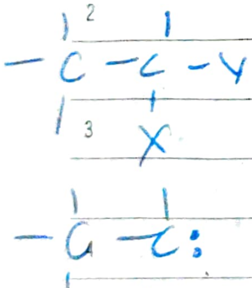
Elimination Reaction

alc KOH / alc NaOH / $C_2H_5O^{\ominus}$ / CH_3OK / RONa / ROK

- E_1 (Branching)
  - 3° alkyl halide
  - ↓ carbocation
- E_2 (Non Branch)
  - 1° alkyl halide
  - ↓ Transition state
- E_1CB (−I gp)
  - Carbanion

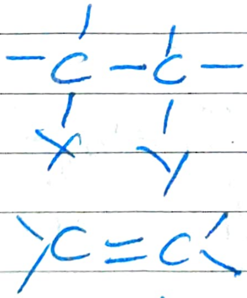
→ Removal of two atom or group → β-elimination, formation of π-bond

α-elimination



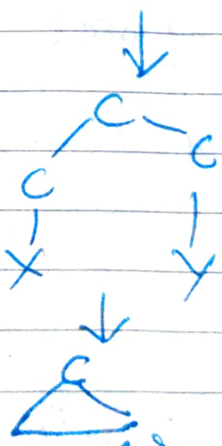
Carbene

β-elimination



π-bond formation

γ-elimination



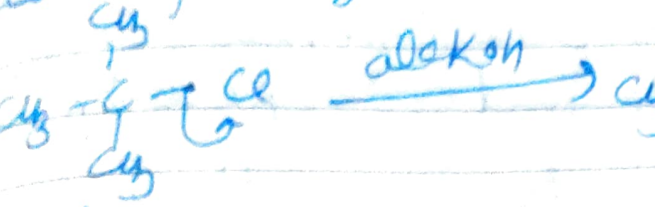
cyclic

E_1 (Unimolecular elimination Reaction)

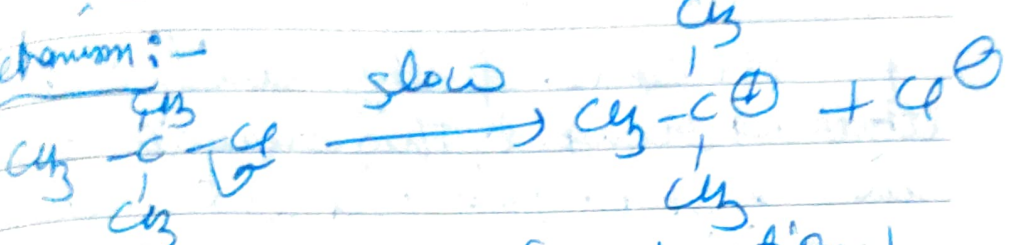
↓ carbocation formation

Unimolecular elimination reaction is k/a E_1 reaction. This reaction follow 1^{st} order kinetics b/c the rate of reaction depends upon

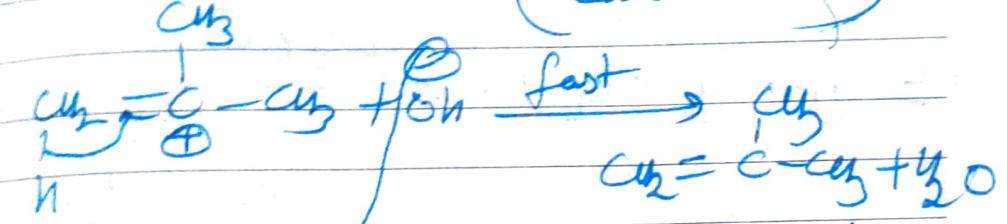
the conc. of 'alkyl halides only'



Mechanism:-



(carbocation)



Product

Thus $\frac{dx}{dt} = k\left[(CH_3)_3C-Cl\right]$

depend on carbocation Stability

3° alcohol $> 2^\circ > 1^\circ$

⇒ more Stable alkene

↓

major (Saytzeff Product)

