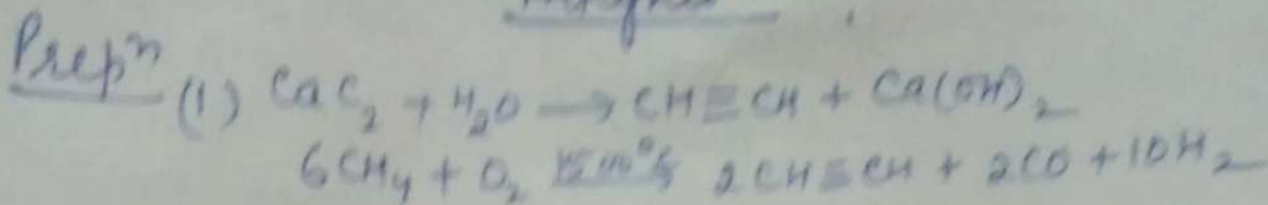


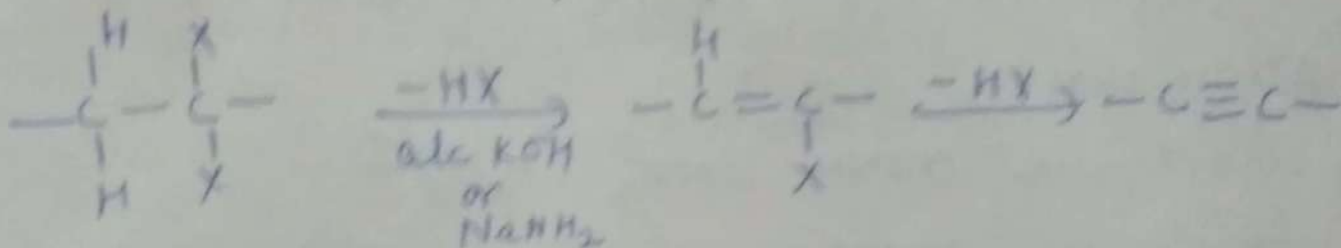
# Alkynes

①

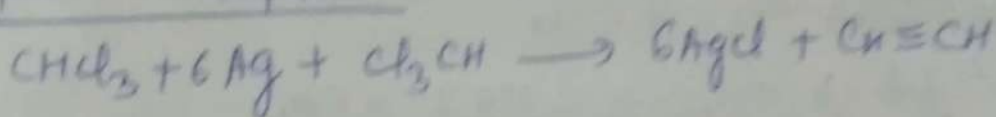
Prep<sup>n</sup>



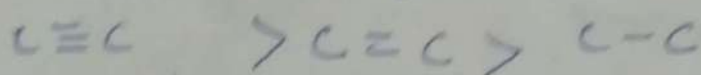
(ii) Dehydrohalogenation of dihaloalkanes  
1,2 1,2-elimination



(iii) From haloform

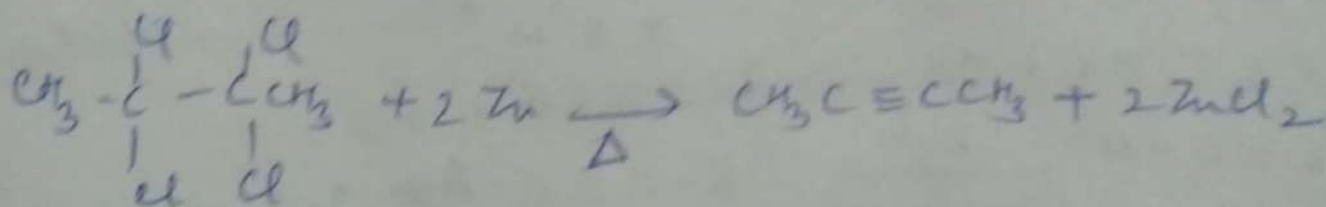
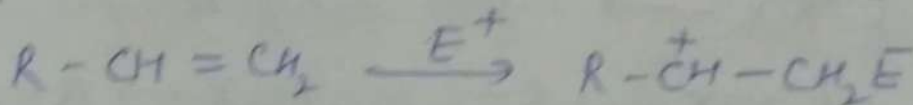
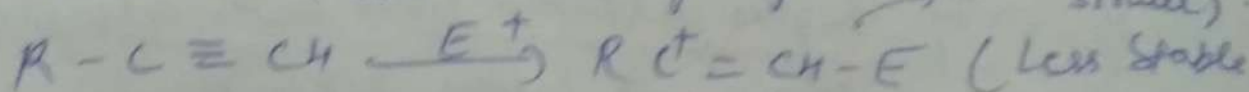


Dehalogenation of vicinal dihaloalkanes

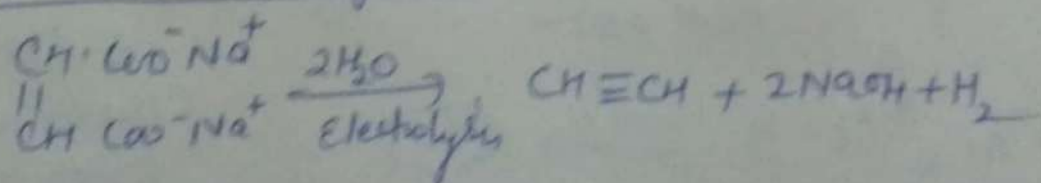


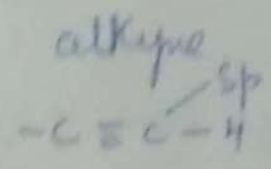
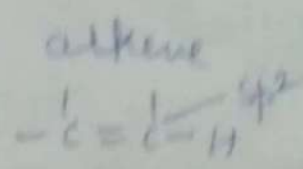
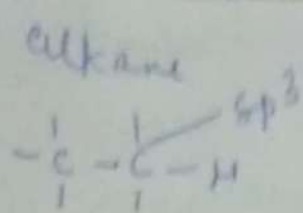
(Stronger) bond Energy

↳ It is difficult to take out  $e^-$  from triple bond which are held more tightly.  $\rightarrow$  ( $E^+$  addition is slower)

