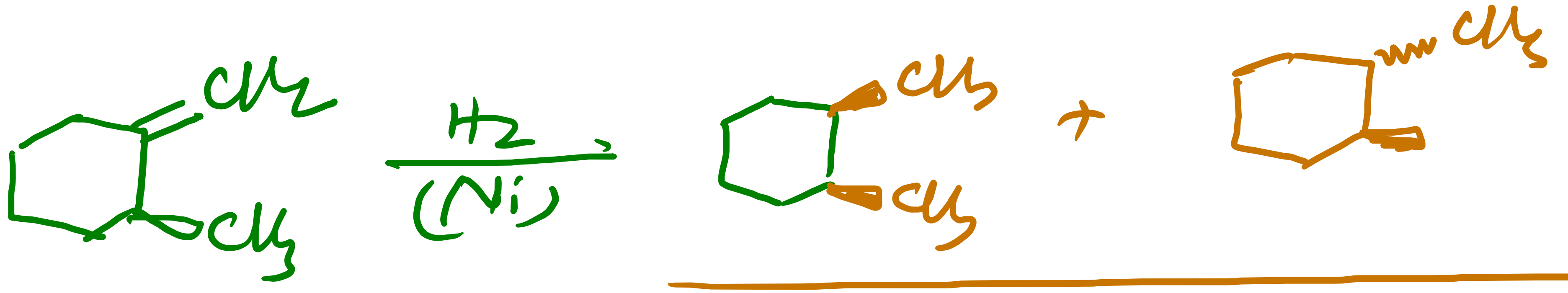
Q(1) $>C=O + \begin{matrix} HS \\ HS \end{matrix}\Big] \xrightarrow[\text{raney Ni } (H_2)]{} >CH_2$.

(5). CSM

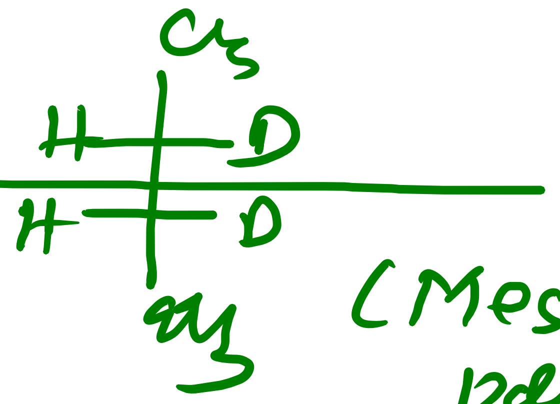
Cis cpd + syn addition

→ Meso pdt.

(2).

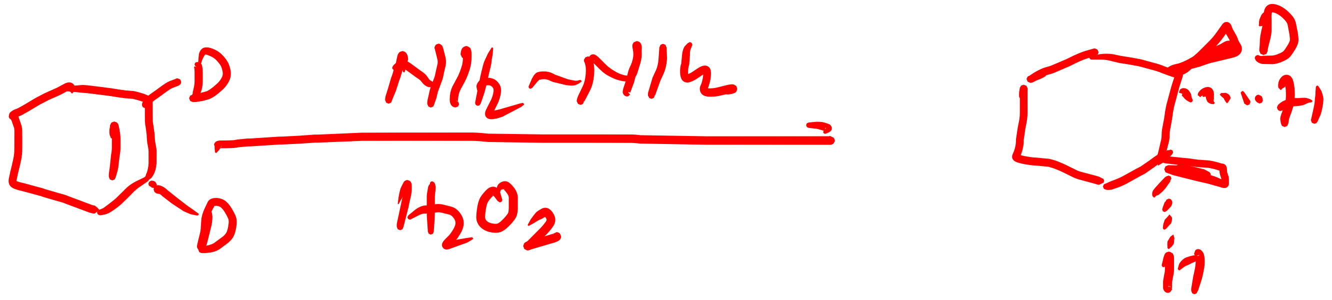


Diastereomers.



(Meso pdt)

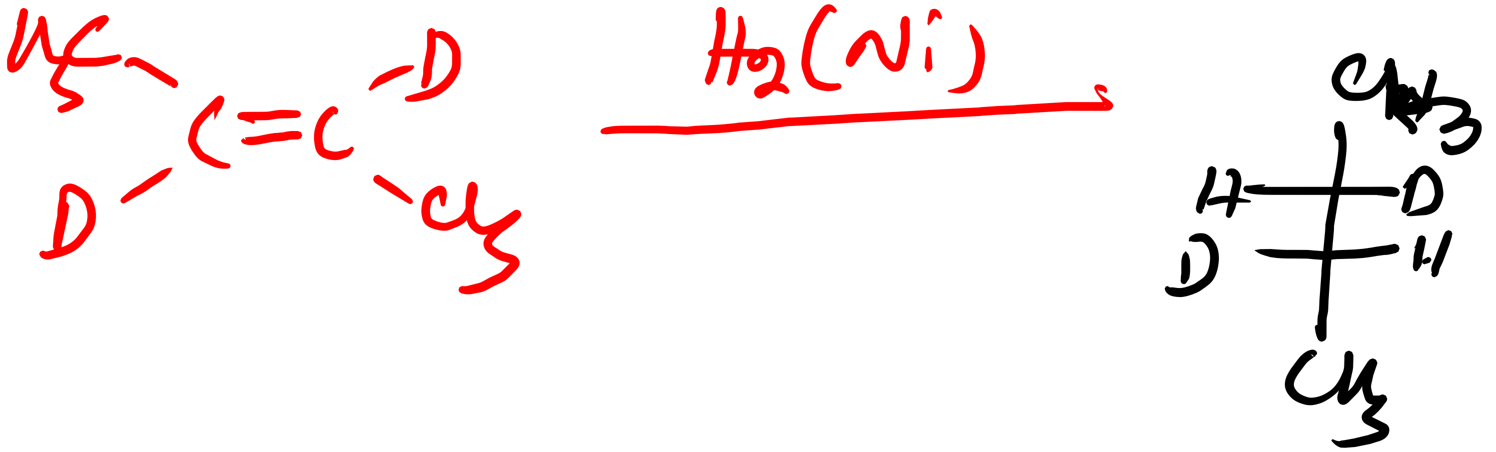
Q 3.



TSR Trans cpd + syn addition

→ Racemic mixture

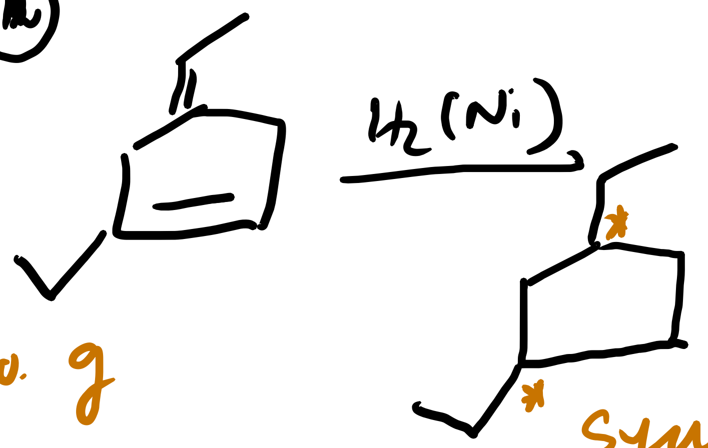
Q 4)



+ ENT.

