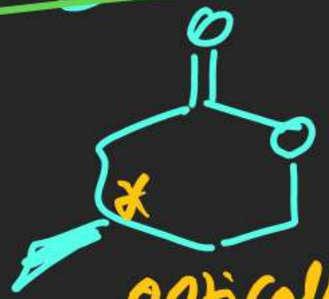
Note (i) Anion Radical Intermidiate
(ii) Two step Reduction for Acid derivatives

(2) $CH_3-\overset{O}{\overset{\|}{C}}-O-CH_3 \xrightarrow[C_2H_5OH]{Na}$ $CH_3-CH_2-OH + CH_3-OH$

(3)  → 
Optically Active — Optically Inactive

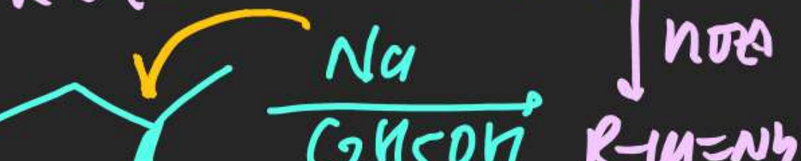
(4)  → 

(5)  → 

(6) $R-C\equiv N \xrightarrow[C_2H_5OH]{Na} R-CH_2-NH_2$

Mech:

Note



(7)

(8) 

Nishant Jindal

(#) Stephen's Reduction :-

⇒ In this Reduction Cynide gets reduced in to aldehyde.

(1) $R-C\equiv N \xrightarrow[(ii)\ H_2O]{(i)\ \overset{+2}{Sn}Cl_2/HCl} R-\underset{H}{\overset{O}{C=}}$

Mechⁿ :

$\overset{+2}{Sn}Cl_2 + 2HCl \longrightarrow \overset{+4}{Sn}Cl_4 + 2[H]$

$R-C\equiv N \xrightarrow{2[H]} R-CH=NH \xrightarrow{H_2O} R-\underset{H}{\overset{O}{C=}}$

Note : One step Reduction of $-C\equiv N$.

(2) 

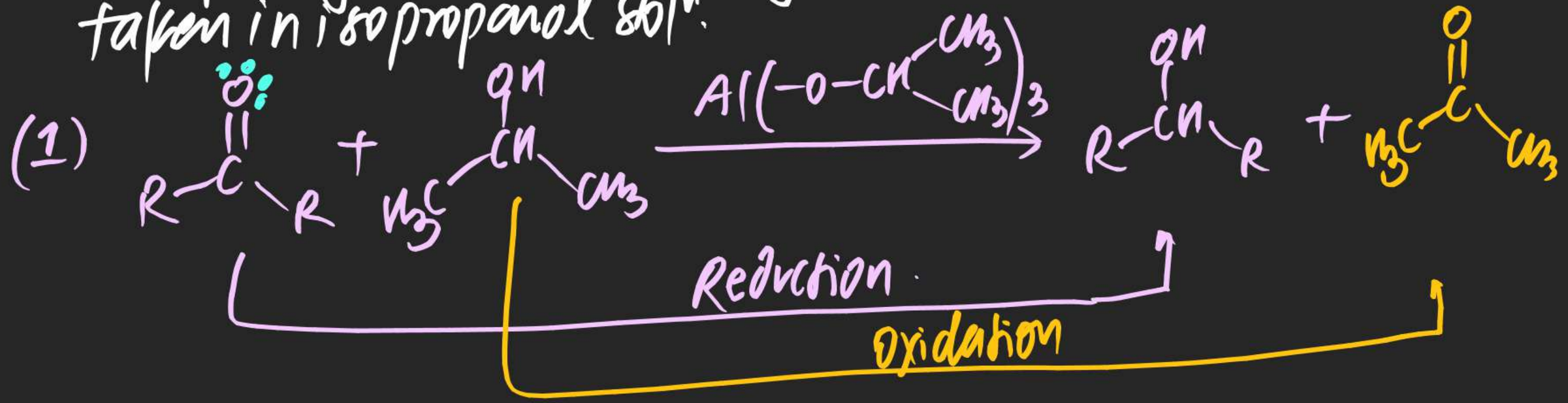
(3) $CH_3-CH_2-CN \xrightarrow{Sn/HCl} CH_3-CH_2-\underset{NH_2}{CH_2}$

(4) 