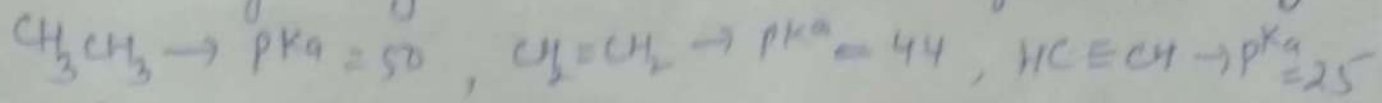


Kolbe's Electrolytic Reac<sup>n</sup>



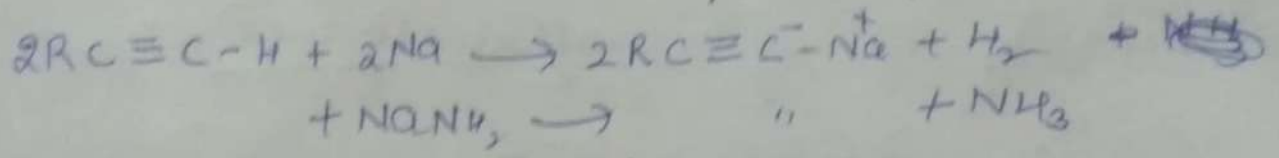
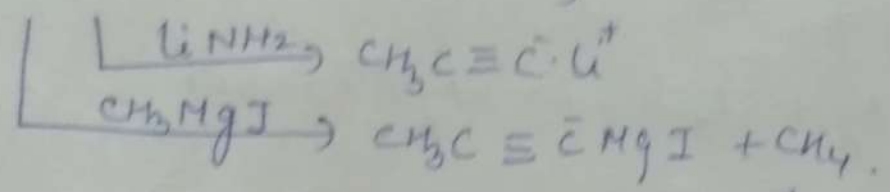
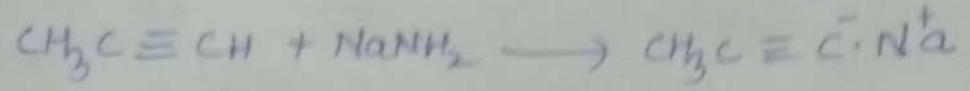


→ increasing s-character, increasing electronegativity ∴ in  $-C \equiv C-H$  easy removal of  $H^+$

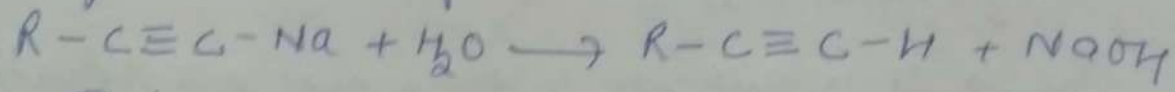


Acidic character reac<sup>n</sup>

reac<sup>n</sup> with  $NaNH_2$ ,  $LiNH_2$ ,  $CH_3MgI$



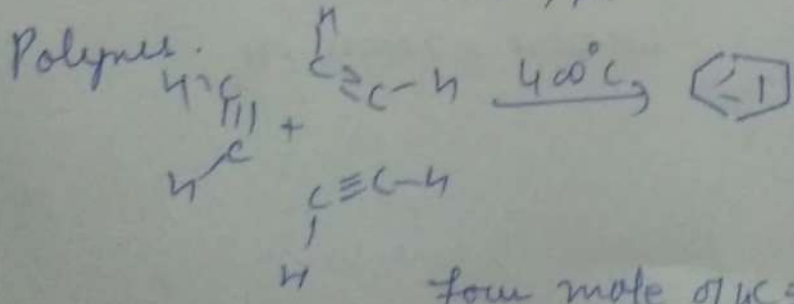
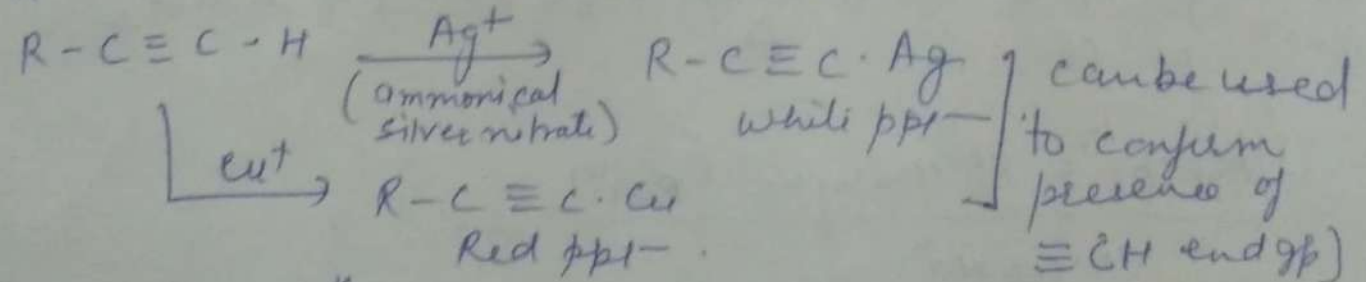
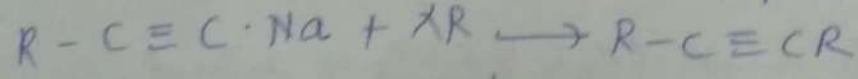
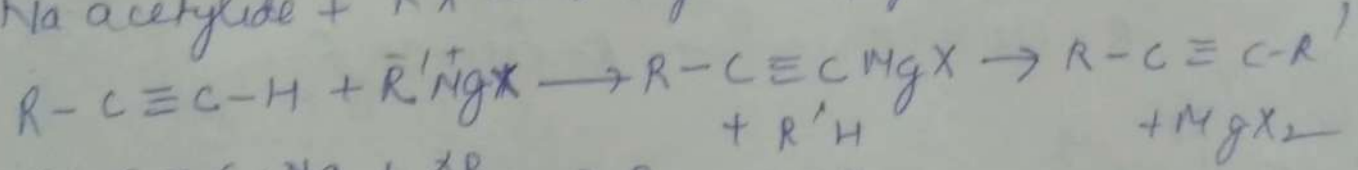
alkynes are stronger acid than  $NH_3$



