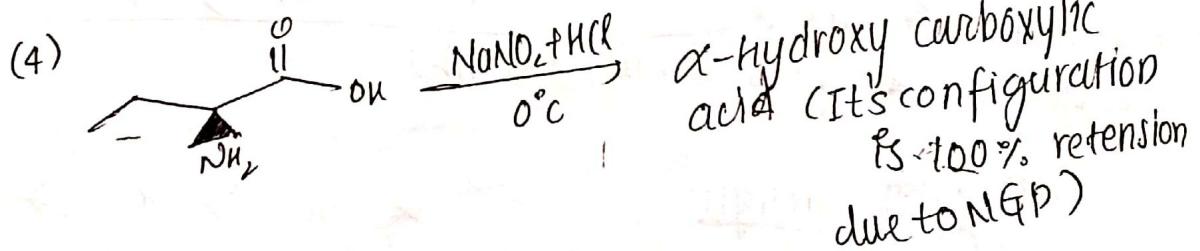
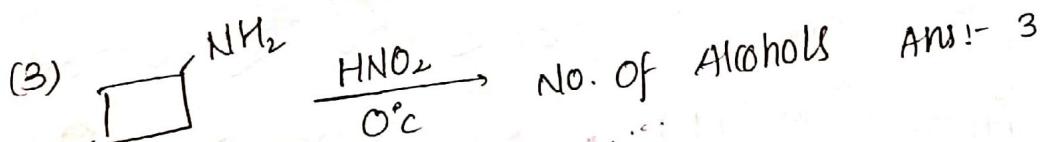
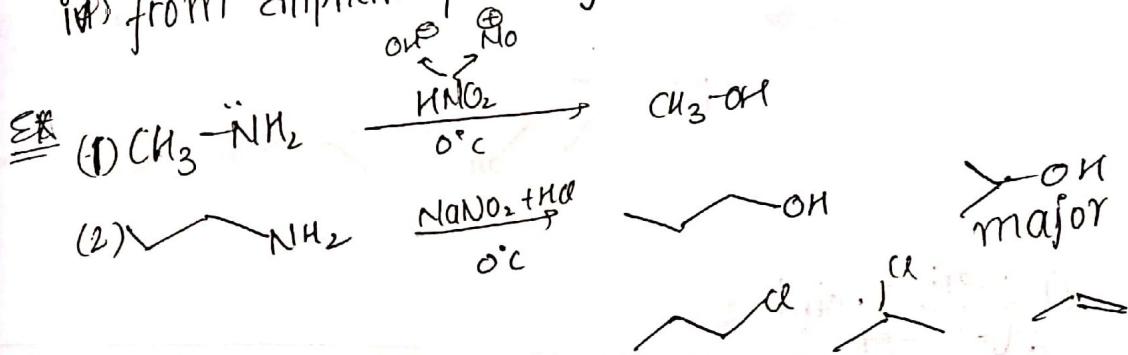


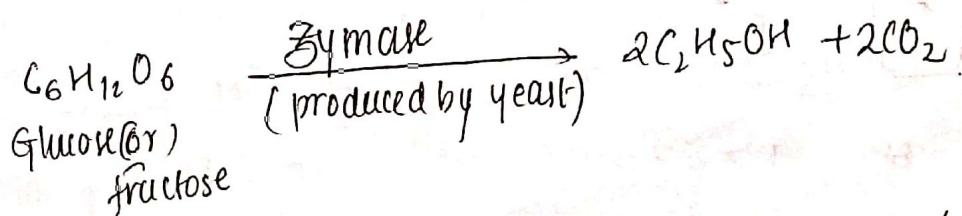
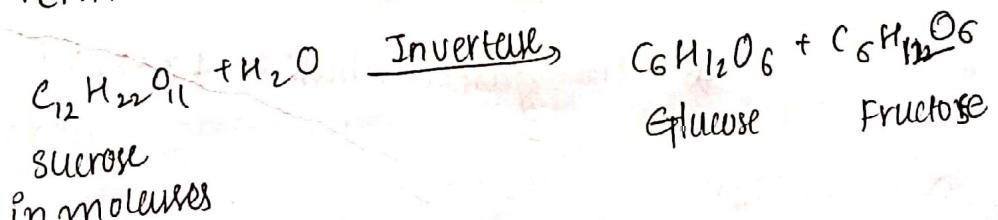
# Alcohols

## Preparations

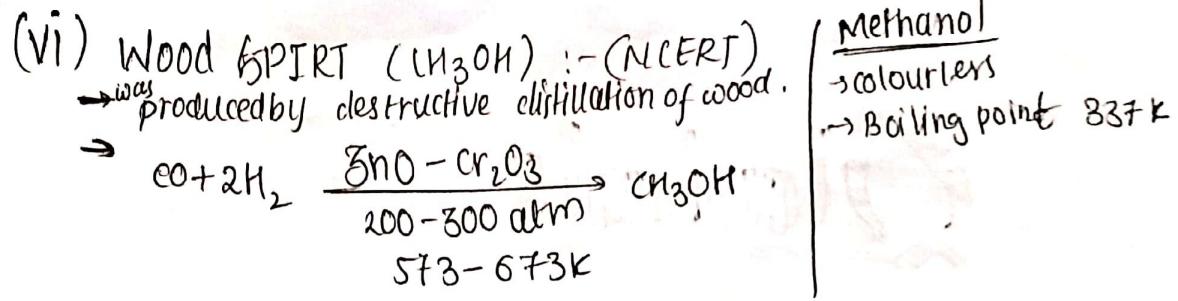
- i) from alkane
- ii) from alkene
- iii) from alkyl halides
- iv) from aliphatic primary amines.



## (V) Fermentation (NCERT)



\* Action of zymase is inhibited when alcohol % so formed exceeds 14%.



