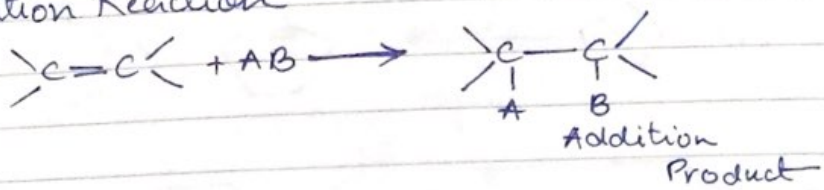
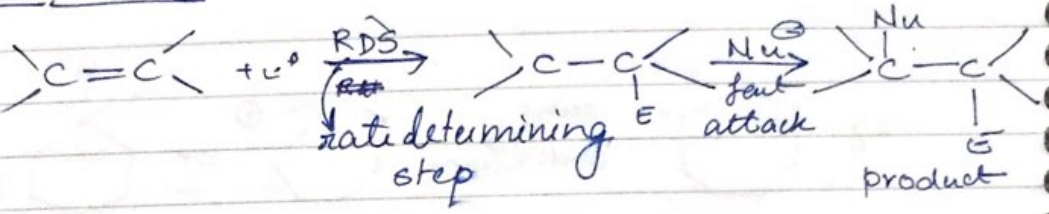
(2) Addition Reaction



(A) Electrophillic Addition

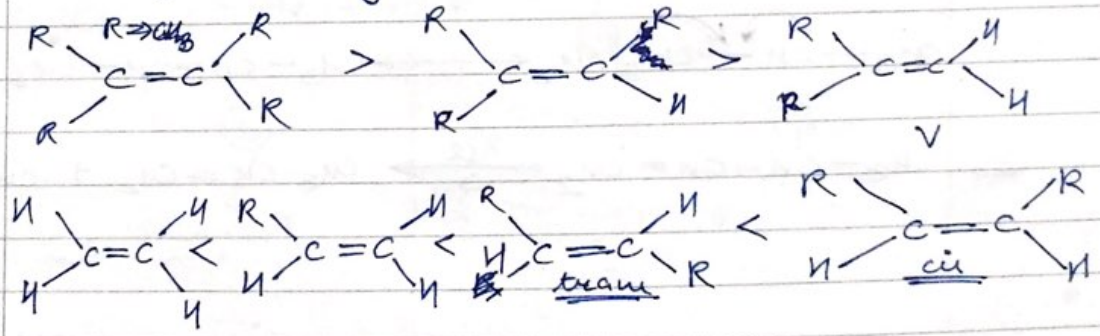
→ Rate of ~~rxn~~ reaction depend upon the ~~attack~~ attack of $E^{\oplus}$.

General ~~Rxn~~ Rexn



* Alkene, Alkyne and Alkadiene are e⁻ rich specie, hence they favour the ~~attack~~ of $E^{\oplus}$.
* Rate of ~~Rxn~~ Rexn ∝ stability of carbocation.