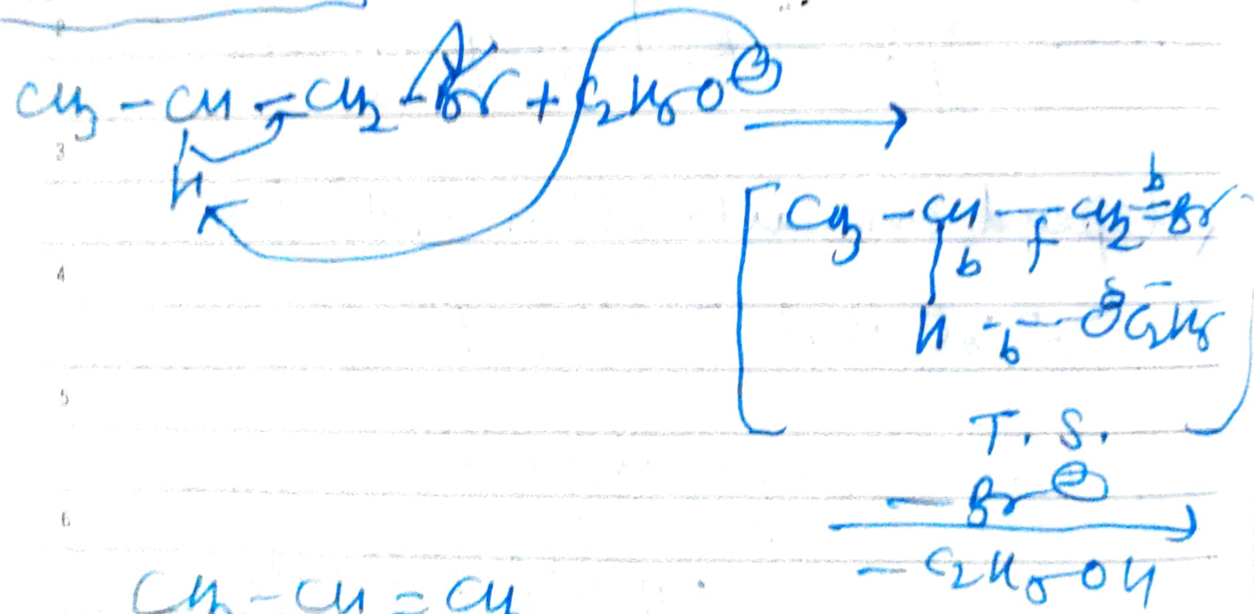
↓

more Substituted alkene will be formed

E_2 Reaction :- Bimolecular elimination Reaction, is K/a E_2 reaction. This reaction follows Second order kinetics it means the rate of reaction is depends upon the conc. of alkyl halide and the attacking reagent. This reaction occurs in one step. ~~This~~ via intermediate transition state

ex $CH_3-CH_2-CH_2-Br \xrightarrow{C_2H_5O^{\ominus}} CH_3-CH=CH_2 + C_2H_5-OH + Br^{\ominus}$

mechanism :-

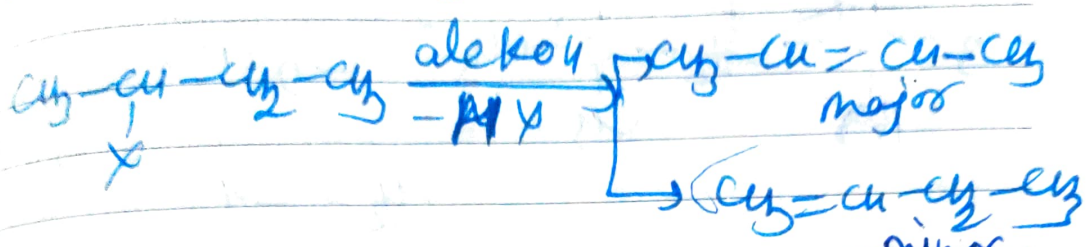


$CH_3-CH=CH_2$

$$\frac{dx}{dt} = K[CH_3CH_2CH_2Br][C_2H_5O^{\ominus}]$$

R-I > R-Br > R-Cl > R-F Better leaving gp fast the reaction

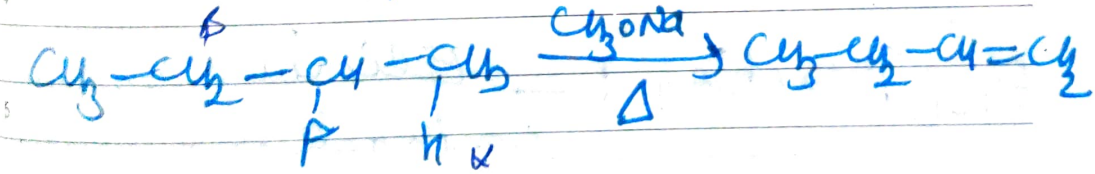
Saytzeff Rule:- According to this rule more substituted alkene is more stable and more stable alkene is formed major product in dehydro-halogenation reaction