### Properties

(1) Solubility :- (a)  $\text{CH}_3\text{OH} > \text{CH}_3\text{CH}_2\text{OH} > \text{CH}_3(\text{CH}_2)_2\text{OH} >$   
 $\text{CH}_3(\text{CH}_2)_3\text{OH}$



(2) Boiling point :-

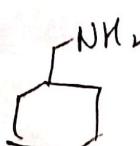
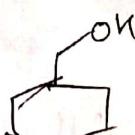
since increase in no. of carbons increases vander waals forces in (a)  
and decrease in surface area decreases vander waals forces in (b)



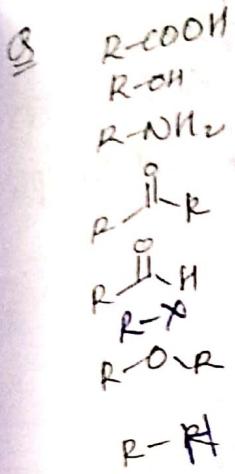
(3) Acidic strength :-  $\text{CH}_3\text{OH} < \text{CH}_2\text{OH} < \text{CH}_3\text{CH}_2\text{OH} < \text{CH}_3(\text{CH}_2)_2\text{OH}$

In aq. sol :- 1 > 2 > 3 > 4

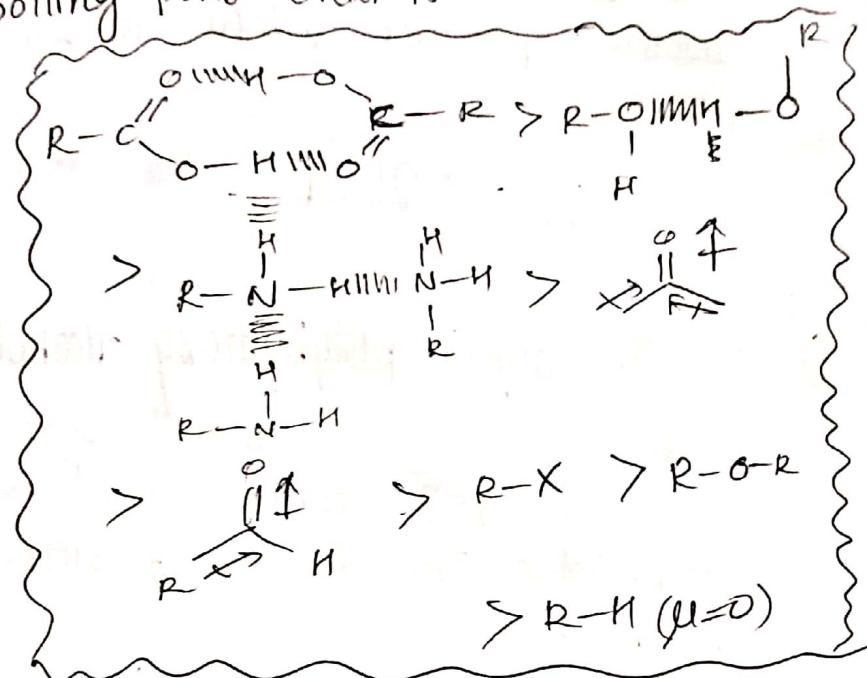
⊗ In gaseous phase :- 4 > 3 > 2 > 1



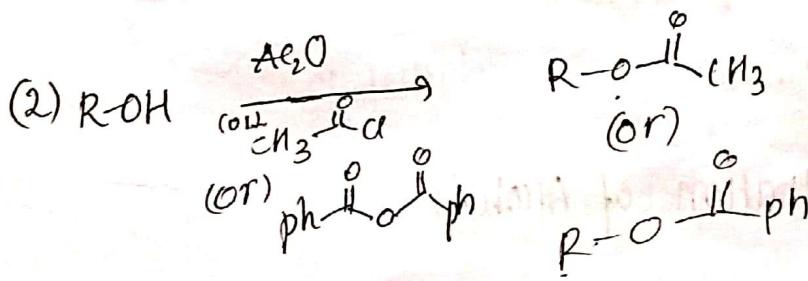
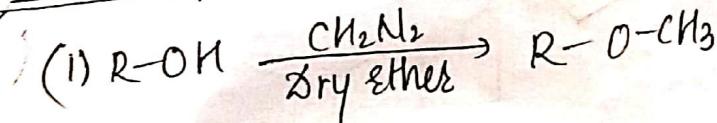
BP :- 1 > 2 > 3 > 4



for equal molecular weight the  
boiling point order is



### Chemical properties



(1) Alcoholic ( $\text{OH}$ ) groups, phenolic ( $\text{OH}$ ), ( $\text{NH}_2$ ) of  $^1\text{amine}$ , ( $-\text{NH}$ ) of  $^2\text{amine}$ , Aniline gives above rxn.

(2) Therefore it's the best method used to predict the no. of ( $-\text{OH}$ ) and ( $-\text{NH}_2$ ) groups

Q1

An organic compound has molecular formula  $C_6H_{12}O_8$  (Mwt. = 180). After complete Acetylation product weighs 390. find no. of -OH groups.

5-OH groups

Q2

An ayclic polyhydroxy alcohol has the molecular wt. 82 after complete acetylation product wt. is 208. Both reactant and product seem to be stable. Then fin no. of stereoisomers for the reactant.

3 - OH groups

$82 - 48$

(3)