Nishant Jindal

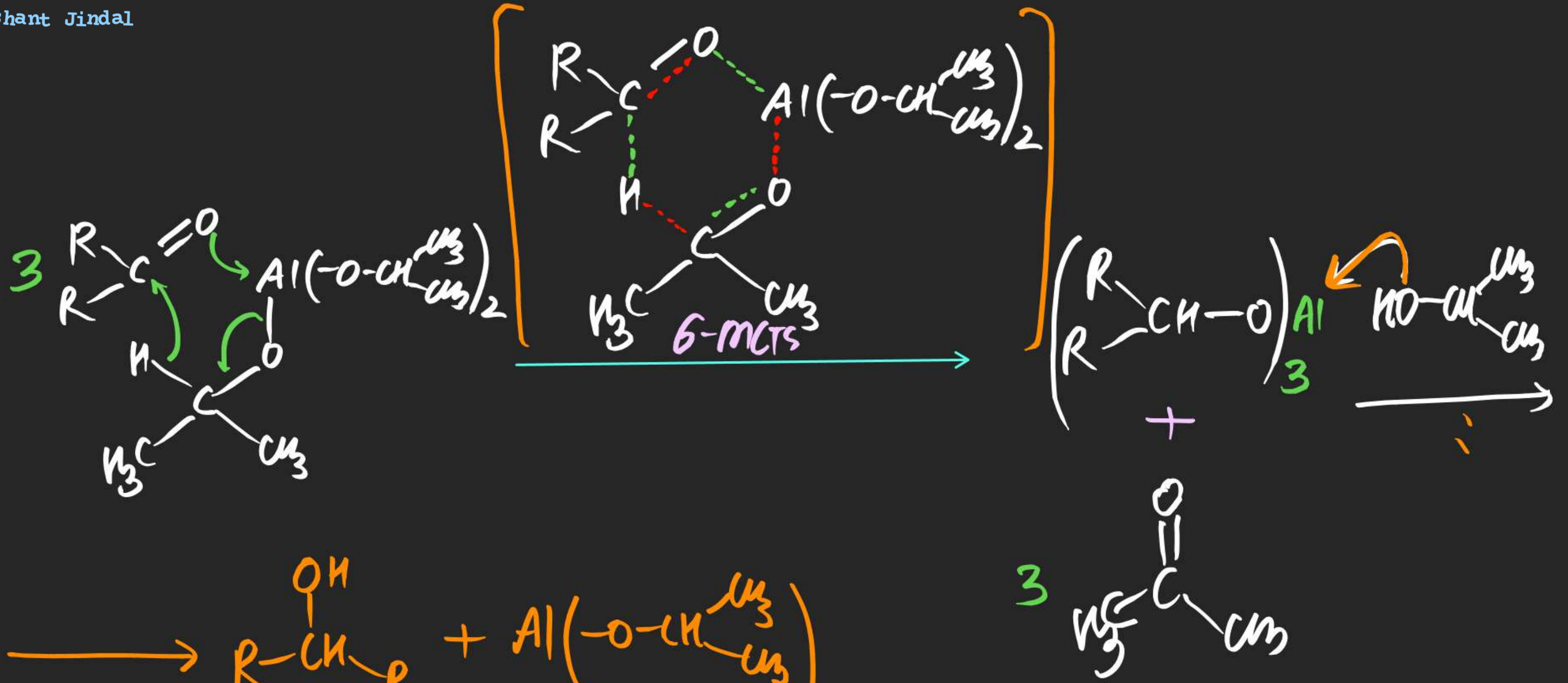
(#) MPV Reduction: [Meerwein Pondrof Verly Reduction]

⟹ In this Reduction Carbonyl compound gets Reduced into Corresponding Alcohol By using Aluminium isopropoxide taken in isopropanol solⁿ.



Mechⁿ;

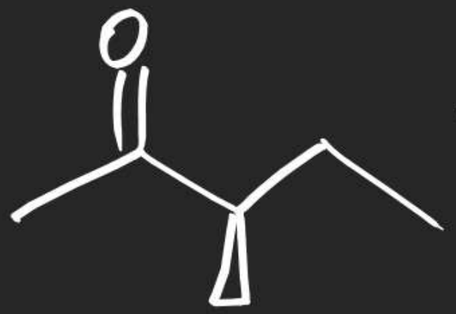
Nishant Jindal



Note 6 MCTS involved.

