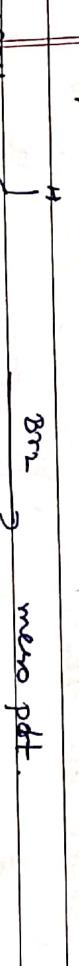
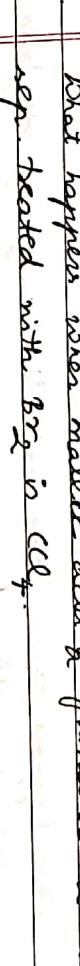
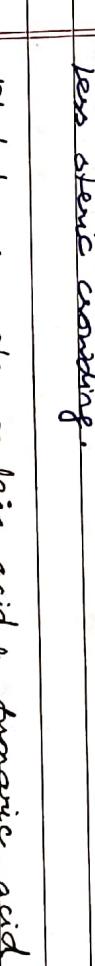
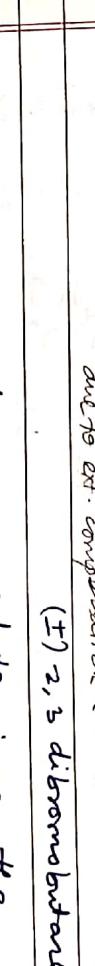
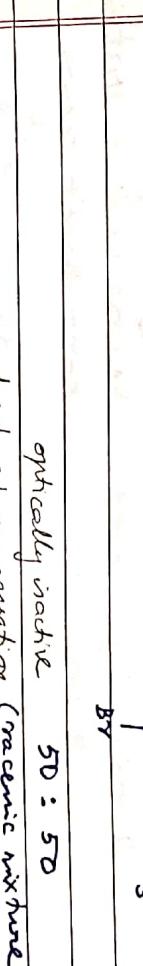
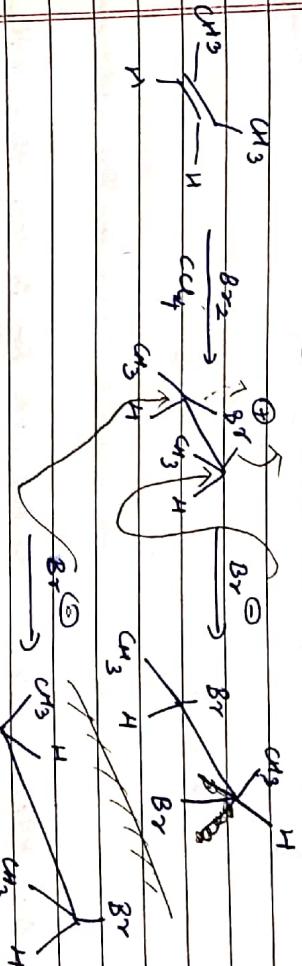
meso part (optically inactive)
due to internal compensation

CH_3 - via Halonium intermediate:



g. What happens when *cis* & *trans* isomers of but-2-ene are separately treated with Br_2 in CCl_4 .

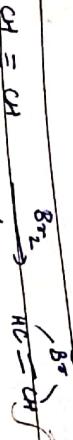
Trans - (in prev. page)



Q. Between ethylene & acetylene which one is more reactive towards Br addition rxn

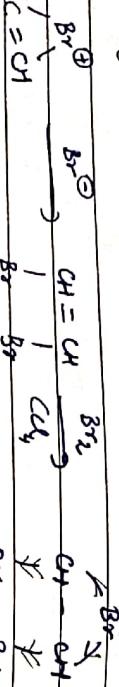
$109^{\circ} 28 - 60^{\circ}$

(more stable due to lone pair. less angle strain)



Ethylenes are more reactive towards Br addition.

Q. When acetophenone is treated with Br_2 in CCl_4 then ethylene dibromide is generated in the rxn medium. That is, here further addition to $\text{C}=\text{C}$ doesn't occur.