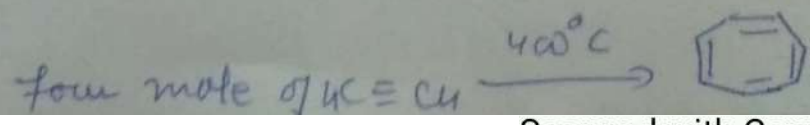
$CH \equiv C^-$  is more stable

Prep<sup>n</sup> of higher alkynes from lower alkynes

Na acetylide +  $RX \rightarrow$  higher alkynes

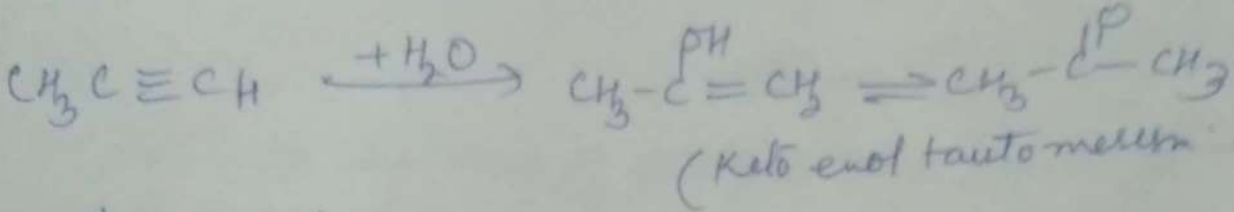
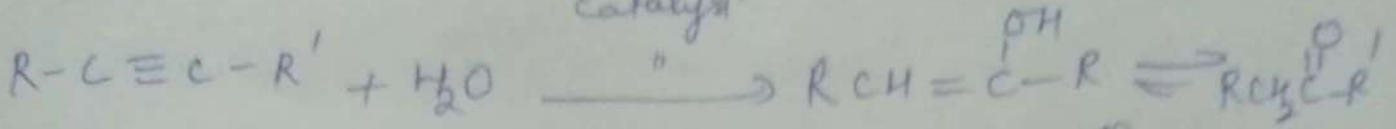
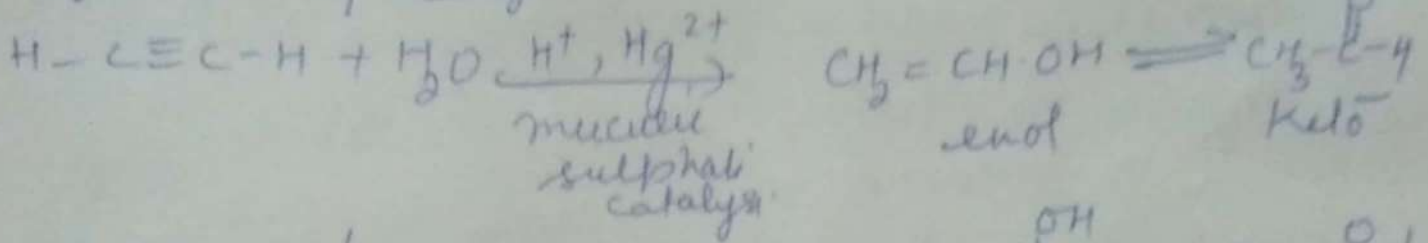


(Distinguish terminal & non-terminal alkynes)

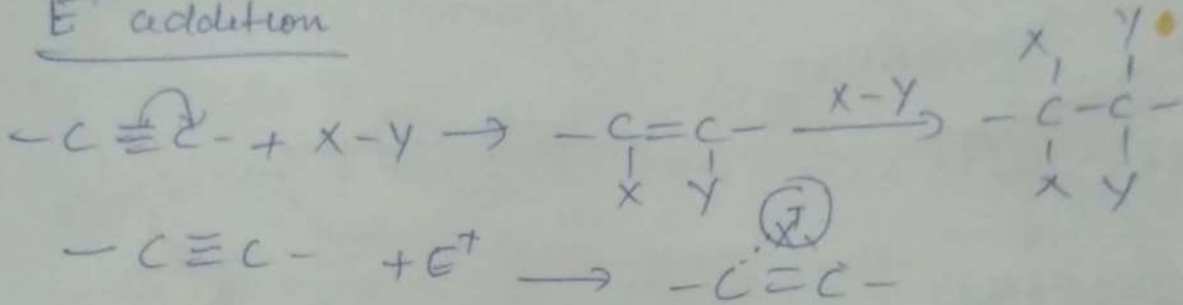


# Hydration of Alkynes

(3)

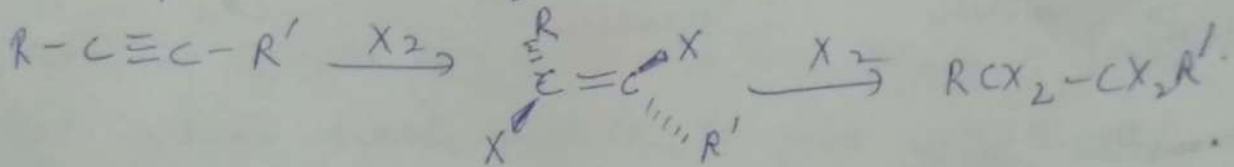


## E<sup>+</sup> addition

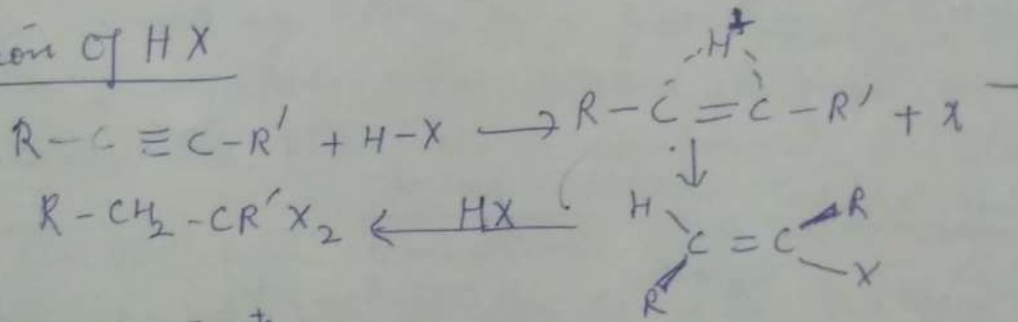


## Addition of halogens

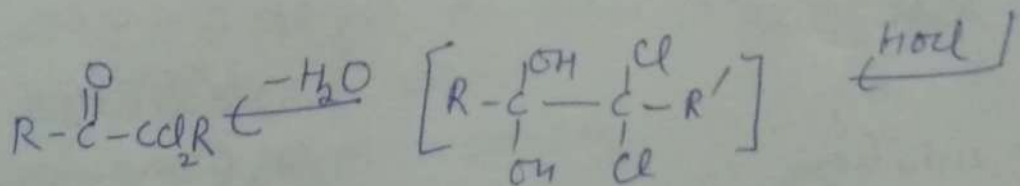
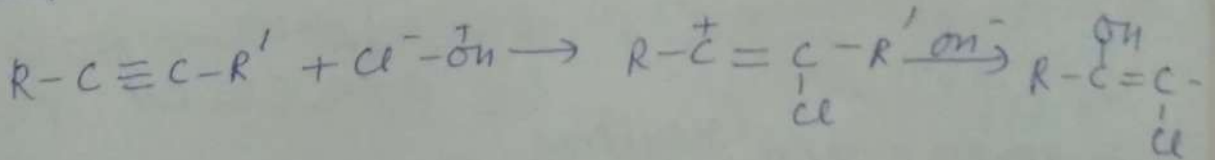
Cl<sub>2</sub> > Br<sub>2</sub> > I<sub>2</sub>