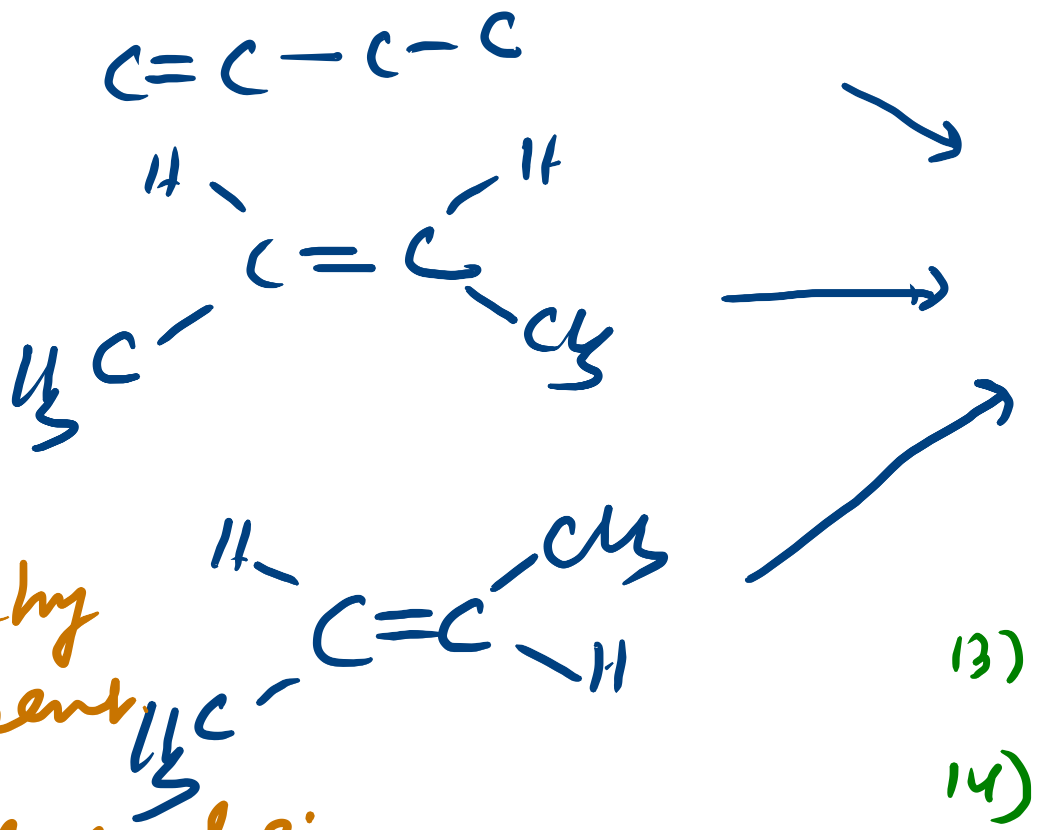
(4)

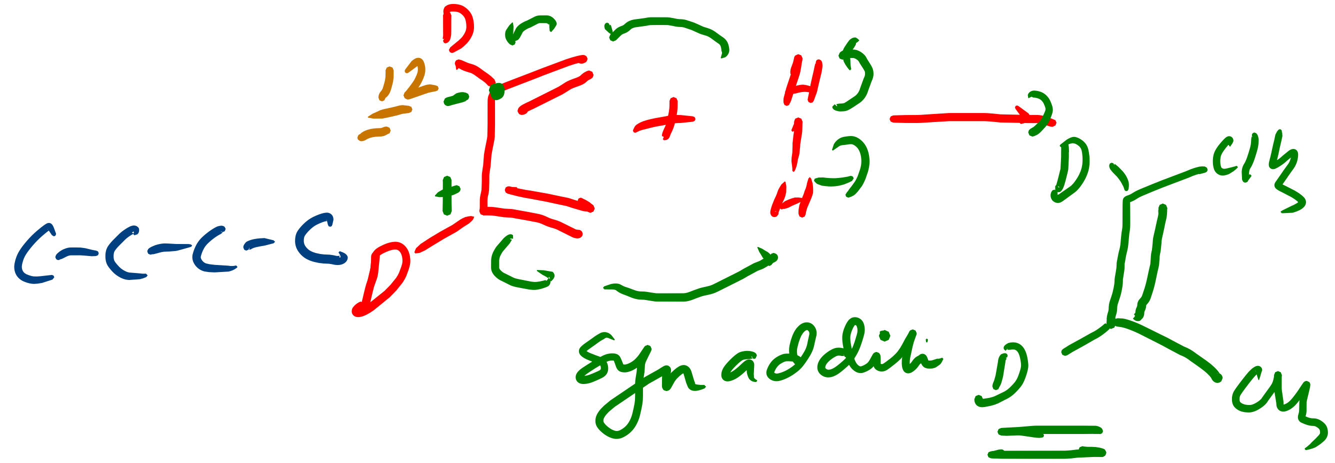
(a)



No. of stereo isomers = 3.

symmetry present achiral centre.



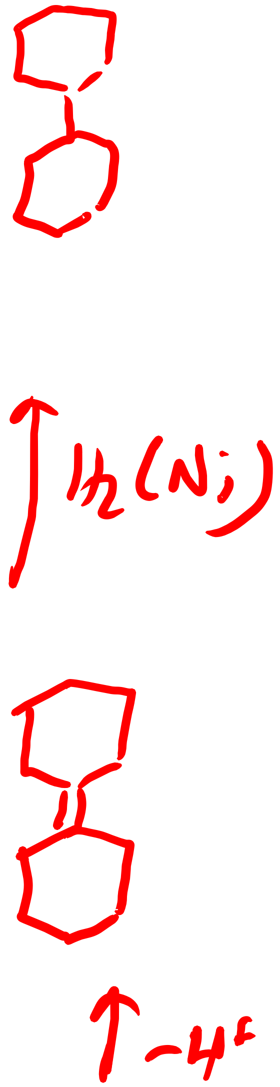


syn addition

(c).

13) dane.

14) $NaBH_4$.

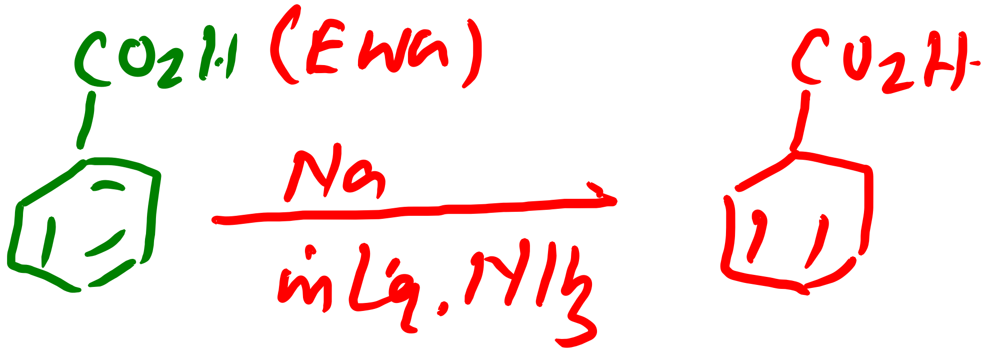


7) $H_2(Pd-CaCO_3)$ Lindlar :

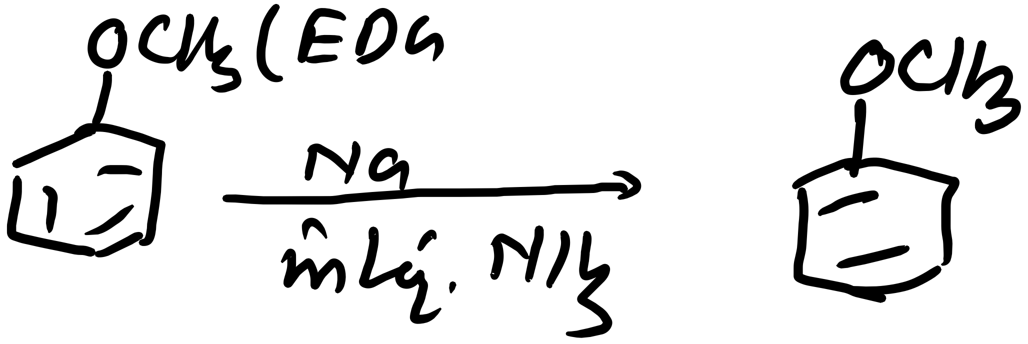
Alkyne → cis alkene

Alkene → No reaction.