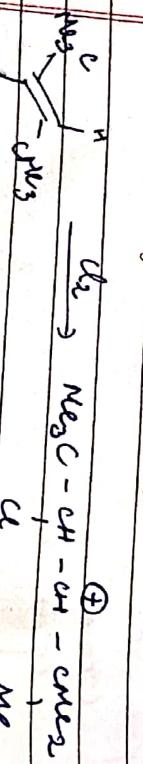


(After solv.) very very unstable
bromonium ion intermediate

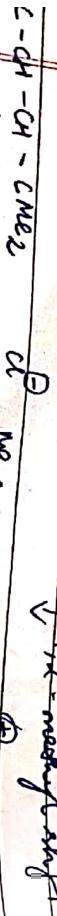
+⁴ charge is destabilized

Q. What happens when trans-1,2-dibromoethylene is treated with chlorine.

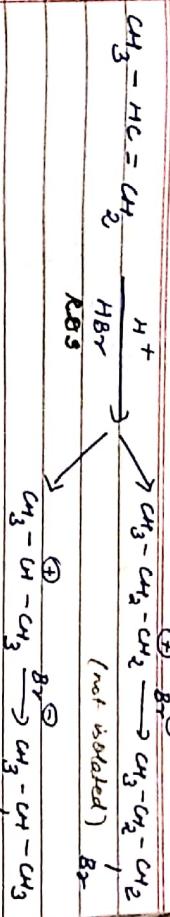
Cl⁰ - both give anti-addition



↓ first methyl shift
 $\text{CH}_3 - \text{CH} = \text{CH}_2$ (π -complex)

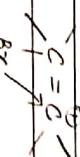


3° carbocation



Markonikov addition.

H doesn't have a lone pair, hence no NIP to form any sort of hexamium intermediate



* $\text{HI} > \text{HBr} > \text{HCl} > \text{HF}$ (Acidic strength) proton donating ability.

Here, the first step is the RDS. Hence the rate of reaction depends on the acid strength. With higher acid strength the rate also increases. Here bridged intermediate mimics the bromonium ion intermediate can't be formed as H has no e⁻ pair available, however a π complex is a intermediate in some cases.

Here the stability of C⁺ determine the overall orientation of addn.

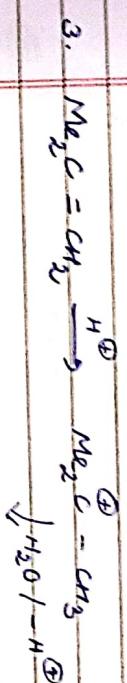
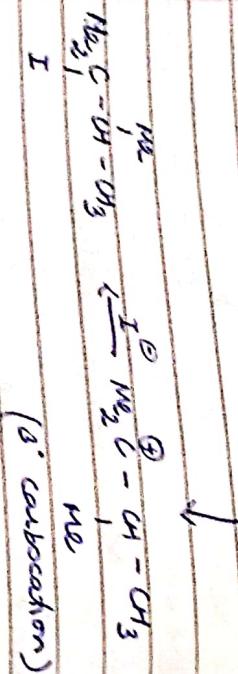
This type of addn where X⁰ is attached to more substituted carbon atom is known as Markonikov's addn.

$\text{CH}_3 - \text{CH} = \text{CH}_2$ (π -complex)

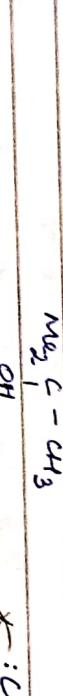
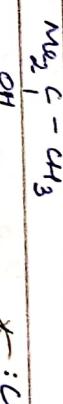
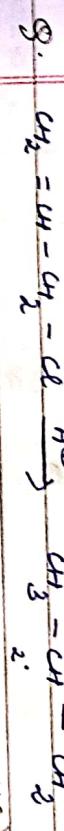
↓

H⁰

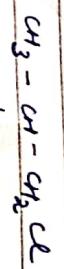
discrepancy



- I effect decreases rate of the rxn
- + R effect determines orientation of the rxn

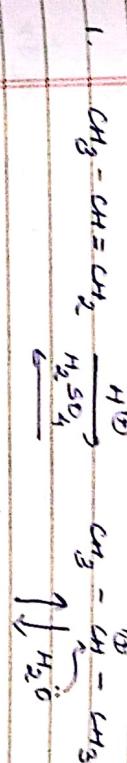


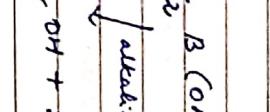
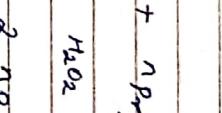
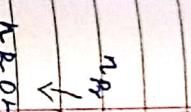
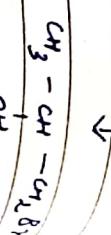
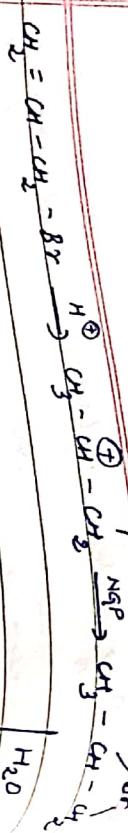
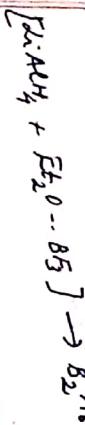
HGP is not feasible because Cl is more electronegativity.