## Addition of HX

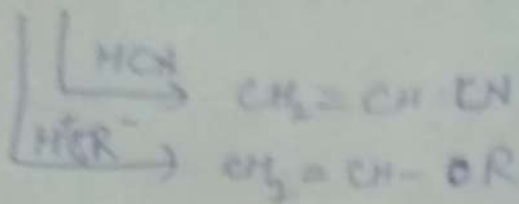
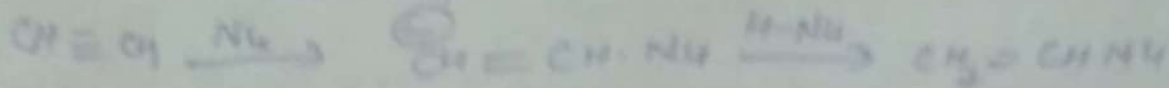


## Add. of HOCl

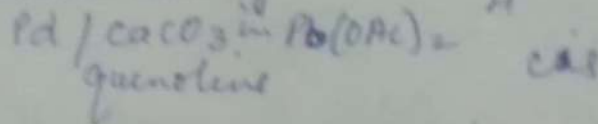
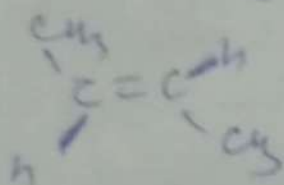
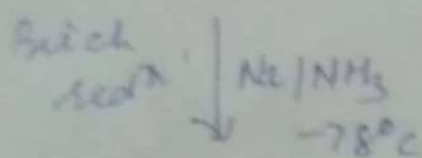
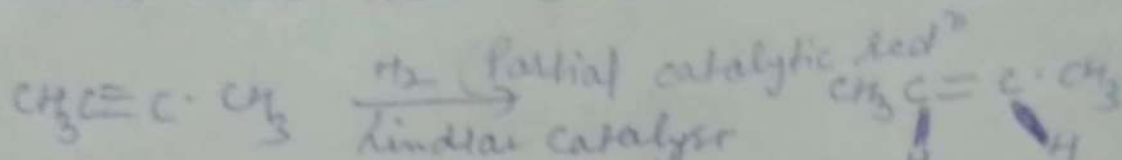
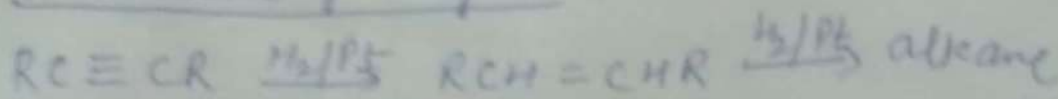


## Nucleophilic addition reaction

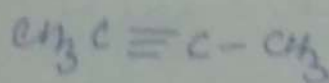
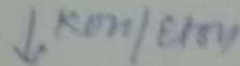
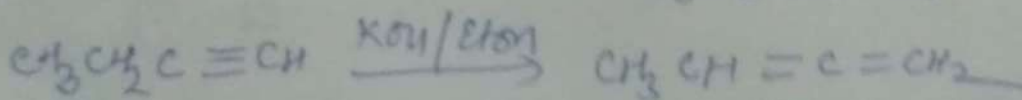
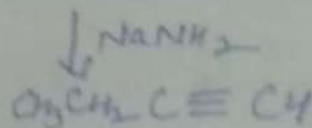
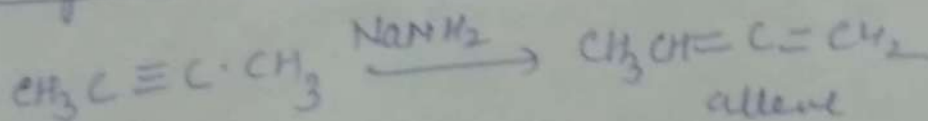
Carbocation intermediate  $\text{Nu}^-$  higher than alkene  
 $\text{H}-\text{Nu} \xrightarrow{\text{base}} \text{Nu}^-$



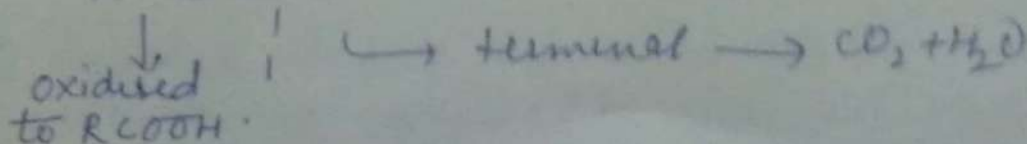
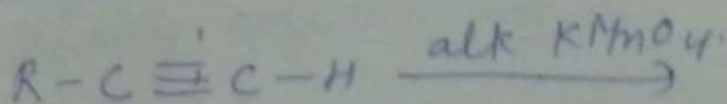
## Reduction of Alkyne