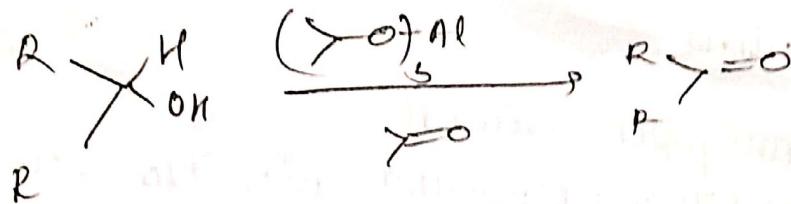


### (3) Dehydration of Alcohols

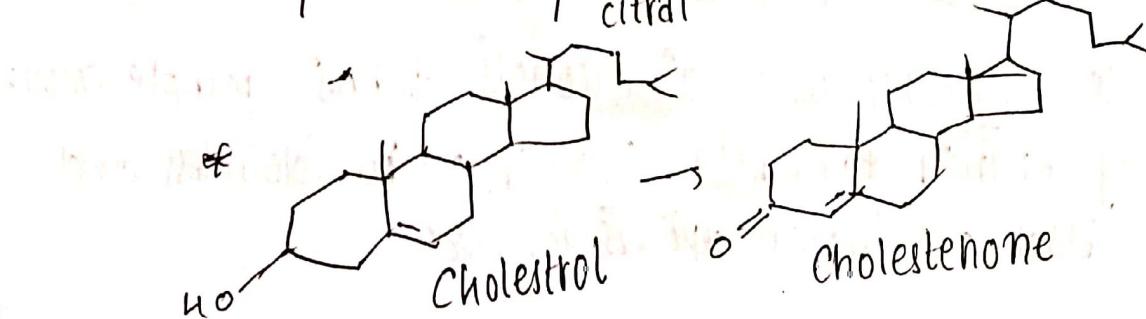
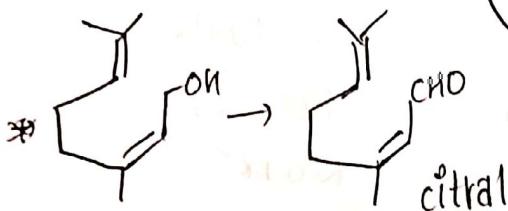
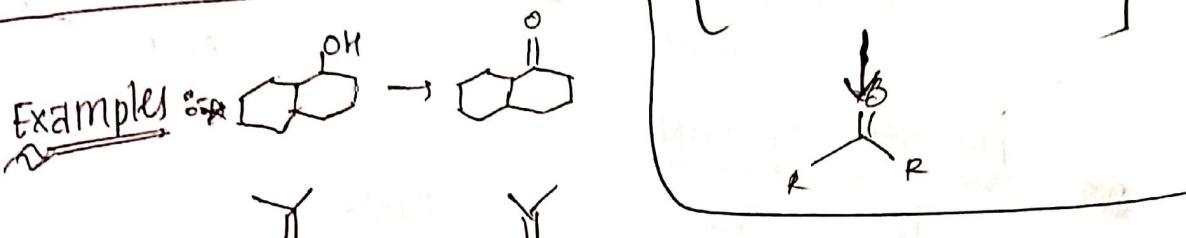
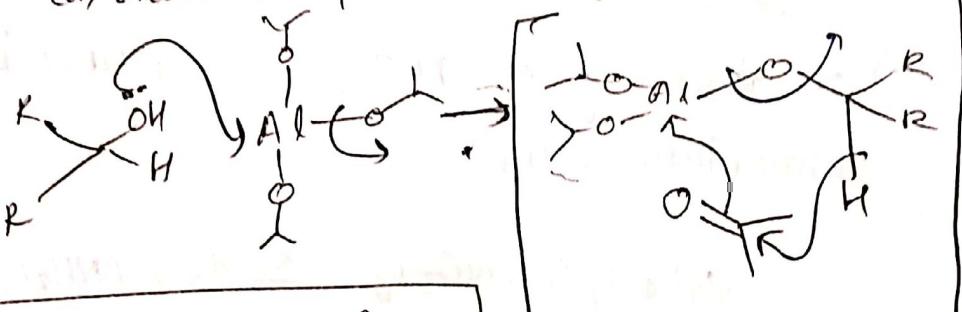
### (4) Alcohols to alkyl Halides

### (5) Oppenauer oxidation

Alcohols are oxidised to corresponding carbonyl compounds in presence of aluminium iso propoxide, along with ketone.



Mechanism :- (i) Hydride ion transfer is observed.  
(ii) mechanism proceeds through <sup>cyclic</sup> 6M. ring TS<sup>#</sup>.



(6) MPV Reduction (Meerwein Ponndorf Verleg)  
conversion of carbonyl compounds to alcohols by  
means of Aluminium iso-propoxide along with alcohol.

## Lab Reactions

- (i) Litmus paper - Neutral
- (ii) All alcohols give pop sound with Na meter
- (iii) All alcohols are insoluble in NaOH solution except methanol.
- (iv) All alcohols gives red colour with acidic ammonium nitrite. (ix)



### function of CAN

- i)  $^1\text{o}$  alcohol  $\rightarrow$  aldehyde
- ii)  $^2\text{o}$  alcohol  $\rightarrow$  ketones
- iii)  $^3\text{o}$  alcohol  $\rightarrow$   $\text{NaOx}^-$

(v) primary and  $2^{\circ}$  alcohol turns purple colour of  $\text{KMnO}_4 \rightarrow (\text{Mn}^{+7})$  (alkaline) to colourless and black (or) brown ppt. is formed.

(vi)  $1^{\circ}$  and  $2^{\circ}$  alcohols turns orange dichromate to green. (x)

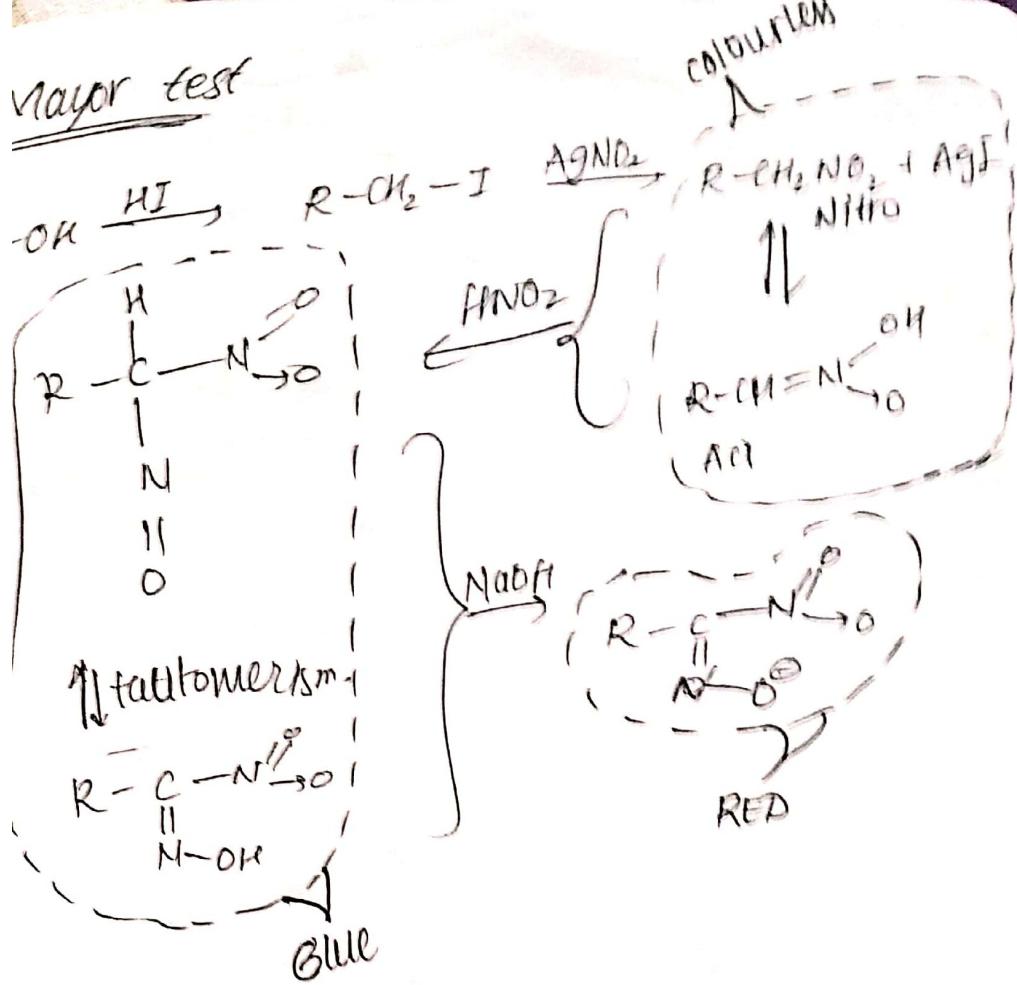
(vii) All alcohols gives fruity smells with carboxylic acids in acidic solution.