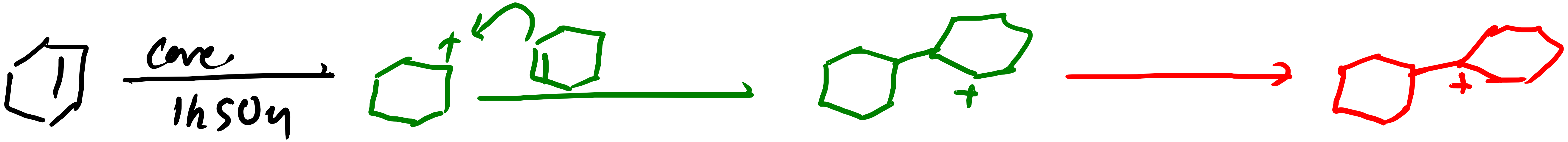
(8)



(9)

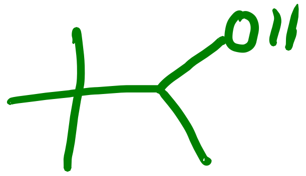


10)

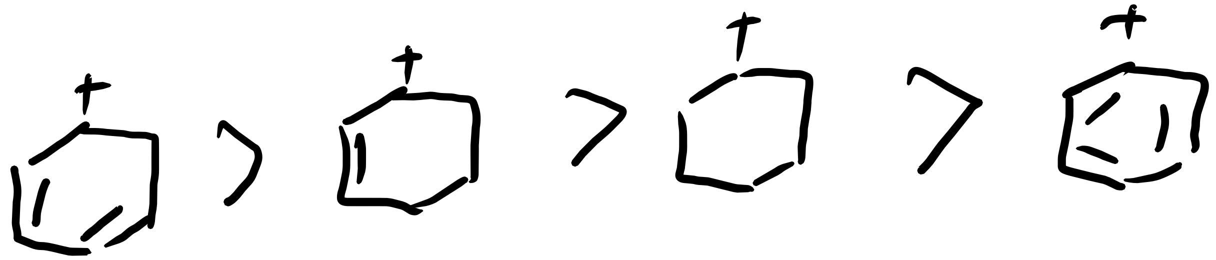


Q 15) $CH_3-CH_2-Br \xrightarrow{AgCN} CH_3CH_2-\overset{+}{N}\equiv\overset{-}{C}: \xrightarrow[H_2(Ni)]{} CH_3CH_2-NH-CH_3$ ✓

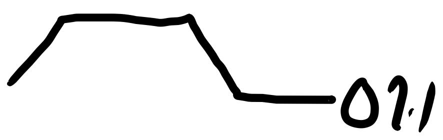
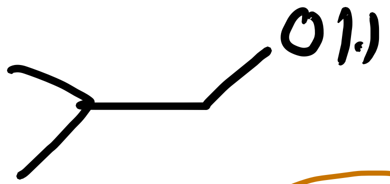
: Alcohol & ether :

1)  $\xrightarrow[\Delta]{conc.\ H_2SO_4} Me_3C-\overset{+}{C}H-CH_3 \xrightarrow[of\ Me^-]{1,2\ shift} Me_2\overset{+}{C}-\underset{CH_3}{\underset{|}{C}H}-CH_3 \xrightarrow{-H^+} \rangle C=C\langle$

2) More stable C^+, dehydration rate is more.



$\boxed{1°\ Alcohol < 2°\ Alcohol < 3°\ Alcohol.}$

3)  < 

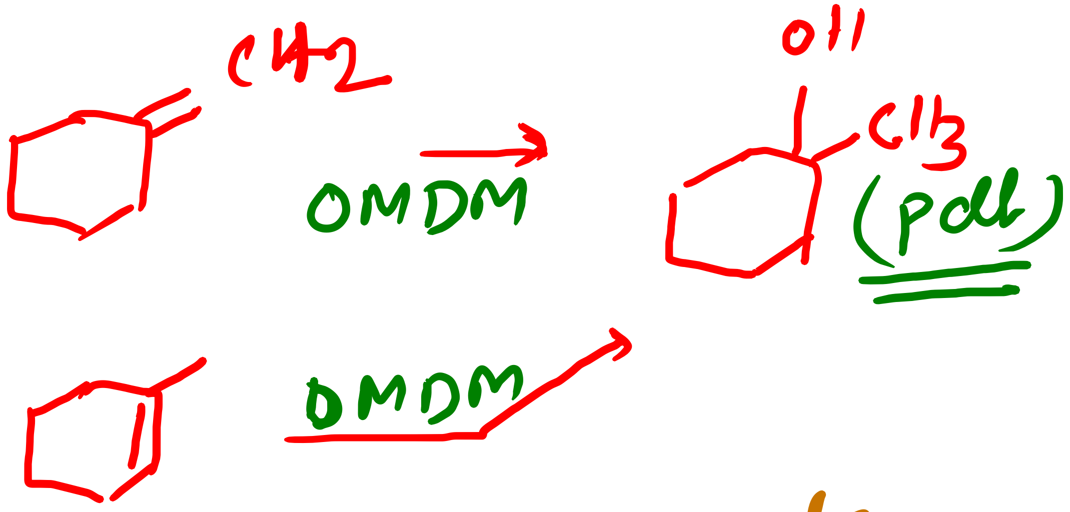
$CH_3-CH_2-CH_2-\overset{+}{C}H_2 < \begin{matrix} H_3C \\ H_3C \end{matrix}\rangle CH-\overset{+}{C}H_2$

4) done.

5) M.pt without rearrangement

OMDM.

6)



For symmetrical alkene, M. rule is not applicable.

7) done.

8) HBO (anti M. pdt) }
OMDM (M. pdt) } same pdt

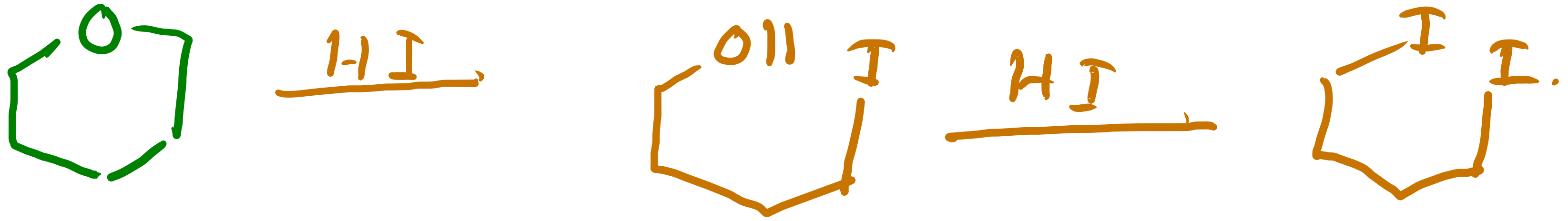
symmetrical alkene

$H_3C-CH=CH-CH_3$

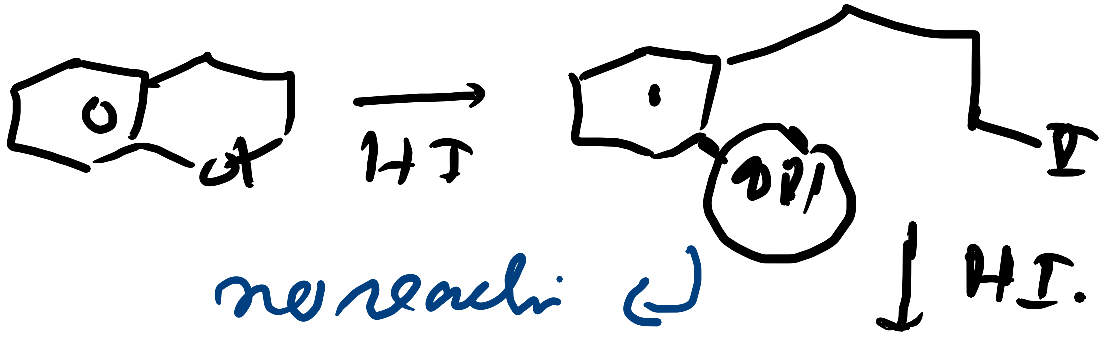
same pdt $\xleftarrow{HBO}$ | $\xrightarrow{OMDM.}$ same pdt

9) (B) Ph-O-Ph. ⟶ neither SN1 nor SN2.