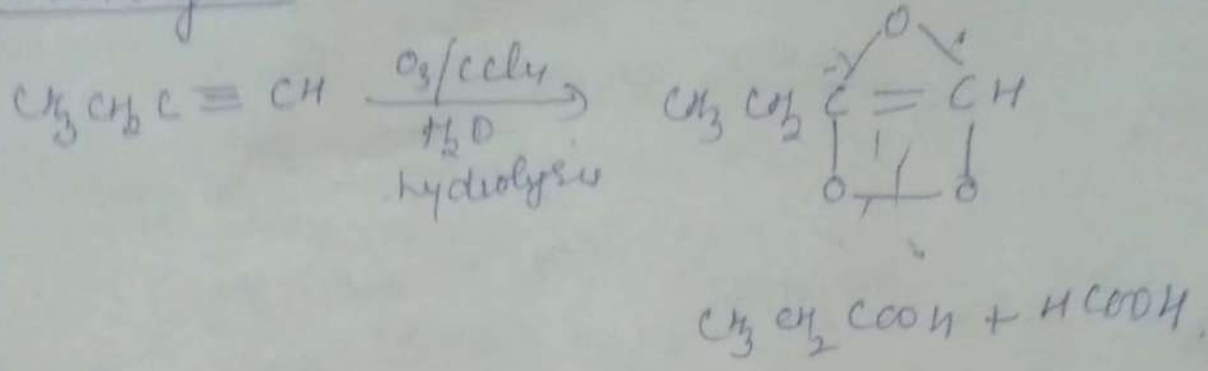
## Acetylene allene rearrangement



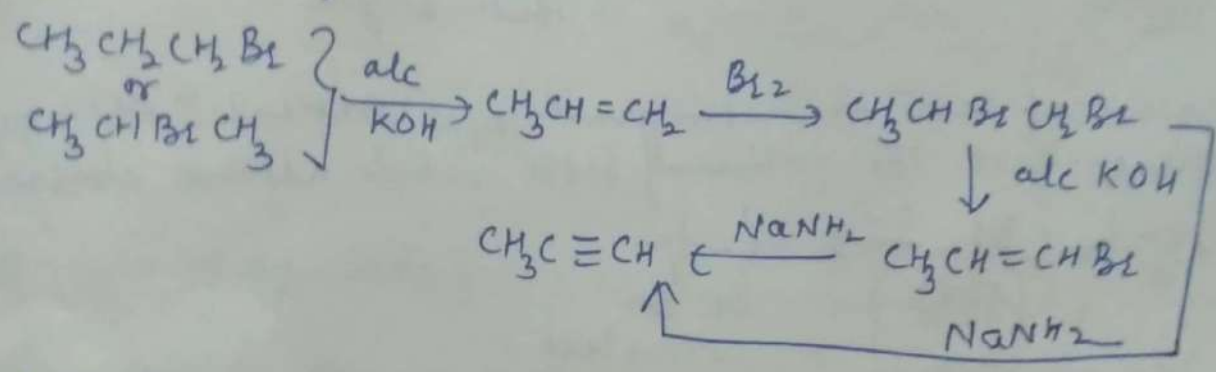
## Oxidation



Ozonolysis

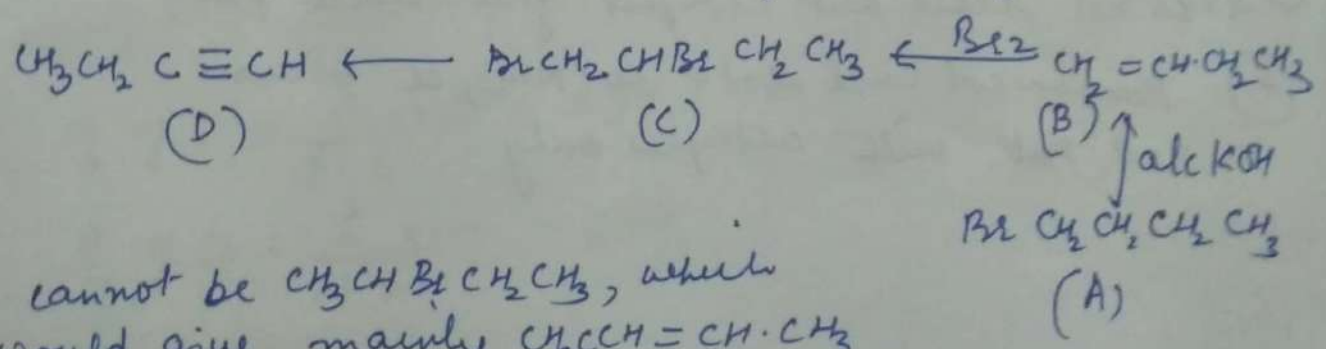


→ outline the synthesis of propyne from isopropyl alcohol or propyl bromide



→ Heating  $\text{C}_4\text{H}_9\text{Br}$  (A) with alc. KOH forms an alkene,  $\text{C}_4\text{H}_8$  (B), which reacts with  $\text{Br}_2$  to give  $\text{C}_4\text{H}_8\text{Br}_2$  (C). (C) is transformed by  $\text{KNH}_2$  to a gas  $\text{C}_4\text{H}_6$  (D). which forms a precipitate when passed through ammoniacal  $\text{CuCl}$ . Give the structures of compounds (A) through (D)

Ans The ppt with ammoniacal  $\text{CuCl}$  indicates that (D) is a 1-alkyne. which can only be 1-Butyne.

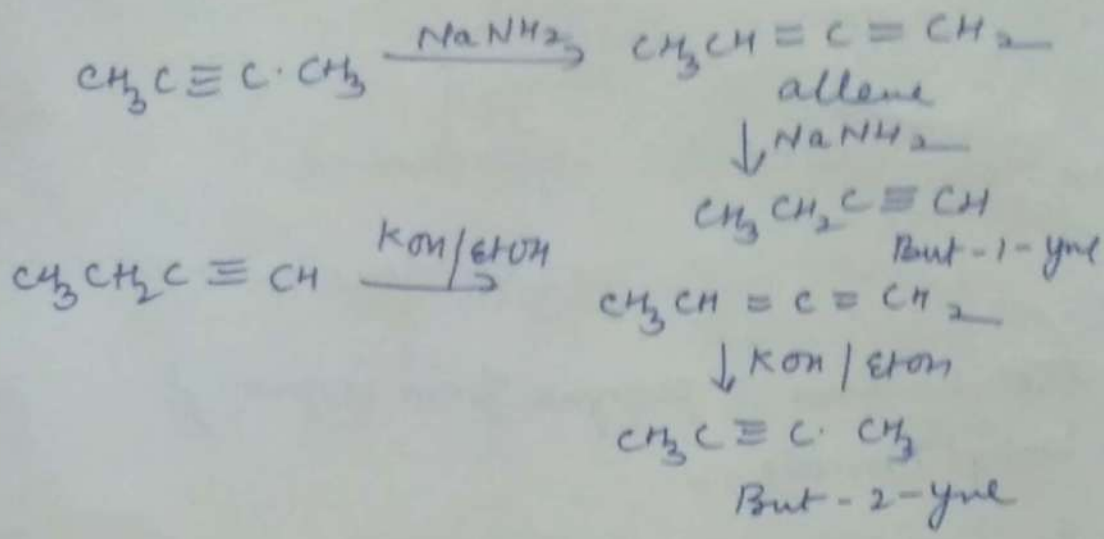


(A) cannot be  $\text{CH}_3\text{CH}(\text{Br})\text{CH}_2\text{CH}_3$ , which would give mainly  $\text{CH}_3\text{CCH}=\text{CH}\cdot\text{CH}_3$  and finally  $\text{CH}_3\text{C}\equiv\text{C}\cdot\text{CH}_3$ .

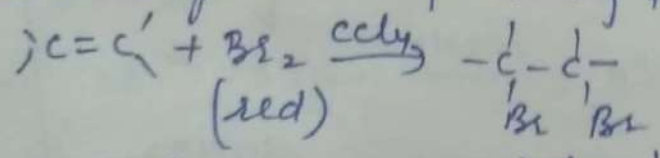
" Conjugated dienes are more stable due to resonance stabilised as compared to isolated dienes.

# Acetylene allene rearrangement

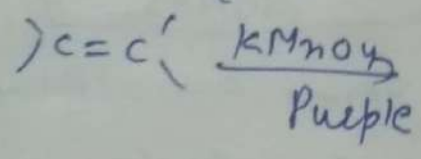
(6)



chemical tests to distinguish b/w Alkene & Alkyne  
alkenes give the following tests while alkyne does not



(red) colorless



Purple Brown-Black ppt colorless

Both the tests given by alkynes also

Distinguish B/w alkene & alkyne.