### Lucas test

Revise notes

- Aliphatic linear alcohols with more than 6 carbons are insoluble, therefore Lucas test is not used.

## Vilayet test



${}^1\text{R-OH} \rightarrow$  Red colour

${}^2\text{R-OH} \rightarrow$  Blue colour

${}^3\text{R-OH} \rightarrow$  colourless

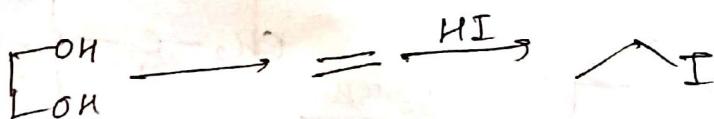
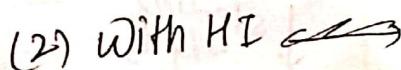
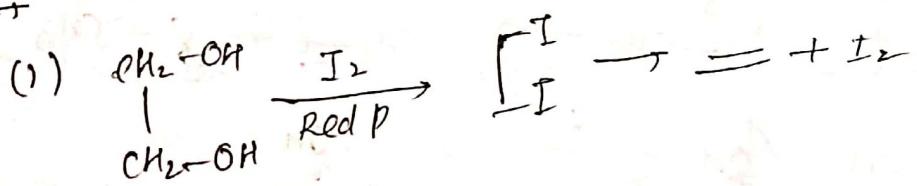
alcohols give yellow solids.