10)



ROH + HI ⟶ RI



no reaction with HX

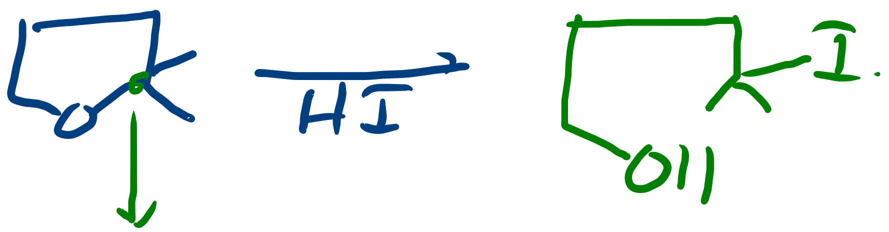
no diiodide

10) (C)

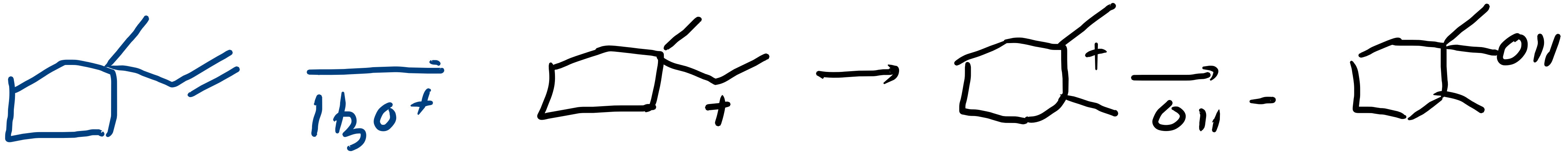
11) done.

12) OMDM.

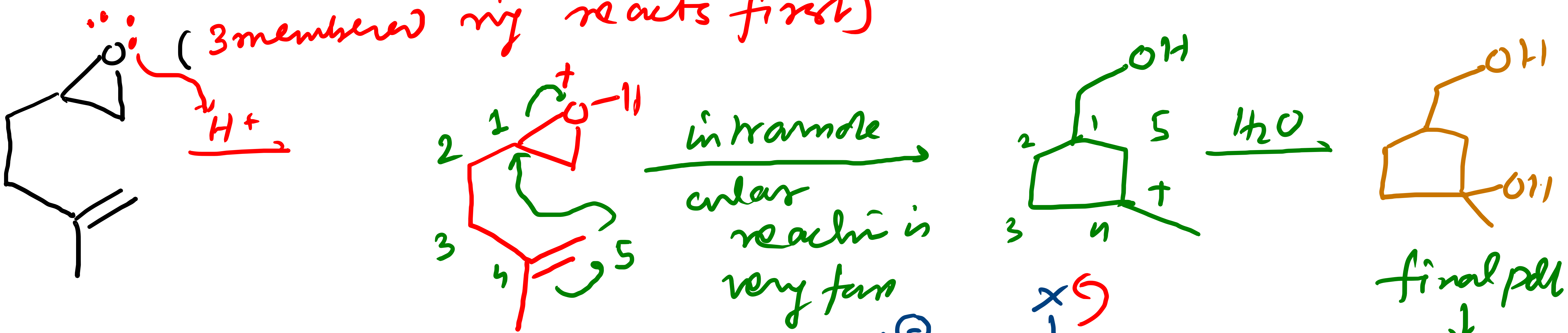
(17)



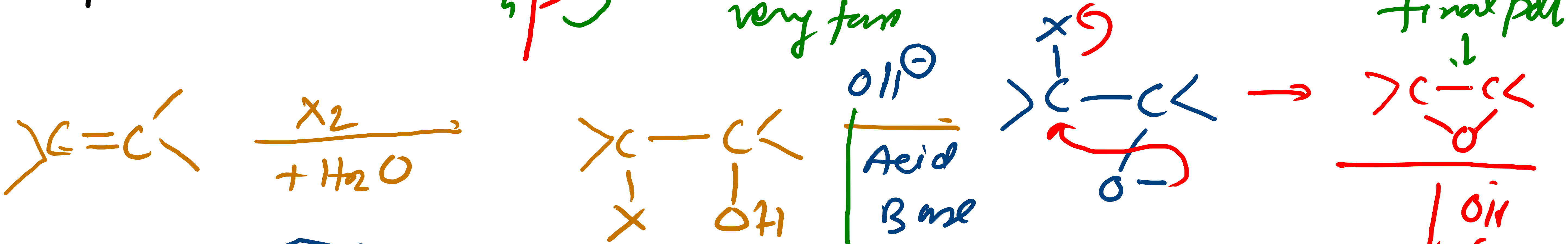
13)



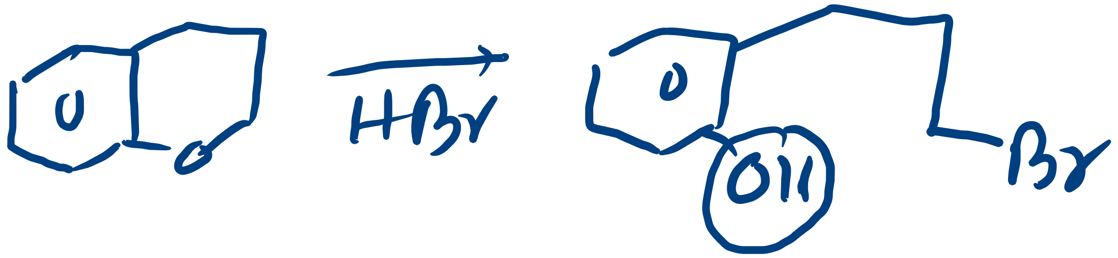
14)



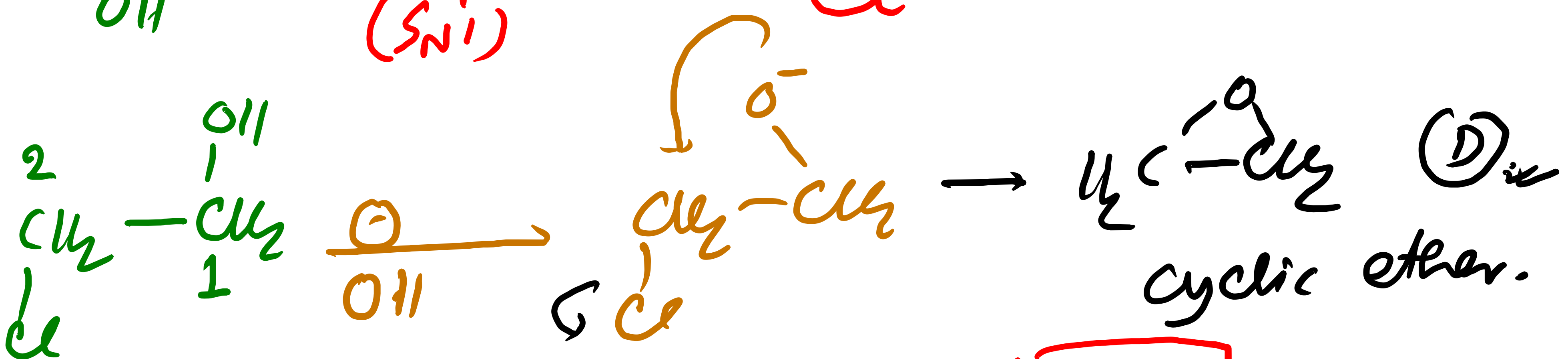
15)