* ~~Reacting~~ Reactivity order towards ~~attack~~ attack of $E^{\oplus}$

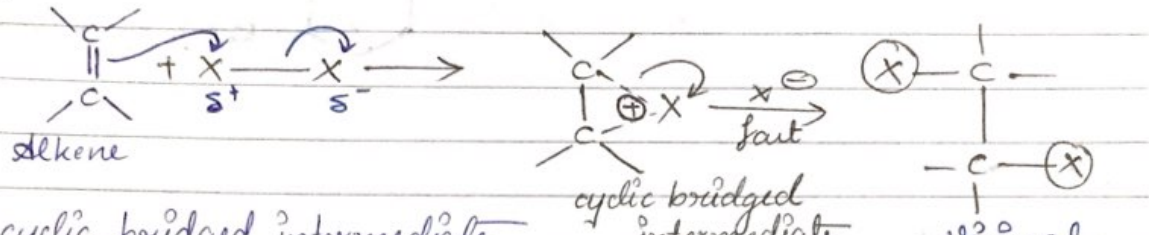


Addition of Halogen

$X_2 \rightarrow Cl_2, Br_2, I_2$

$Br/CCl_4 \longrightarrow$ Reddish Brown

General Reaction



* cyclic bridged intermediate
* No rearrangement
* Anti addition

$CH_2=CH_2 \xrightarrow[CCl_4]{Br_2} CH_2(Br)-CH_2(Br)$

Reddish Brown colour disappears

Test for unsaturation

or

Bromine water test

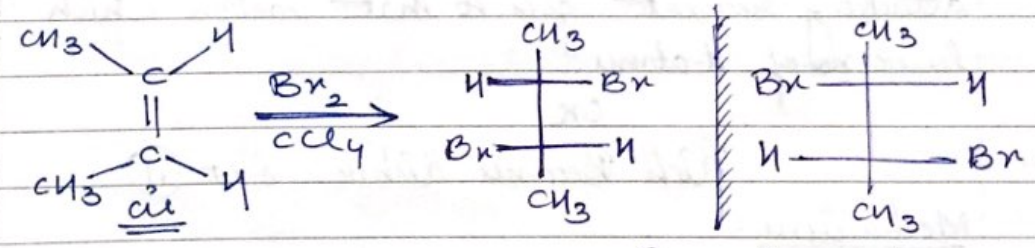
#
- C → cis
- A → anti
- R → Racemic

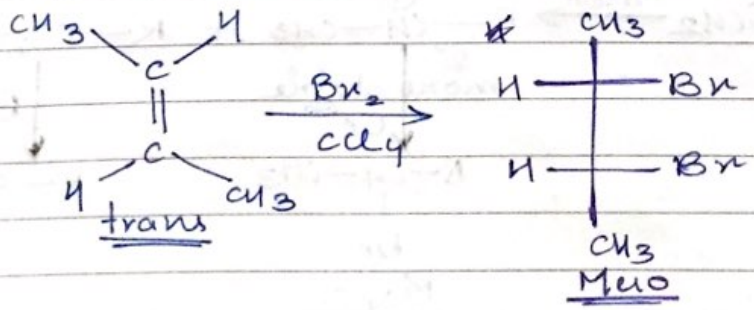
* If we do anti-addition on cis-Alkene, we get Racemic mixture

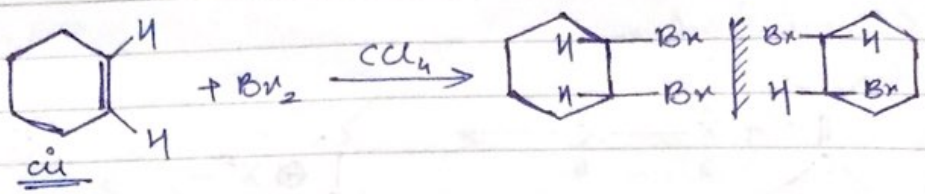
- T → trans
- A → Anti
- M → Meso

* If we do anti-addition on trans alkene, we get Meso mixture

Ex







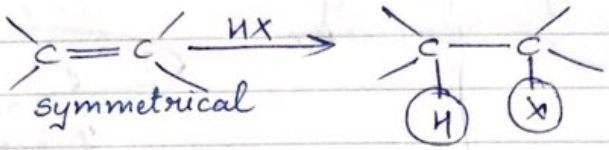
cis

2 Addition of HX

HX → Halogen acid

Eg – HCl, HBr, HI

General Reaction



Remarks

Intermediate is $C^{\oplus}$

Rearrangement – Possible

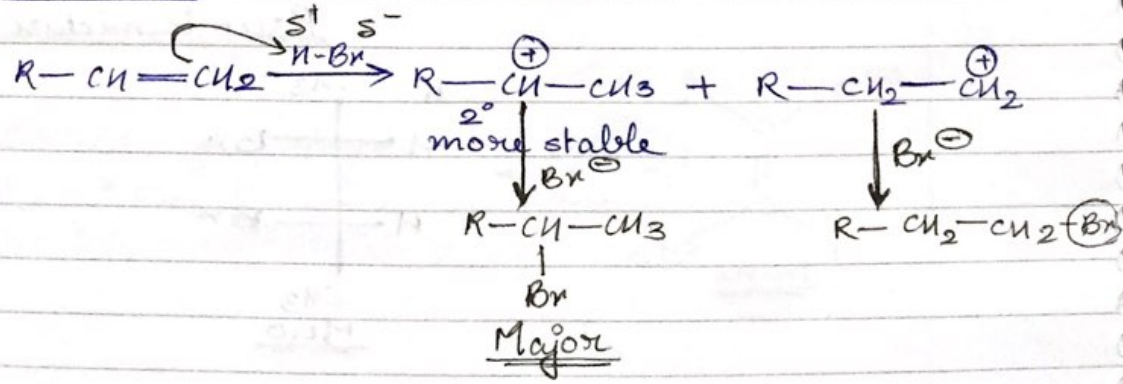
Unsymmetrical Alkene follow Markovnikov's Rule.