# Diools

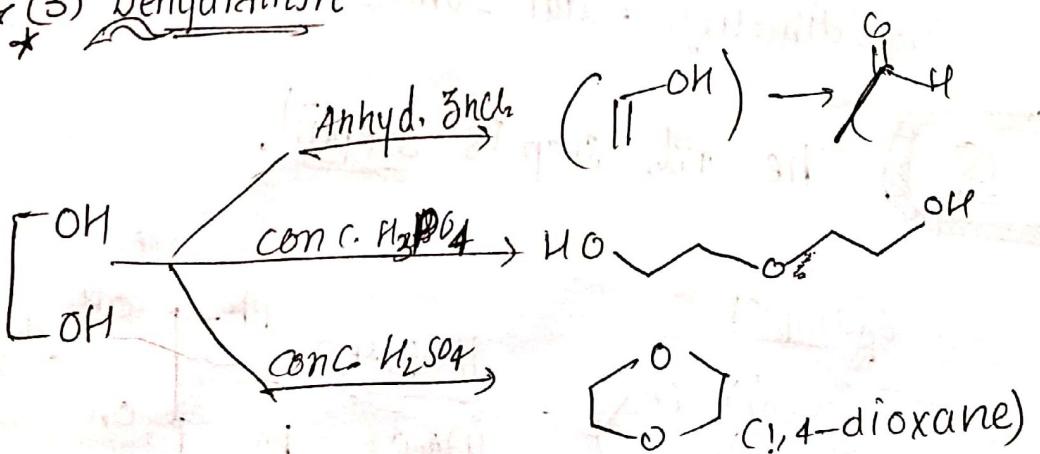
## Preparation :-

- (i) from alkenes
- (ii) from carbonyl compounds
- (iii) from vicinal dihalides

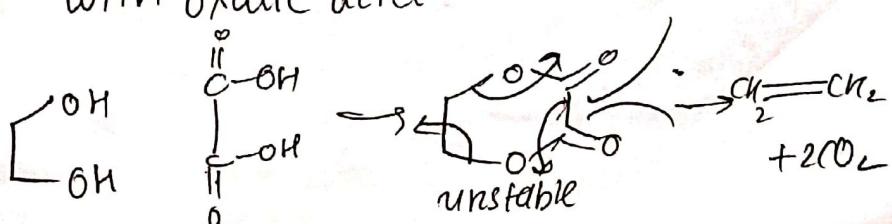
## Properties :-



## \* \* (3) Dehydration

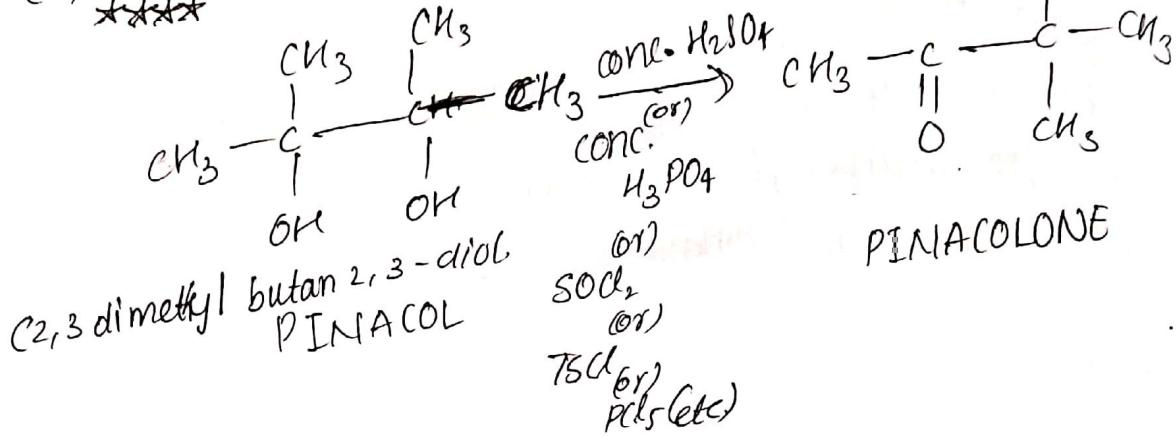


## (4) Rxn with oxalic acid

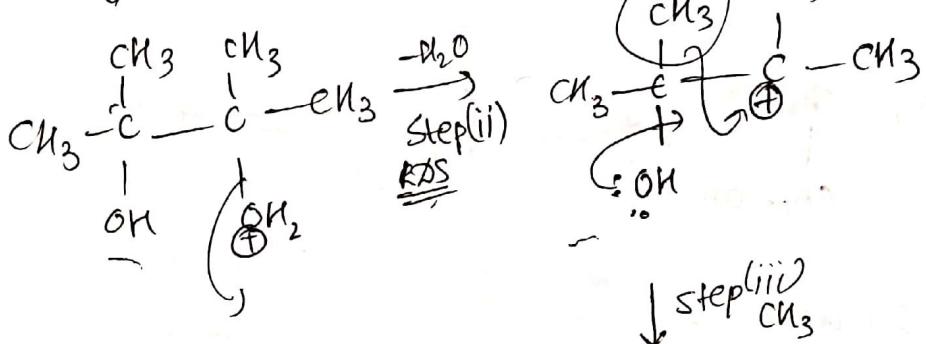


(5) ~~ADU~~

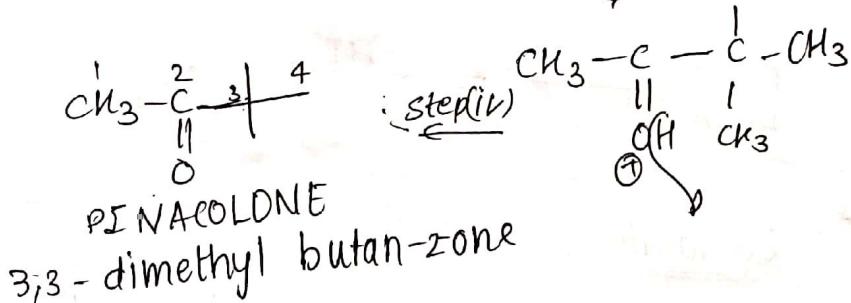
## PINACOL - PINACOLONE REARRANGEMENT :-



↓ Step(i)

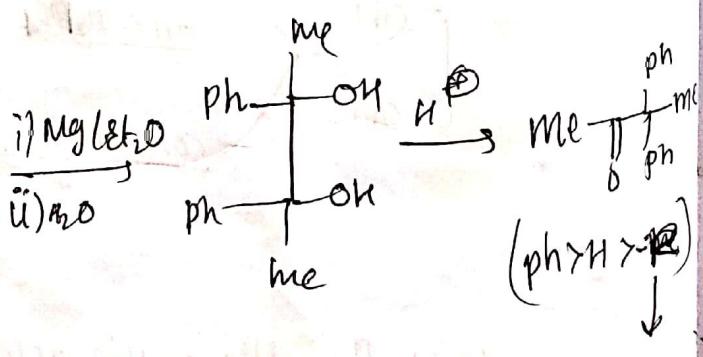


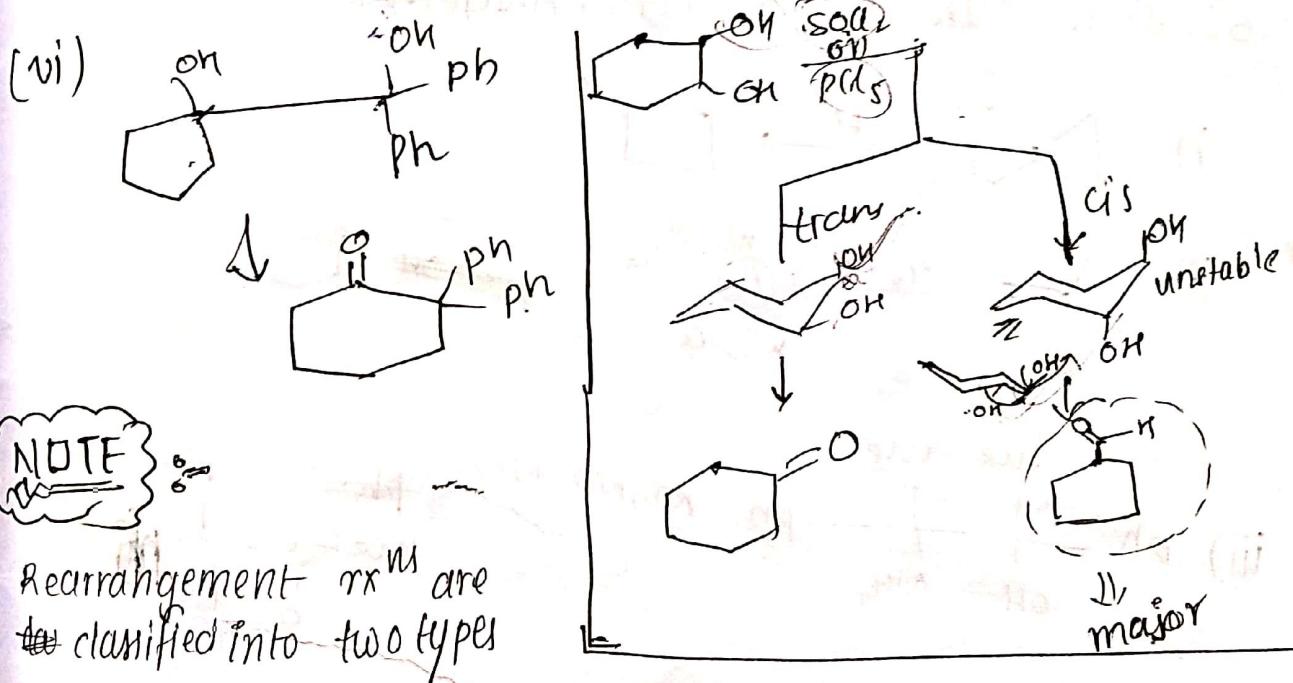
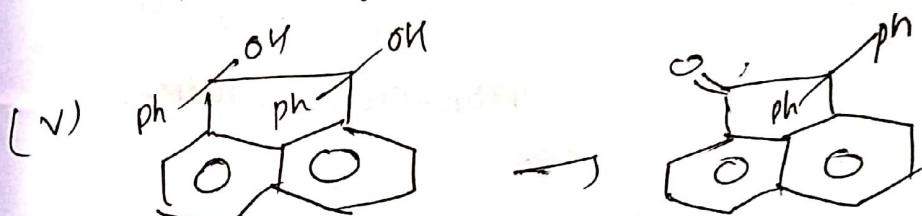
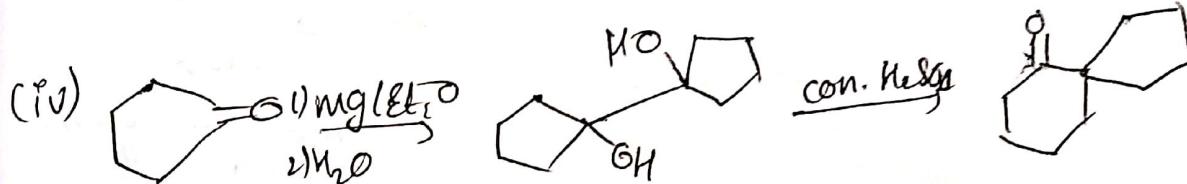
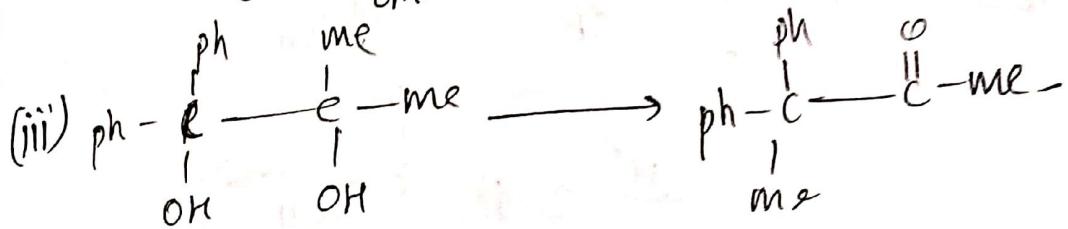
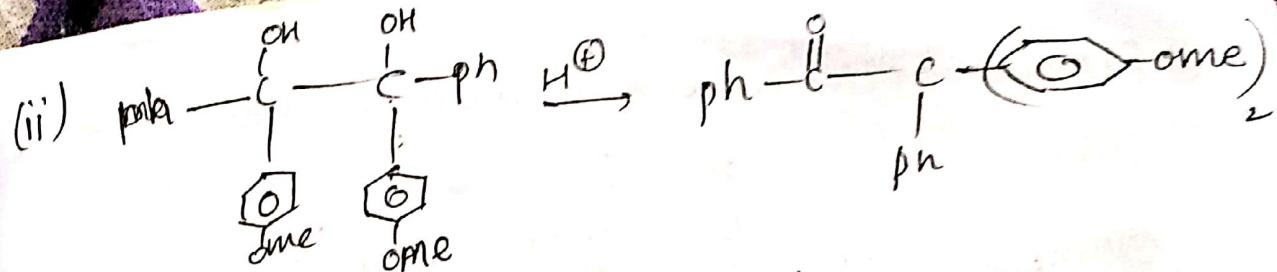
↓ Step(iii)