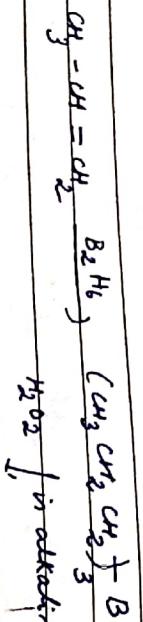
[A]

Addⁿ of water (hydration) \Rightarrow acid catalysed





Hydroboration - Oxidation rxn:
(Anti-Markovnikov addn to C=C)

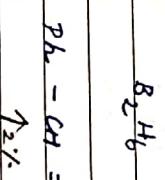
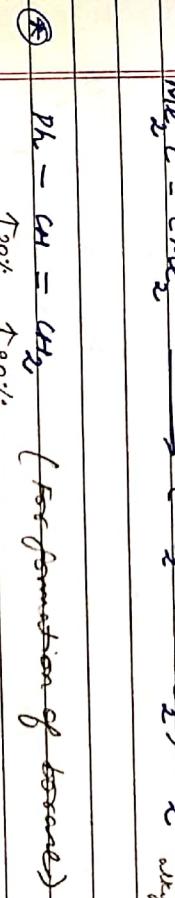
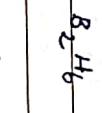


1° alcohol

instead of 2° alcohol

Mechanism:

(more stable 2°)

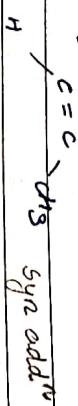
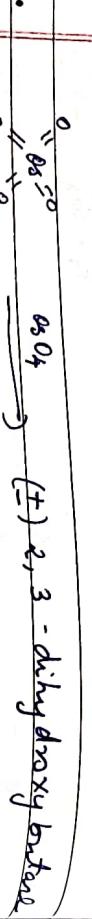


α -effect: two lone pairs adjacent
repel each other

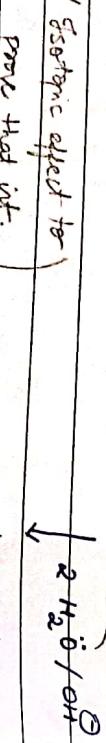
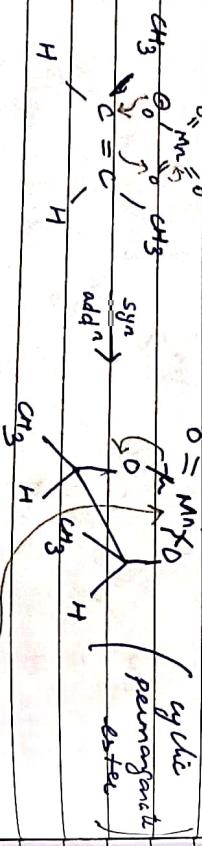


disadvantages:

- i) OsO_4 is highly toxic
- ii) OsO_4 is highly expensive

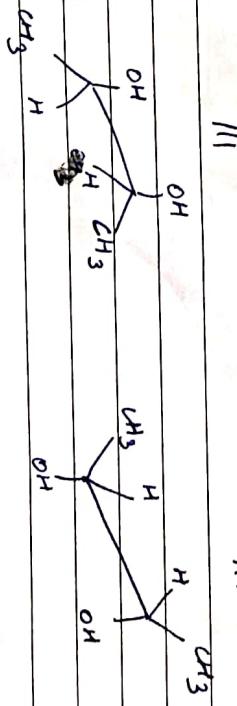
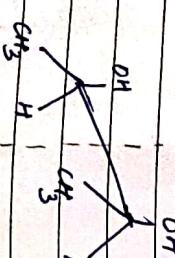


* bio-hydroxylation using alkaline permanganate:

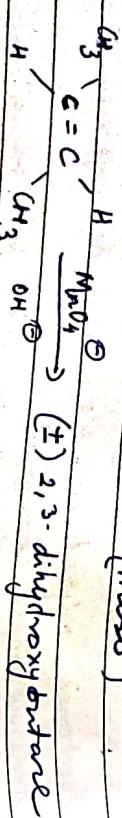


(isotopic effect for
prove that int.)

is formed

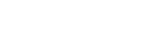
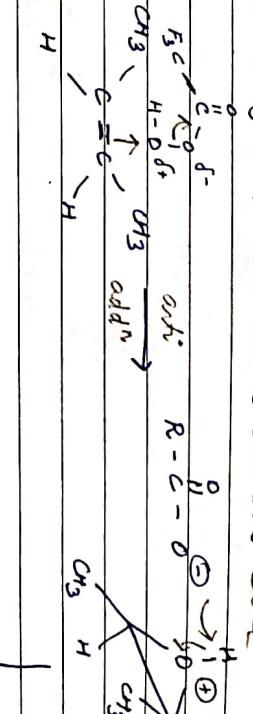


(meso)

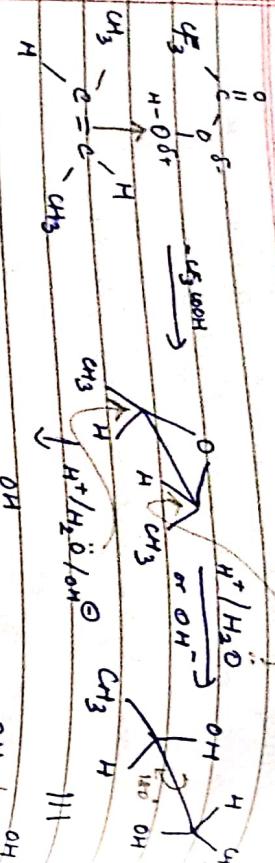


KMnO_4 is highly oxidising in nature. Hence there is a prob. of product getting oxidised.

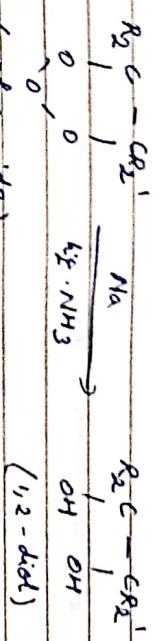
• Trans-hydroxylation using peroxy acid:



discrete
edge

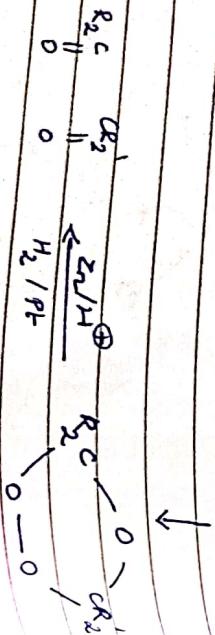
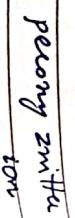
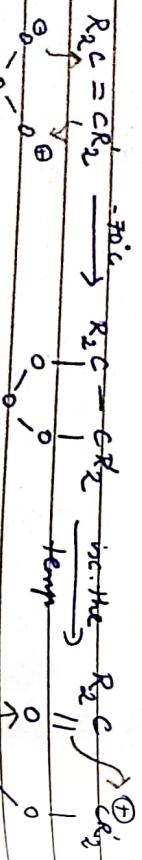
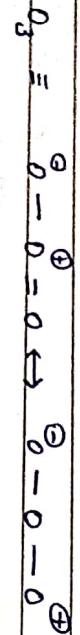


Expt. evidence for the mechanism: not yet done
Brown + others



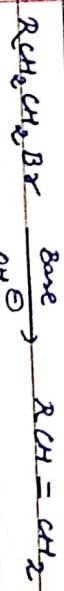
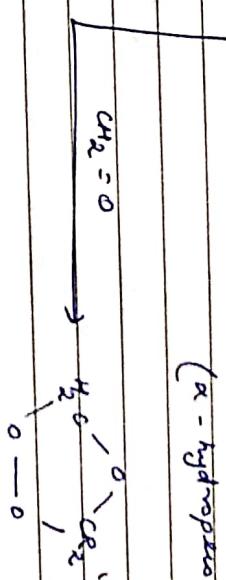
~~propoxy ether~~)

OZONOLYSIS REACTION:

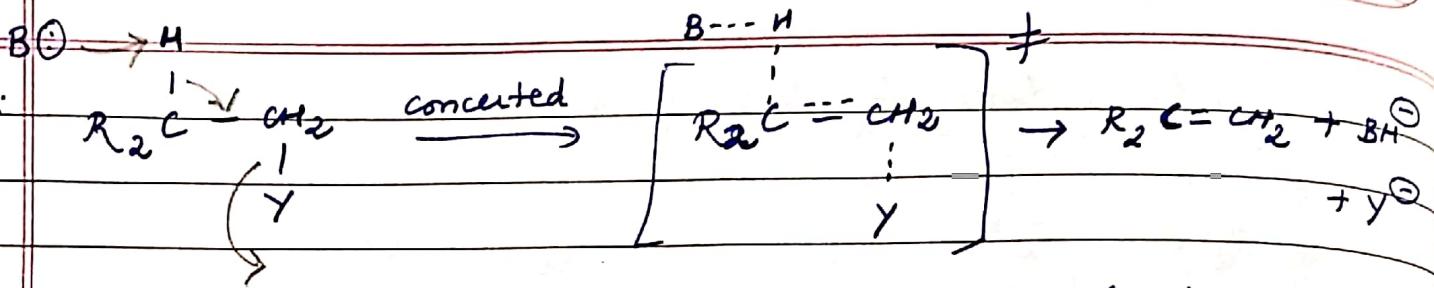


ELIMINATION REACTIONS:

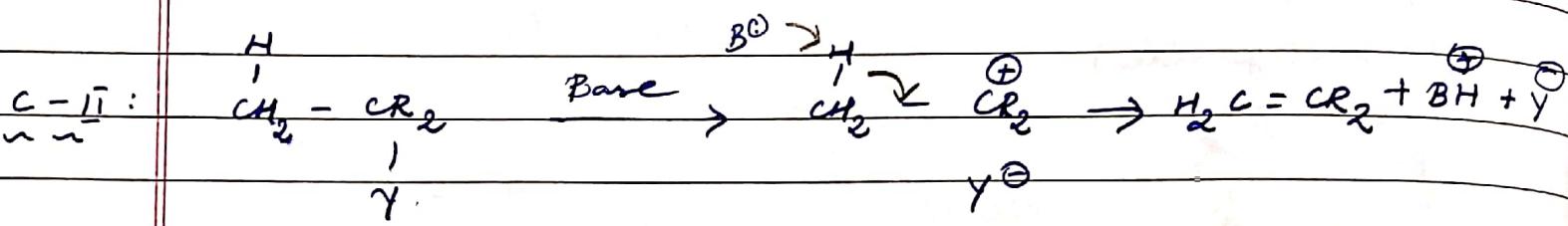
Ozoneide incorporating CH_2 group
from $\text{C}_2 = \text{O}$



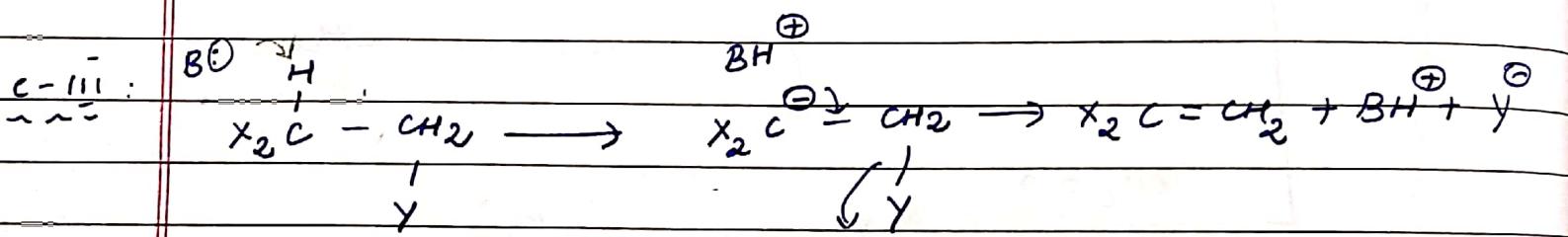
classmate



E₂ mechanism (Elin. bimolecular)



E₁ mechanism (Elin. unimolecular)



E₁ CB mechanism (Elin. unimolecular via carbocation intermediate)
(cong. base)