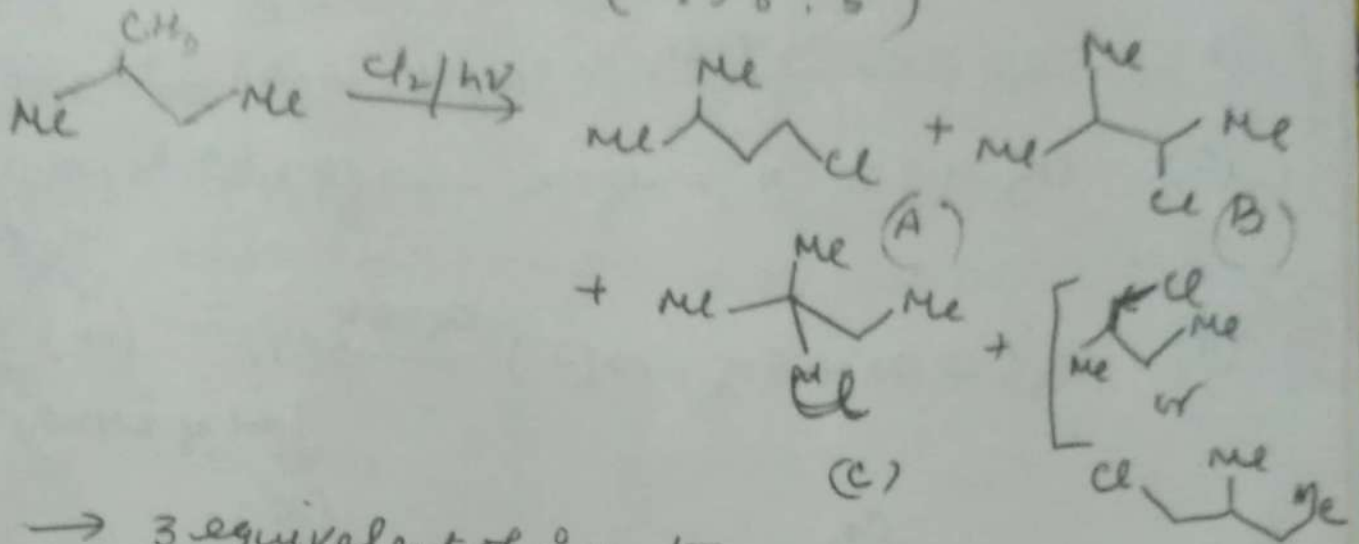
with Ammonical  $\text{AgNO}_3$  (Tollen's reagent) alkene

① does not react but alkynes give white ppt-

② Ammonical  $\text{CuCl}$  sol<sup>n</sup> &  $\text{Cu}(\text{NH}_3)_2\text{Cl}$  gives red ppt with alkynes only.

## Alkanes

Calculate the % of all the monochlorinated products obtained from the chlorination of 2-methyl butane. The relative reactivity of  $1^\circ$ ,  $2^\circ$  &  $3^\circ$  H to chlorination is (1:3.8:5) ①



Str. A $\rightarrow$ 3 equivalent of $1^\circ$ H atoms		3 x 1 = 3 <sup>D</sup>
Str. B $\rightarrow$ 2 equivalent of $2^\circ$ H atoms		2 x 3.8 = 7.6
Str. C $\rightarrow$ 1 equivalent of $3^\circ$ H atom		1 x 5 = 5
Str. D $\rightarrow$ 6 equivalent of $1^\circ$ H atom		6 x 1 = 6
		21.6