The rds step is step(ii).

Example





### INTRA

→ during migration migratory aptitude doesn't fully detach.

→ Non-cross over products.

→ If migratory aptitude is chiral its configuration is 100% retained after migration.

### INTER

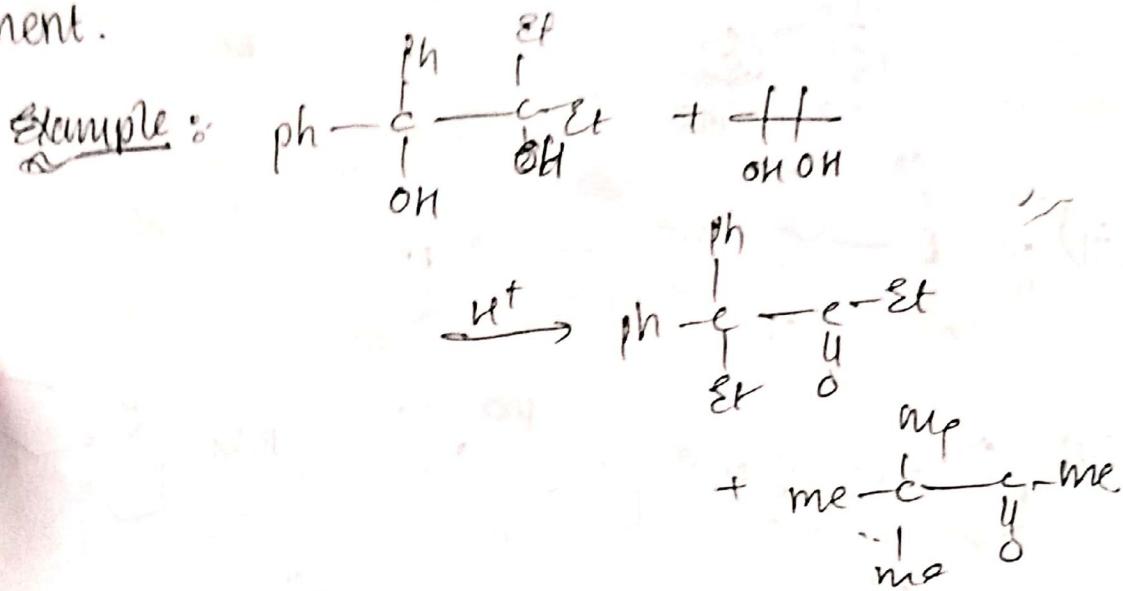
→ during migration , migratory aptitude doesn't fully detach.

→ crossover products are obtained.

→ Here both retention and inversion of chiral migratory aptitude occurs.