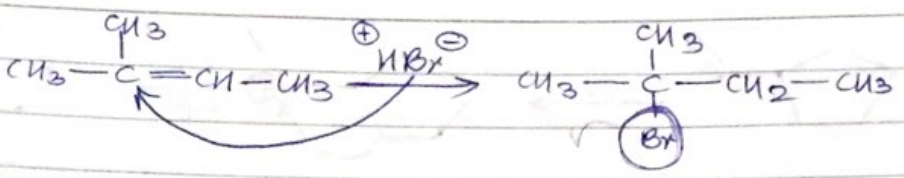
M. Rule: During the addition of HX across any unsymmetrical alkene, the -ve part of the attacking reagent goes to that carbon which carries lower no. of H-atoms.

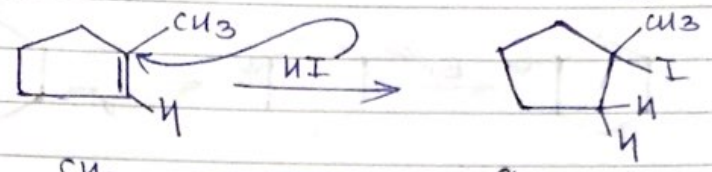
OR

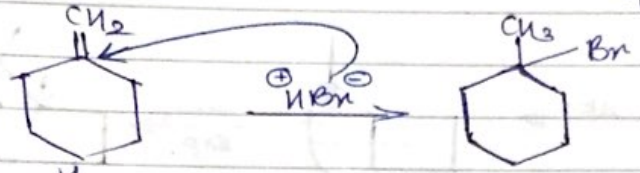
Rich Becomes Richer w.r.t (H)

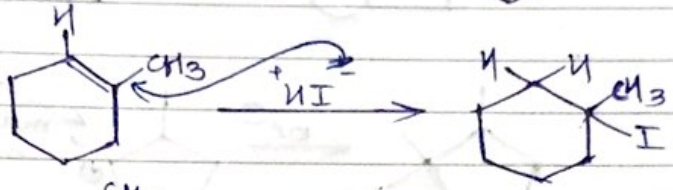
Mechanism:

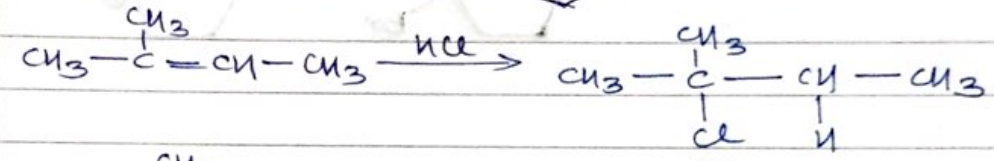


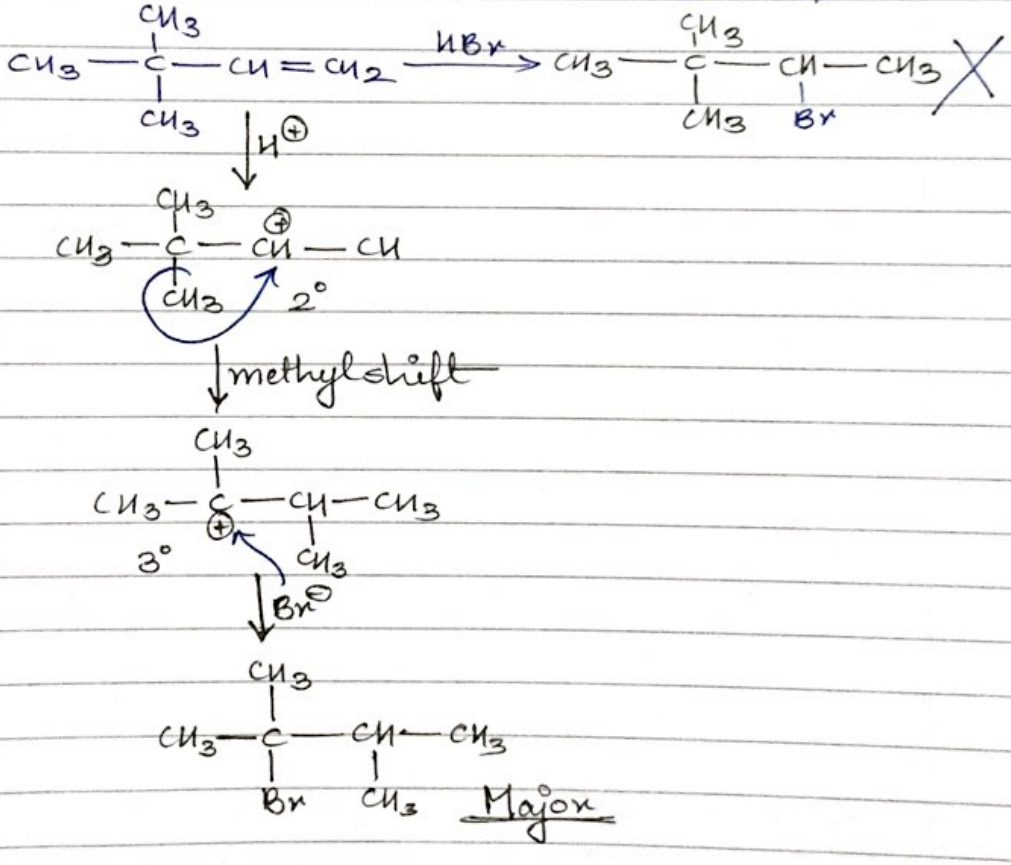
Ex 

② 

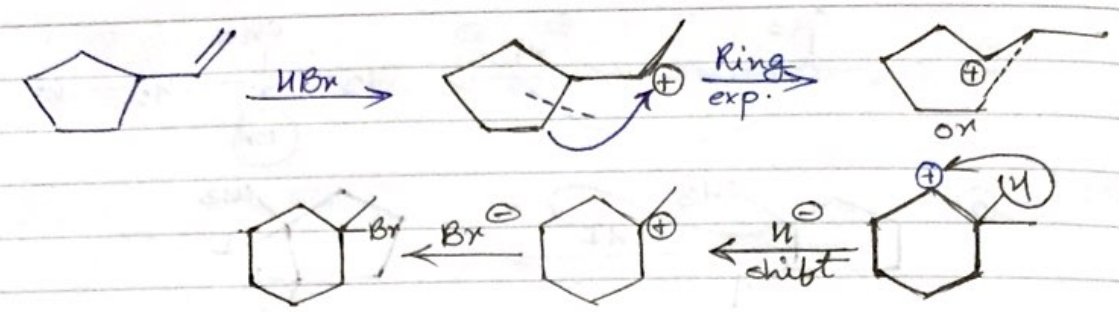
③ 

④ 

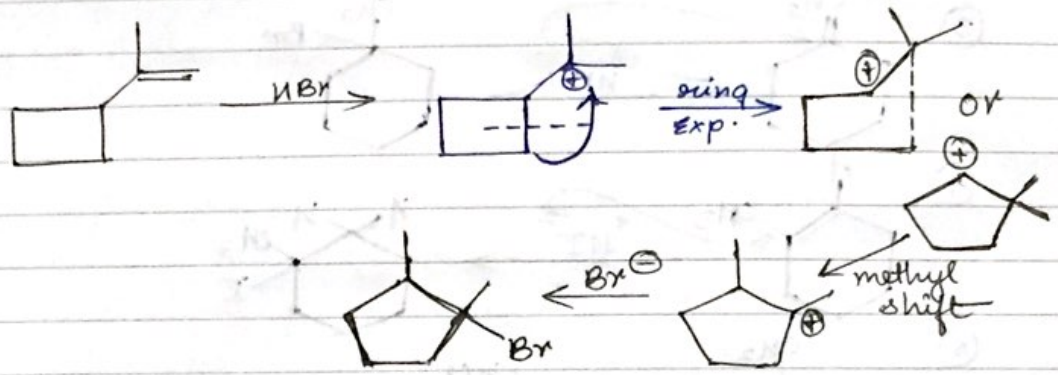
⑤ 

⑥ 

(7)


HBr
Ring exp.
or
H
H shift
Br⊖
Br

(8)


HBr
ring exp.
or
methyl shift
Br⊖
Br