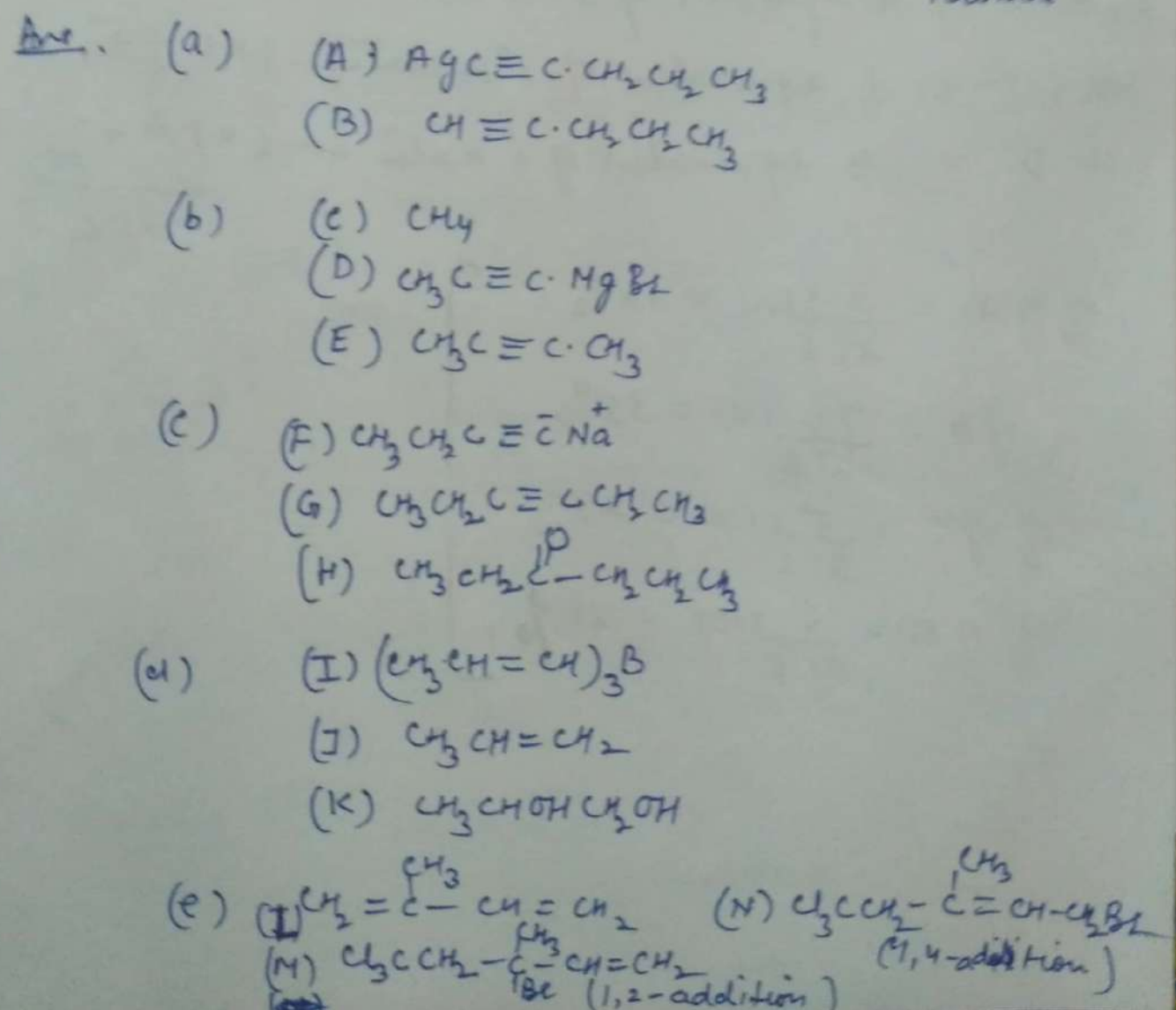
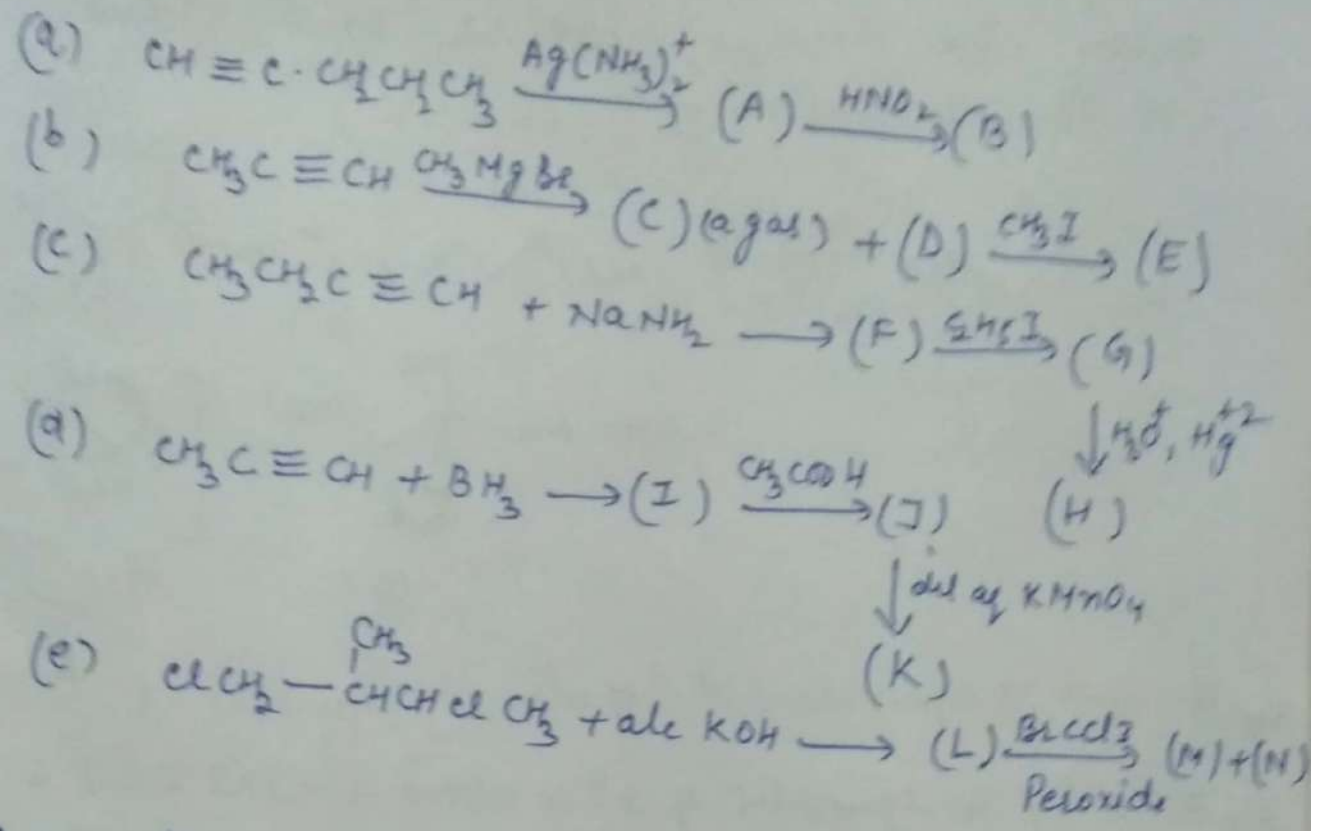
$$\% \text{ of A} = \frac{3 \times 100}{21.6} = 14\%$$

$$\% \text{ of B} = \frac{7.6 \times 100}{21.6} = 35\%$$

$$\% \text{ of C} = \frac{5 \times 100}{21.6} = 23\%$$

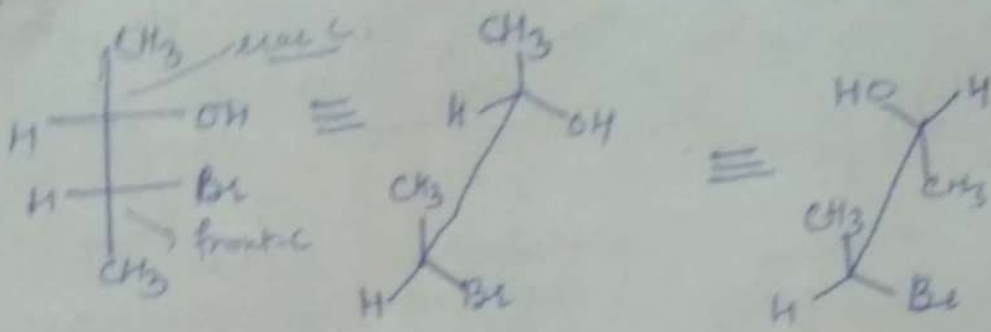
$$\% \text{ of D} = \frac{6 \times 100}{21.6} = 28\%$$

Q write a structural formula for organic comp<sup>(1)</sup>  
 (A) through (N)