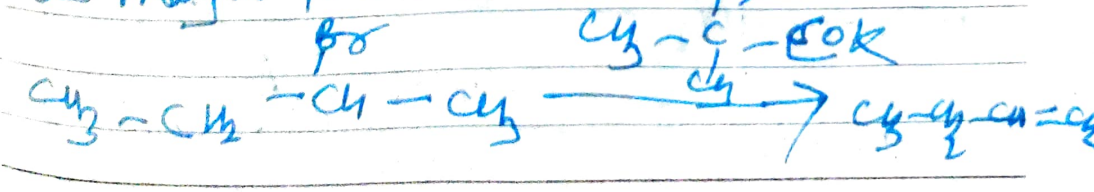
Hoffmann elimination Reaction:-

According to this rule less substituted alkene is less stable and less stable alkene is formed as major product

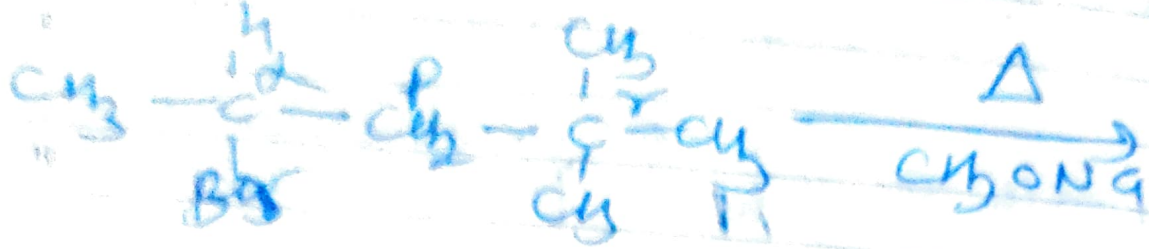
Case I:- If the leaving gp is very poor in nature then product formation takes place via hoffmann elimination.

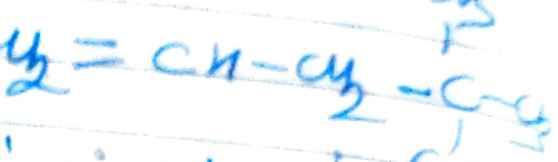


Case II If base (attacking reagent) is bulky in nature then hoffmann product is major product.

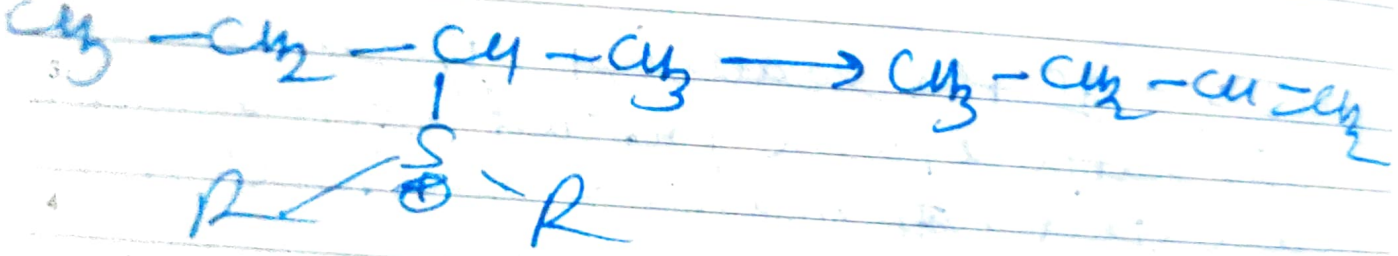


Case III If γ - carbon have no hydrogen atom then the hofmann product is major product.





Case IV If the leaving gp is bulky in nature the product formation takes place via hoffmann elimination.



E1cb Reaction :— Elimination unimolecular conjugate base reaction is K/a E1cb reaction.

Mechanism :—