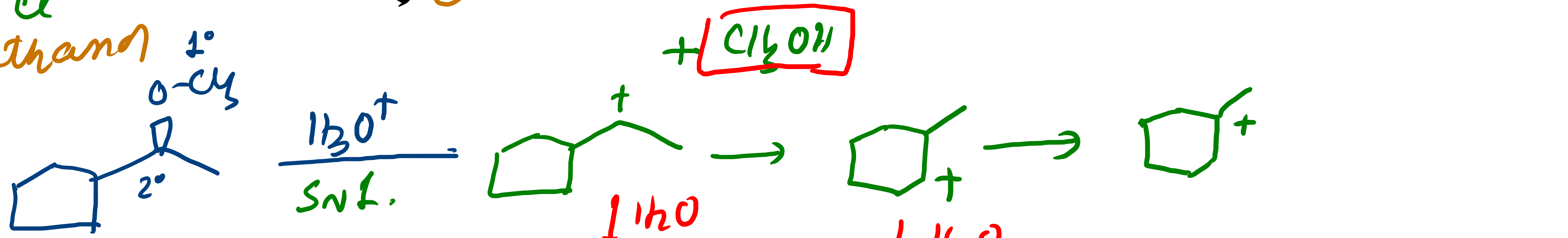
16)

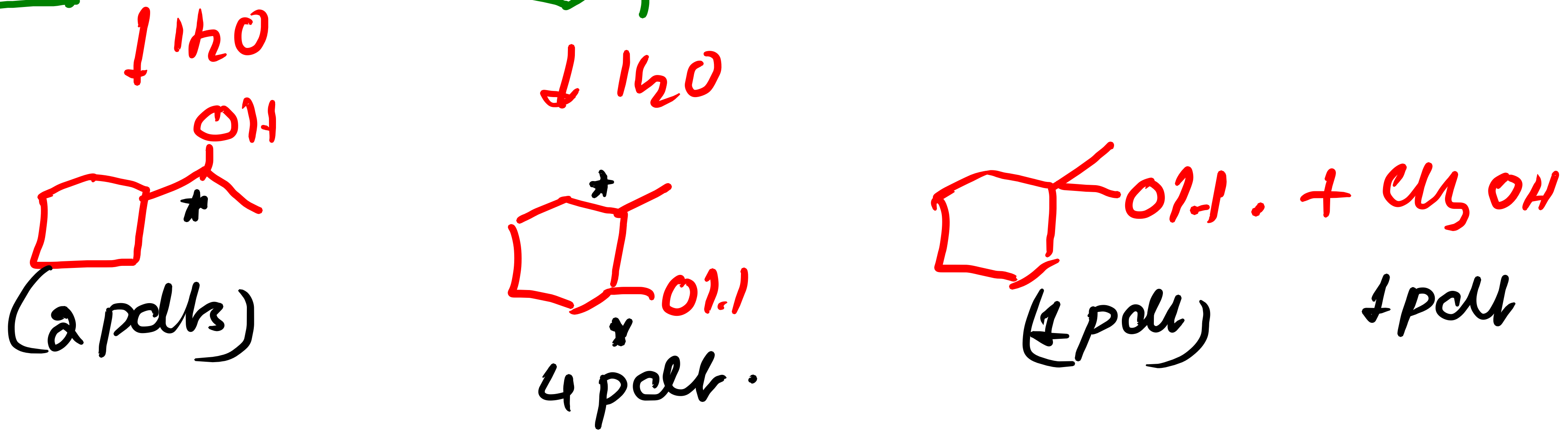


18) $CH_3-\underset{OH}{CH}-CH_3 \xrightarrow[(S_Ni)]{PCl_5} CH_3-\underset{Cl}{CH}-CH_3 \xrightarrow[KOH]{alcoholic} H_3C-CH=CH_2 \xrightarrow{dil\ H_2SO_4} H_3C-\underset{OH}{CH}-CH_3.$

19) 

2chloro ethanol

* 20) 



21) (C) Lucas test

CH_3OH : no turbidity

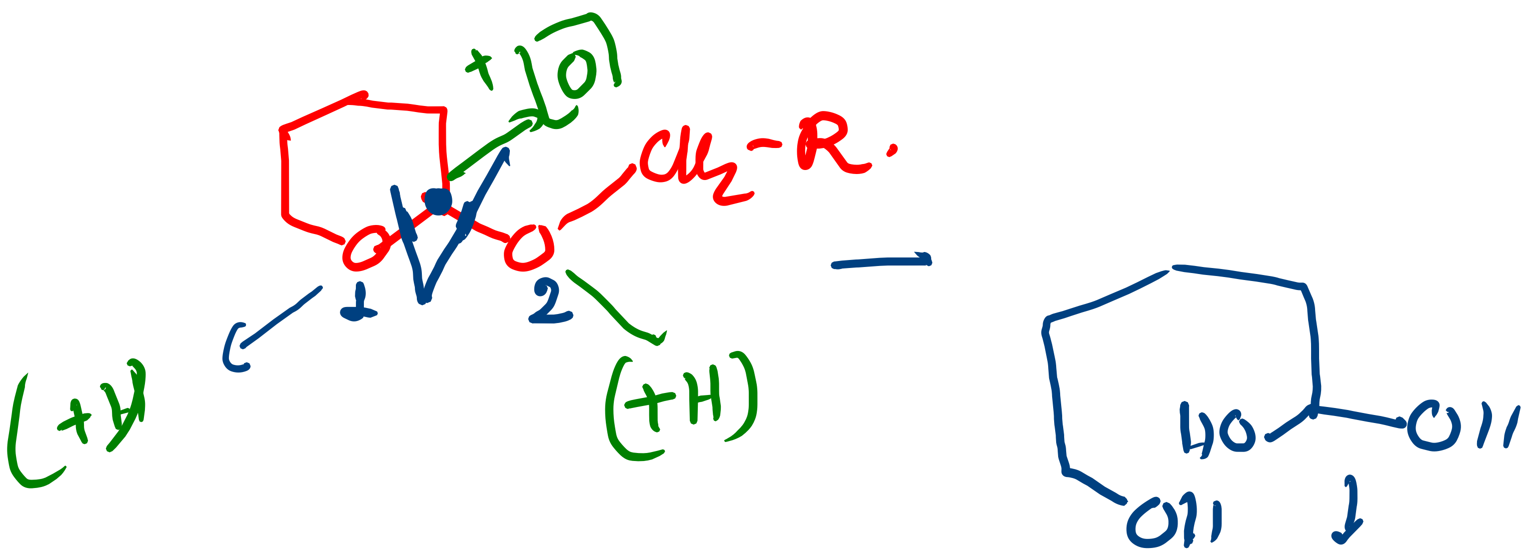
$CH_3-\underset{OH}{CH}-CH_3$: White turbidity
after 5-10 min.

22) $R-\ddot{\underset{..}{O}}-R + BF_3 \longrightarrow$
(Nu) (E)

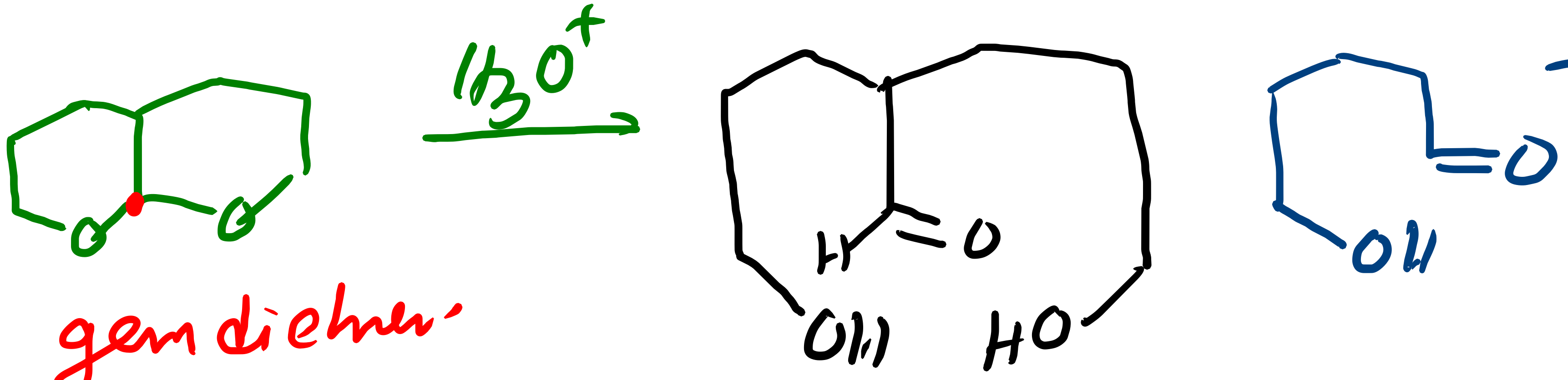
Gemdiether + H_3O^+ →

$R{-}O{-}R' \xrightarrow{H_3O^+} ROH + R'OH$

mixture of alcohol.