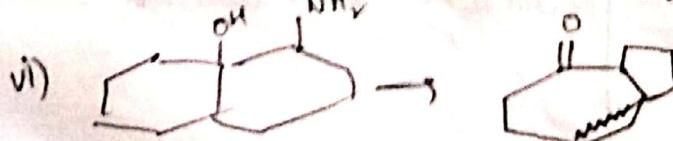
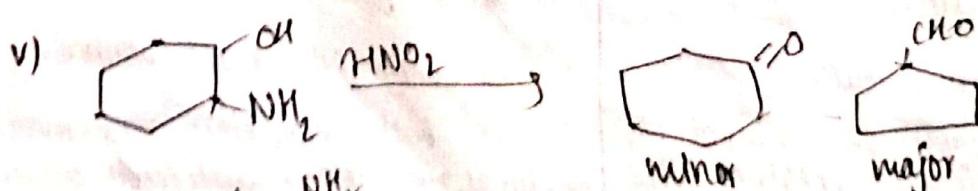
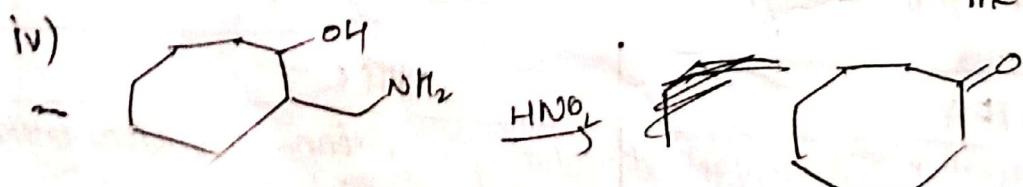
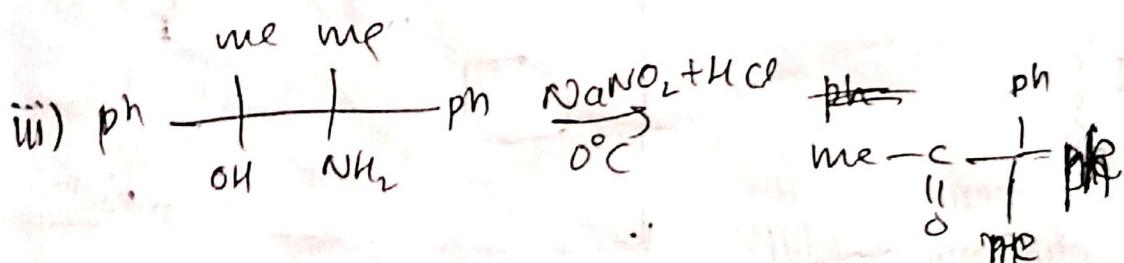
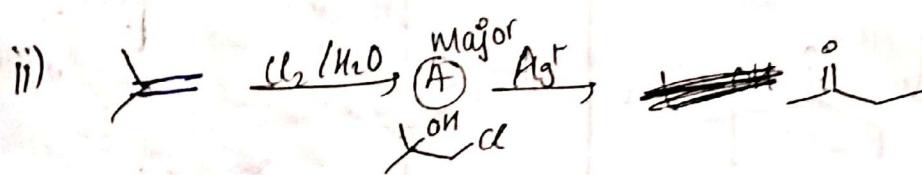
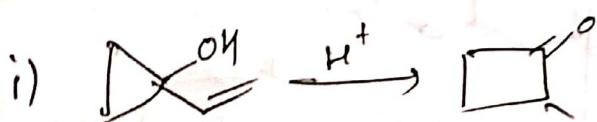
④ PINACOL - PINACOLONE is an intra molecular rearrangement.

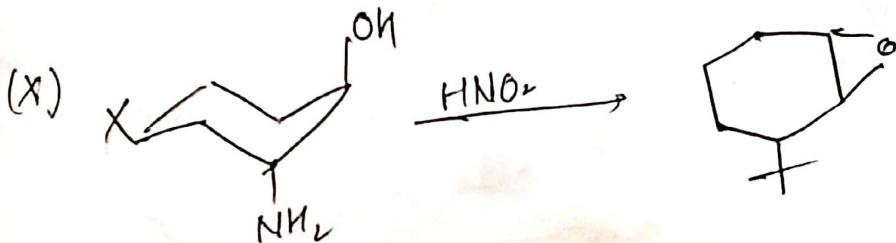
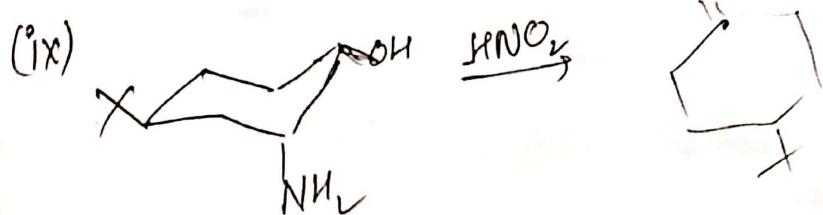
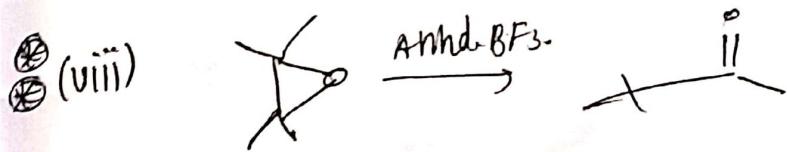
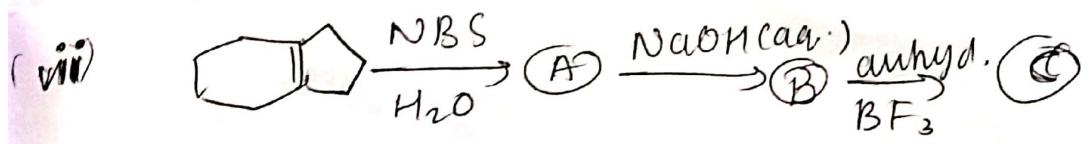
Example:



Non-cross-over product.

### (6) SEMI-PINACOLONE REARRANGEMENT

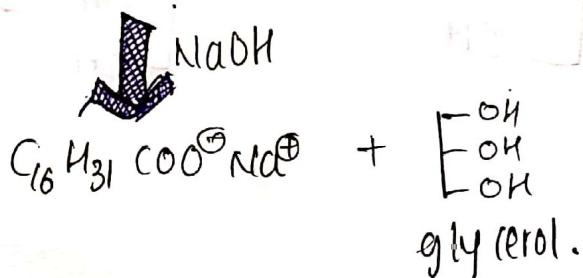
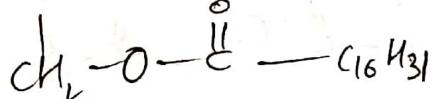
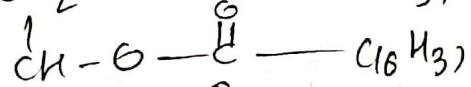
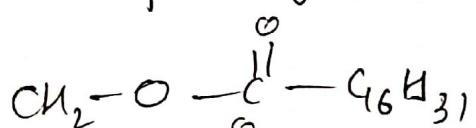