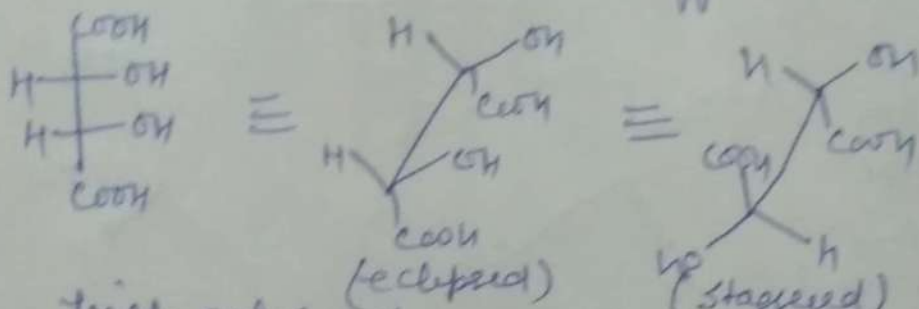


Conversion of Fischer projection to sawhorse and vice versa



eclipsed                      staggered

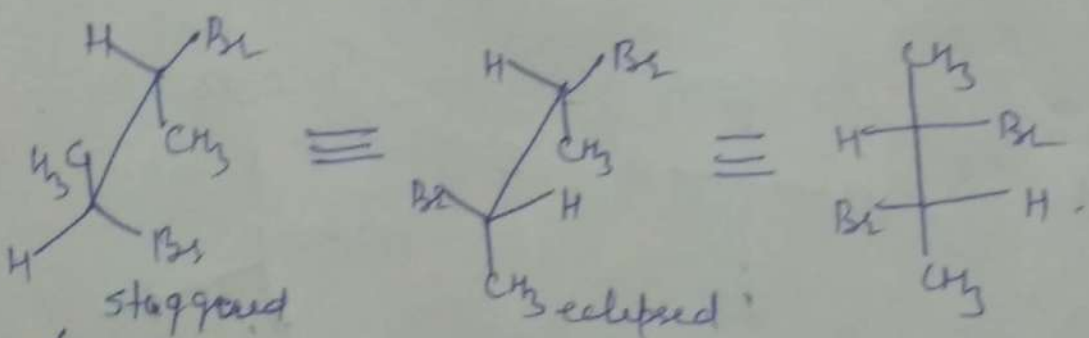
first into eclipsed, for staggered rear carb through  $180^\circ$



(eclipsed)                      (staggered)

first eclipsed, for staggered front - c through  $180^\circ$

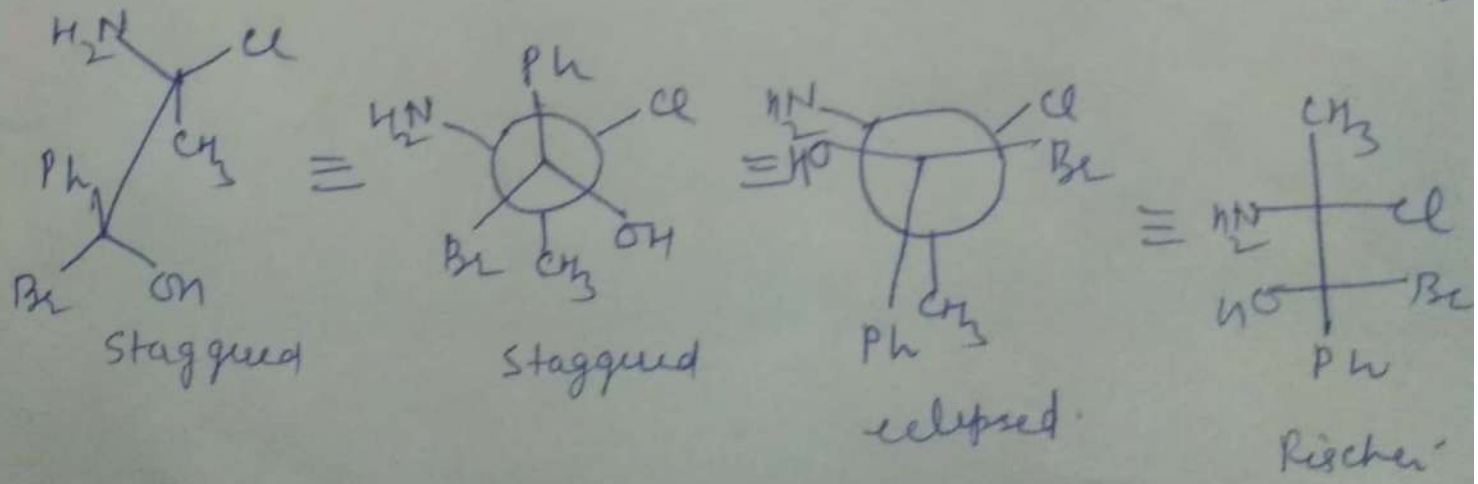
Conversion of sawhorse projection to Fischer projection



staggered

eclipsed

Conversion of sawhorse to Newman to Fischer projection vice versa



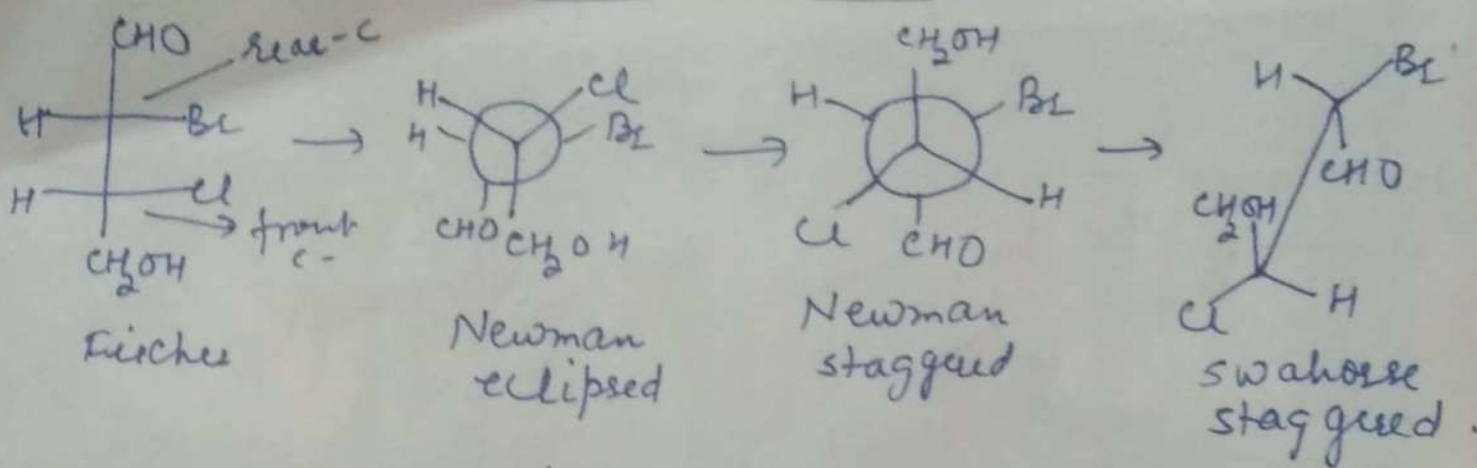
staggered

staggered

eclipsed

Fischer

Conversion of Fischer to Newman to Sawhorse (10)



Fischer into Flying wedge & vice versa