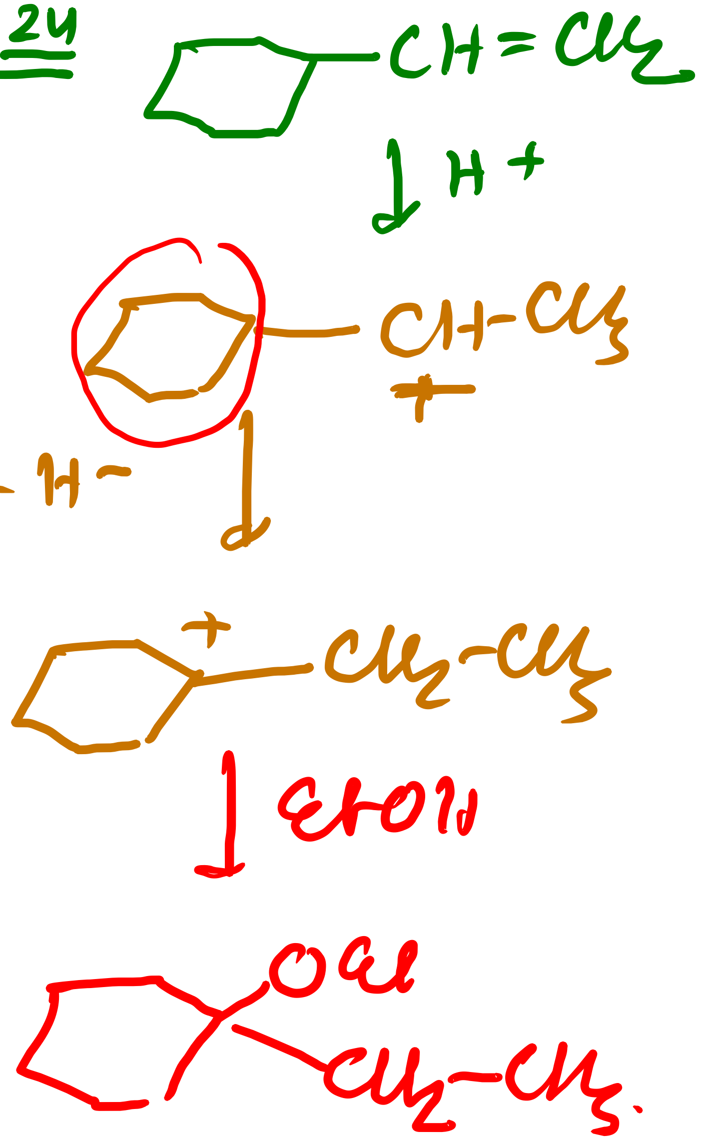


$HO{-}CH_2{-}R$

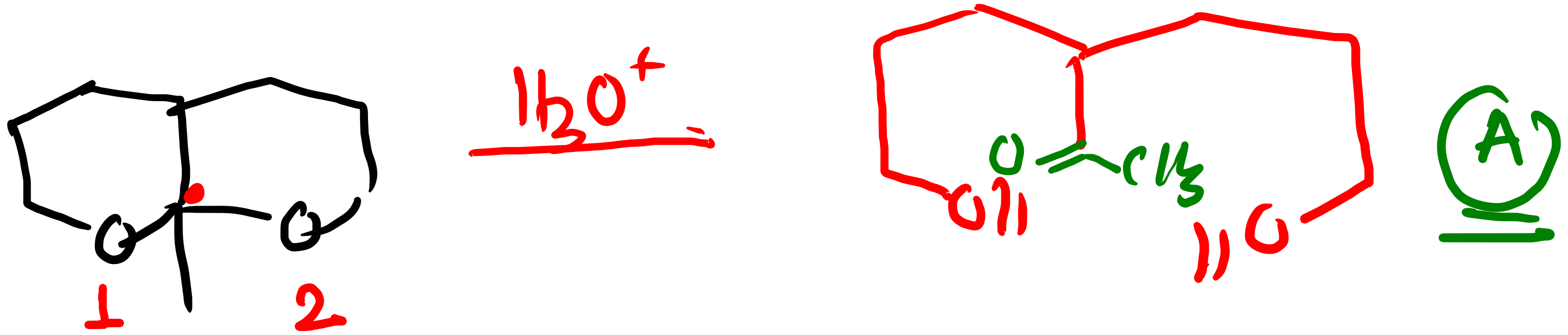


+ RCH_2OH.

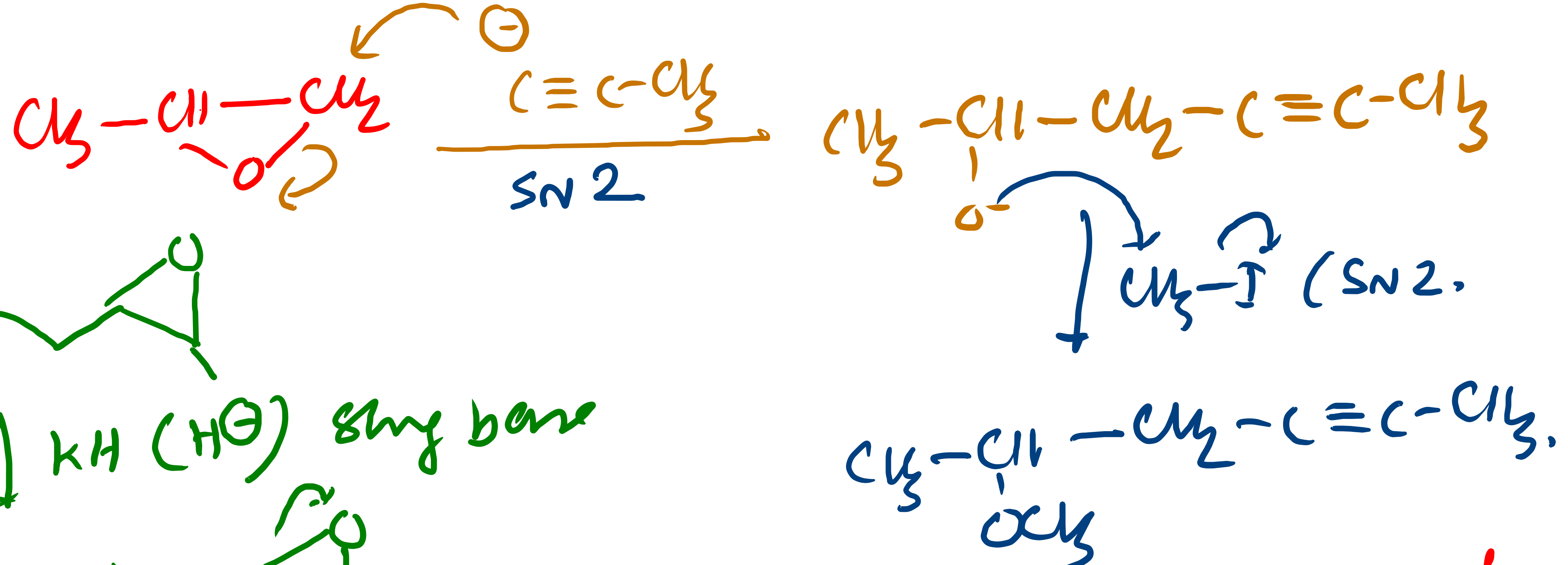
gem diether.