# TRIOLS

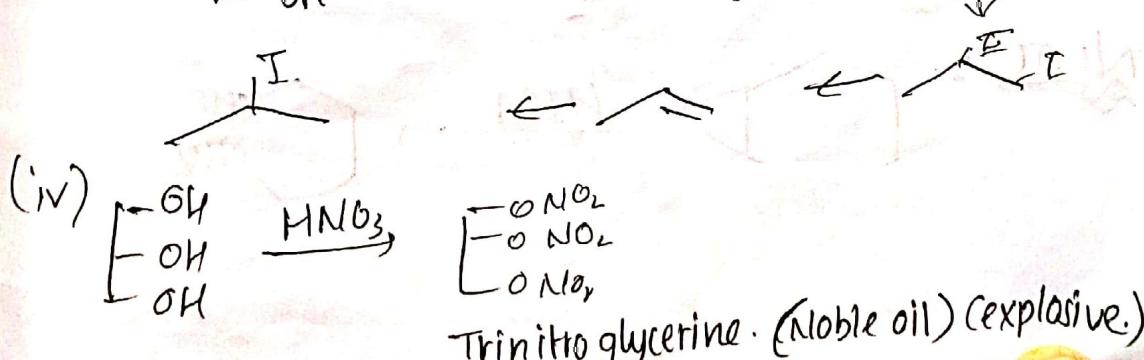
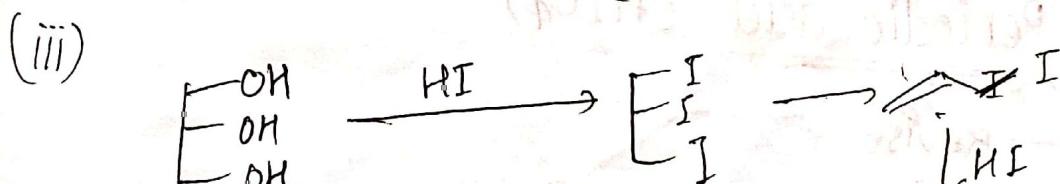
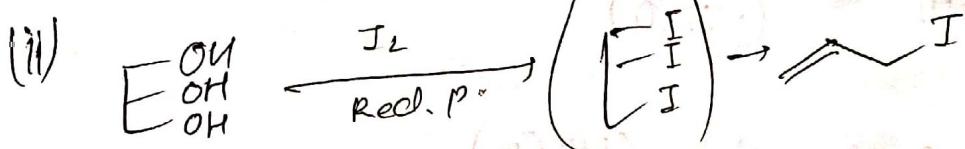
## Preparation

i) Saponification of tri-glycerides (tri ester of fatty acids with glycerol.)



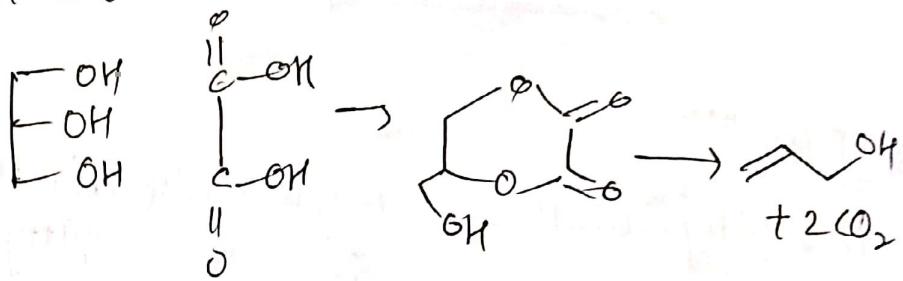
## Properties

(i) Viscosity

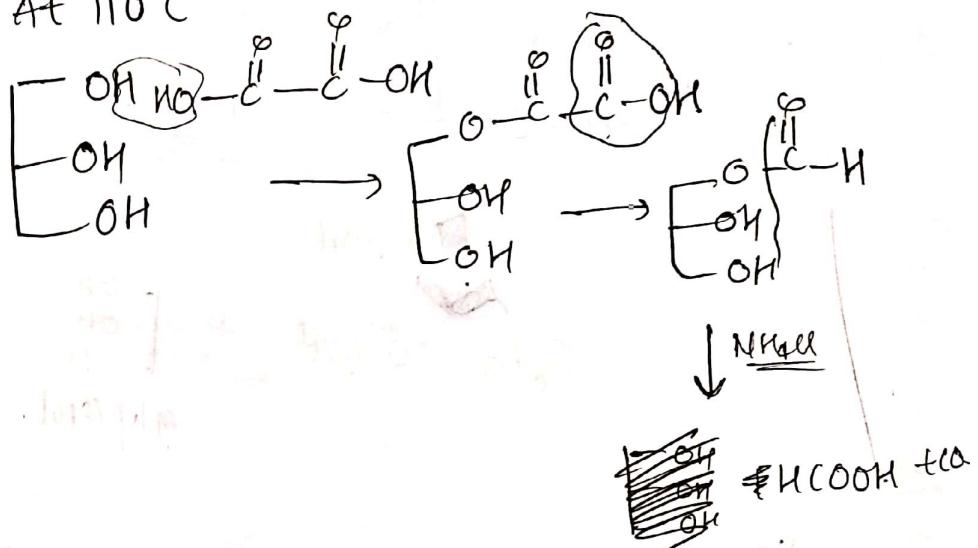


(vi) with oxalic acid.

(a) At  $260^{\circ}\text{C}$



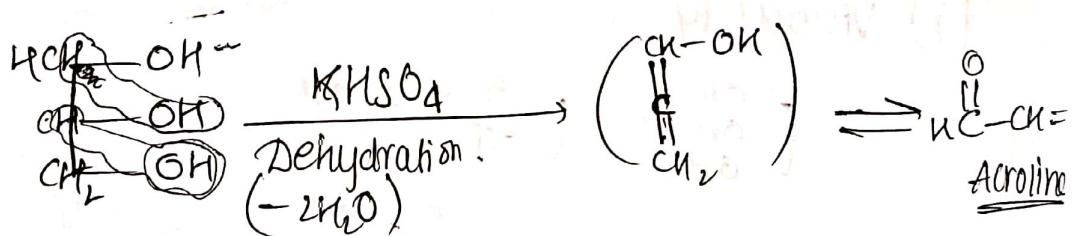
(b) At  $110^{\circ}\text{C}$



(vi)



$\text{RX}^n$  with  $\text{KHSO}_4$



(vii) Periodic acid ( $\text{HIO}_4$ )

→ Revise.

NOTE :-