25)

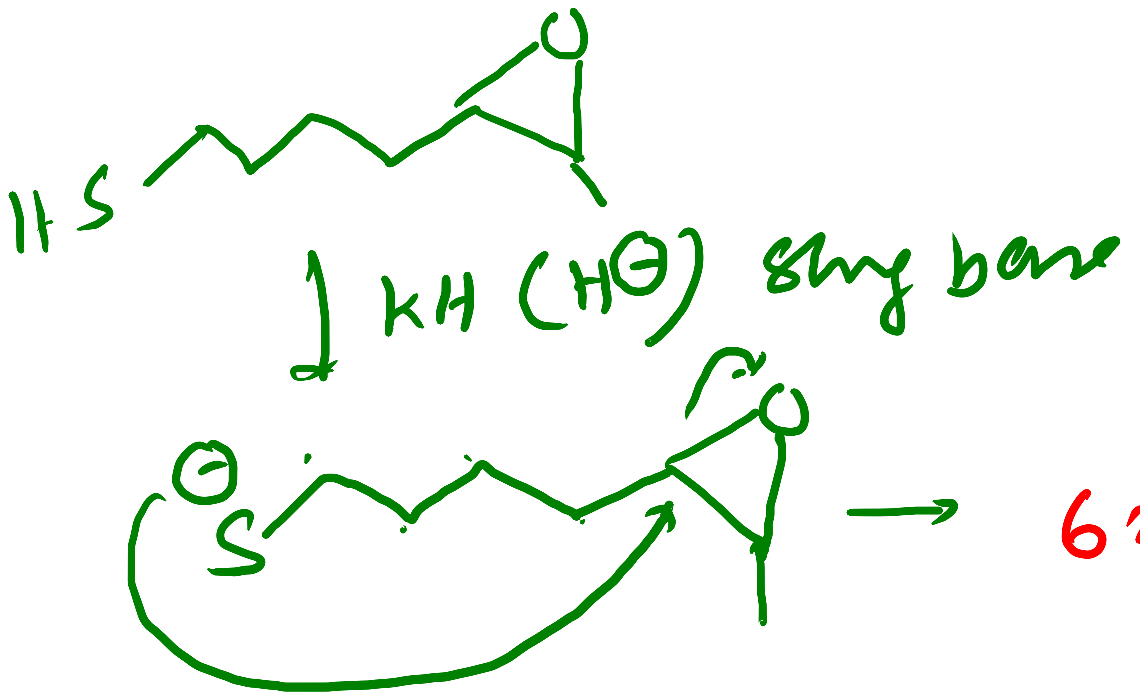


26)

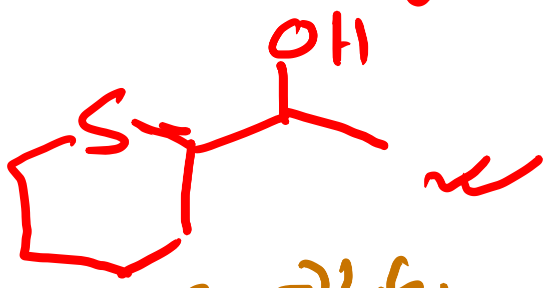


O-2
next class
Rodrelin
+ Alcohol
&
Ether

27)



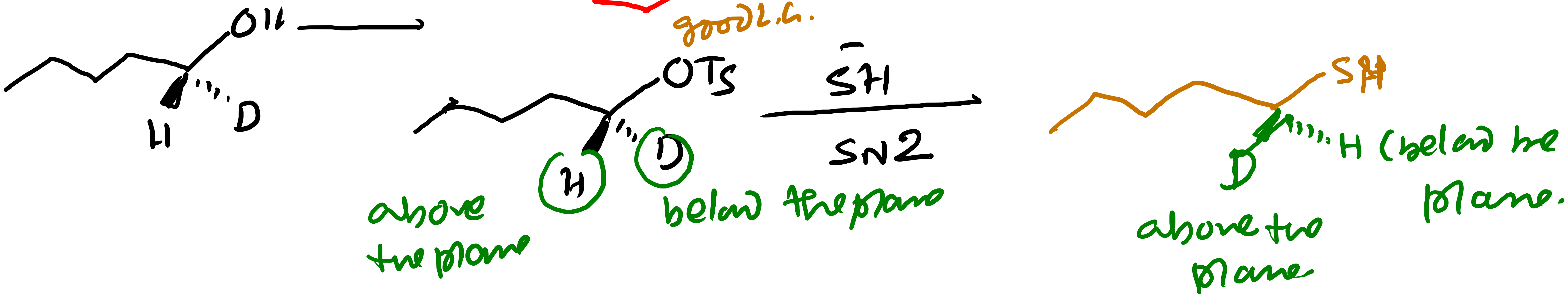
6 membered ring (entra attack fast)



(A)

good L.G.

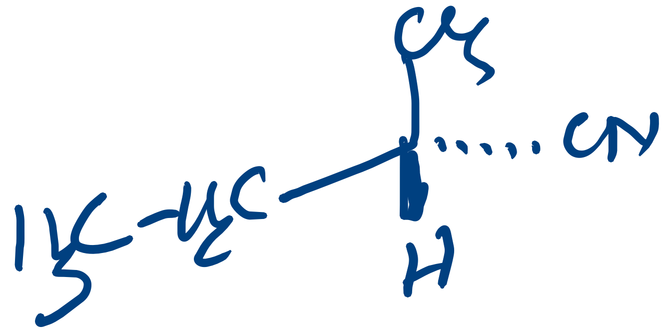
28)



29) ROH $\xrightarrow[S_N2]{PBr_3}$ $\xrightarrow[DMF]{KCN}$: Even no. of S_N2 : Retention of configuration.

S_N2.

$\xrightarrow[(S_Ni)]{PCl_5}$



(C)

that ether sample must be

R-O-R regain.

[O]

R-O-O-R

dialkyl peroxide

Mohr Salt $FeSO_4$

Fe^{3+}

NH_4SCN

$Fe(SCN)_3$ (+3)

(Blood Red colour)

30) ** Mistake.

R-O-R $\xrightarrow{[O]}$ R-O-O-R

Diethyl peroxide (should be)

Ans: (B)

: Fehling solution : Fehling A + Fehling B.

$\overset{+2}{CuSO_4}$ solution — Blue solution

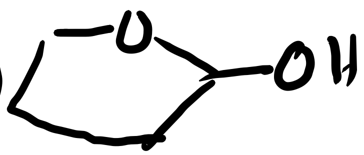
Na-K-tartarate.

$$\left[\begin{array}{l} CO_2Na \\ | \\ CH\ddot{O}H \\ | \\ CH\ddot{O}H \\ | \\ CO_2K \end{array}\right]$$

Cu^{2+}(tartarate) Blue solution. (oxidising reagent)

i) α-hydroxy ketone

ii) HCO_2H

iii)  α hydroxy ether

iv) $PhNHOH$

↓

All give +ve tollens & +ve Fehling test.

$$RCH{=}O \xrightarrow{Cu^{2+}(\text{tartarate})} Cu_2O\downarrow \text{ (reddish brown ppt) } + RCO_2^-$$

$$R\!-\!\underset{\underset{O}{\|}}{C}\!-\!R \xrightarrow[(\text{tartarate})]{Cu^{2+}} \text{✗}$$ no ppt is formed.

~~RCH~~-

is very difficult to be oxidised.

$RCH{=}O$ (Aliphatic Aldehyde)

+ve Fehling test.

$PhCH{=}O$ (Aromatic aldehyde)

−ve Fehling test.

Cpd	Tollens	Fehling
$RCH=O$	✓	✓
$PhCH=O$	✓	✗
$R-\underset{\underset{O}{\parallel}}{C}-R$	✗	✗
$\underset{OH}{CH_2}-\underset{\underset{O}{\parallel}}{C}-R$	✓	✓
HCO_2H	✓	✓
$PhNHOH$	✓	✓
$RNHOH$	✓	✓
$\underset{OH}{RCH}-OCH_3$	✓	✓
$RC\equiv CH$	✓	✗

Tollens: SILVER MIRROR

Fehling: RED COLOUR PPT ($Cu_2O\downarrow$)

$RC\equiv CH$ with Tollens: WHITE PRECIPITATE.

Reducing Sugar.

Benedict soln.

Cu^{2+} (Ci trate) (Blue color)

same as Fehling soln.

$$\xrightarrow{RCH=O} Cu_2O\downarrow \text{ red ppt.}$$

* Glucose.
  Fructose
  All
  mono saccharide gives

  +ve Tollens / Fehling.

* Maltose
  Lactose

  Disaccharide

  +ve Tollens
  +ve Fehling.

Polysaccharide & sucrose –ve Tollens –ve Fehling.

: Ketone Oxidation :

Generally ketone can't be oxidised by oxidising reagent at room temperature

$Ph-\underset{\underset{O}{\|}}{C}-CH_3 \xrightarrow[\text{mCPBA.}]{} CH_3-\underset{\underset{O}{\|}}{C}-O-Ph$

ketone — Ester

$R-\underset{\underset{O}{\|}}{C}-H \xrightarrow[PhCO_3H]{} R-\underset{\underset{O}{\|}}{C}-OH$

Aldehyde — Acid

$Me-\underset{\underset{O}{\|}}{C}-CMe_3 \xrightarrow[\text{PNPBA.}]{} Me-\underset{\underset{O}{\|}}{C}-O-CMe_3$

(methyl) (3° Alkyl)

* That group which has more migrating tendency will be attached with oxygen of ester.

: Baeyer Villiger Oxidation :

↳ In this reaction ketone is oxidised to form ester.

$R-\underset{\underset{O}{\|}}{C}-R' \xrightarrow[\underline{\underline{O.A}}]{} R-\underset{\underset{O}{\|}}{C}-O-R'$

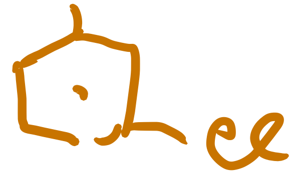
ketone — ester

Peracid

$CH_3-\underset{\underset{O}{\|}}{C}-O-O-H$ Peracetic Acid

$Ph-\underset{\underset{O}{\|}}{C}-O-O-H$. Per benzoic acid

$O=C-O-OH$



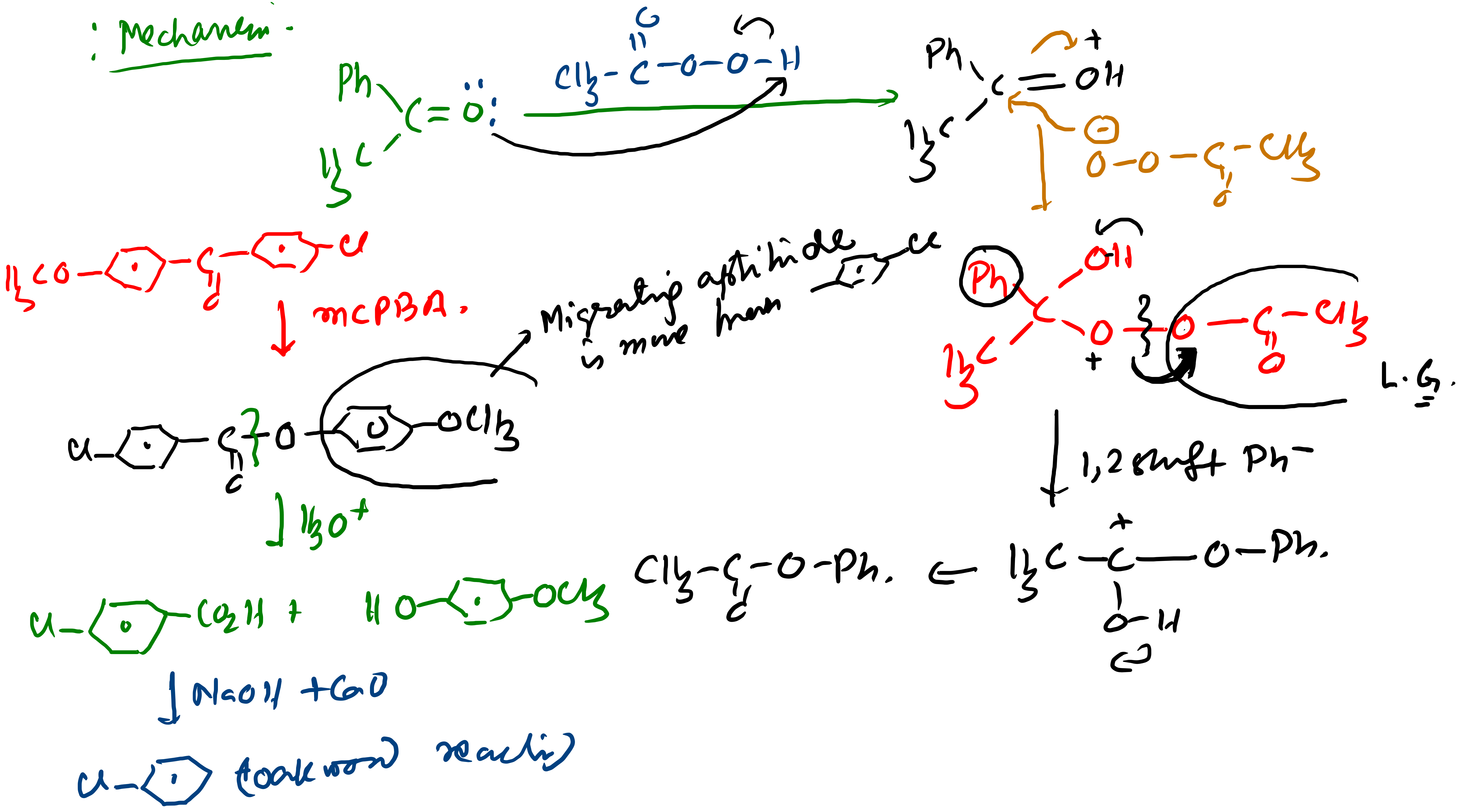
(mCPBA)

$O=C-O-OH$.

(PNPBA)

[Supplying nascent oxygen)

: Mechanism :


mCPBA
Migrating aptitude is more than
1,2 shift Ph⁻
L.G.
H3O+
NaOH + CaO
(Decarboxylation reaction)

(Ketone oxidation at drastic condition) POPOF RULE

Ketone when reacts with $KMnO_4$ at very high temp & pr condition, it is converted into mixture of carboxylic acid

$$CH_3-\underset{\underset{O}{\|}}{C}-C-C-C \xrightarrow[\Delta]{KMnO_4} CH_3-CO_2H + C-C-CO_2H$$

NCERT.

carbon no 1 unit reduced

carbon no remains same.

$$Et-\underset{\underset{O}{\|}}{C}-C-C-C-C \xrightarrow[\text{high P \& T}]{KMnO_4} Et-CO_2H + C-C-C-CO_2H.$$

carbon no remain same.

carbon no is reduced by 1 unit.

$$Et-\underset{\underset{O}{\|}}{C}-Et \xrightarrow[\text{P \& T}]{KMnO_4} EtCO_2H + CH_3CO_2H.$$

$$CH_3-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow[\text{P \& T}]{KMnO_4} CH_3CO_2H + CO_2\uparrow + H_2O$$

$\overset{+2}{HgCl_2}$ soln (mercuric chloride)

$$RCH{=}O + 2HgCl_2 + H_2O \rightarrow RCO_2H + 2HCl + Hg_2Cl_2\downarrow$$

white ppt.

$$\underset{\text{(white ppt)}}{RCH{=}O + Hg_2Cl_2} \rightarrow RCO_2H + 2HCl + 2Hg\downarrow$$

(Black ppt)

Obs:- white ppt converted into black ppt.

	$RCH{=}O$	$RCOR$
(Ag^+) Tollens	✓	✗
(Cu^{2+}) Fehling	✓	✗
(Cu^{2+}) Benedict	✓	✗
Schiff	✓	✗
(Hg^{2+}) $\overset{+2}{HgCl_2}$ soln.	✓	✗

Distinguish

Distinguish (1) $PhCH{=}O$ vs $RCH{=}O$

a) Lucas b) Tollens

✓ c) Fehling d) $NaHCO_3$

(2) $PhCH{=}O$, $PhCOCH_3$

a) Lucas ✓ b) Tollens.

c) Fehling d) $NaHCO_3$