Nishant Jindal

(2)  $\xrightarrow[Me_2CH-OH]{Al(OCuMe_2)_3}$

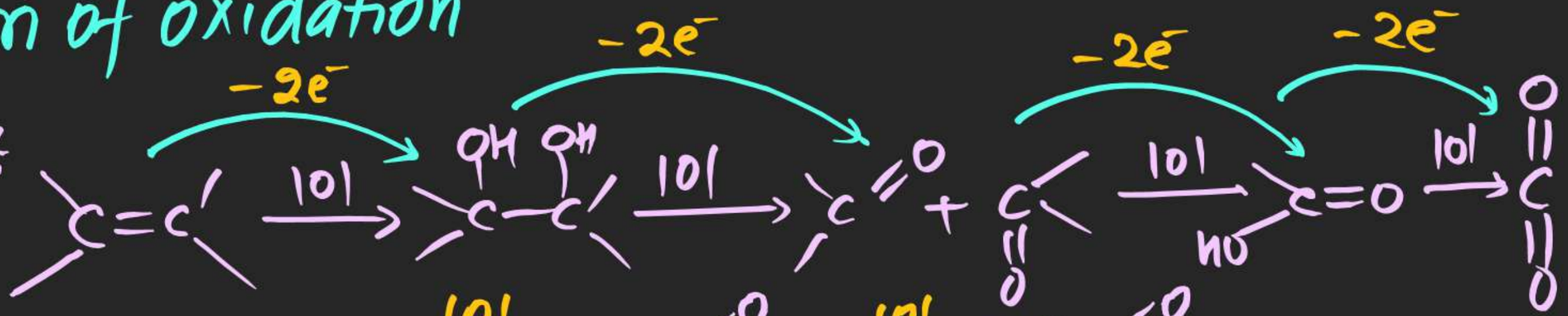
(3)  $\xrightarrow{\text{II}}$

Nishant Jindal

Oxidation Reaction:

⟹ loss of e^-s
⟹ Incrase in Oxidation state
⟹ Pattern of oxidation

(a) Alkene:



(b) Alcohol:

(a) $R-CH_2-OH \xrightarrow{[O]} R-C(=O)-H \xrightarrow{[O]} R-C(=O)-OH$

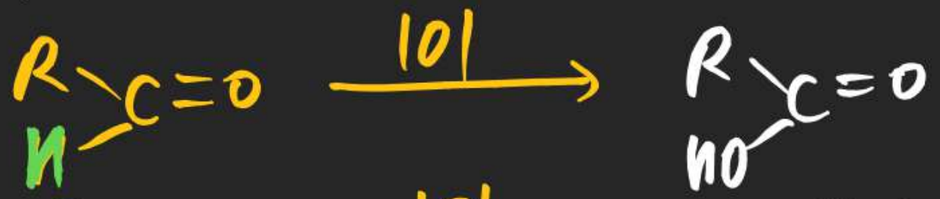
(b) $R_2CH-OH \xrightarrow{[O]} R_2C=O$

(c) $R_3C-OH \xrightarrow{[O]}$ No Oxidn

. . .

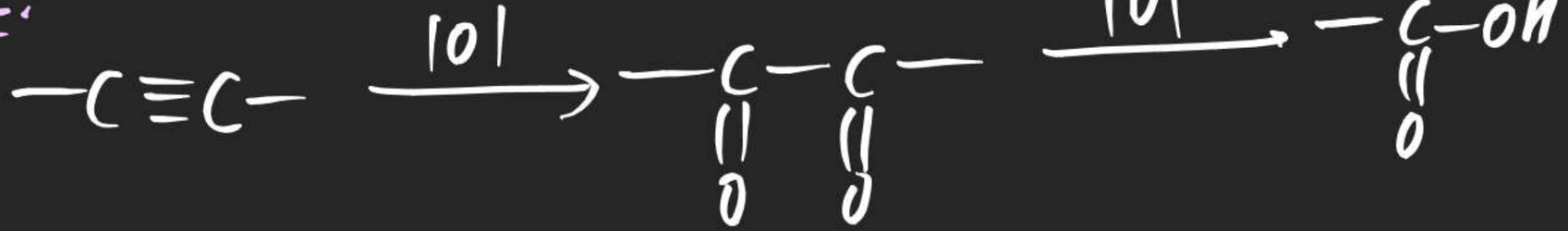
Nishant Jindal

(c) Carbonyl Compound :

(a) 

(b) 

(d) Alkyne :



Nishant Jindal

Oxidation of Alkene:

(1) Glycolisation: Formation of vic-diol (Glycol / Pinacole) By Oxidation of Alkene is known as Glycolisation.

(1) 

(*) Glycol
(x) Pinacole
(✓) Vic-diol

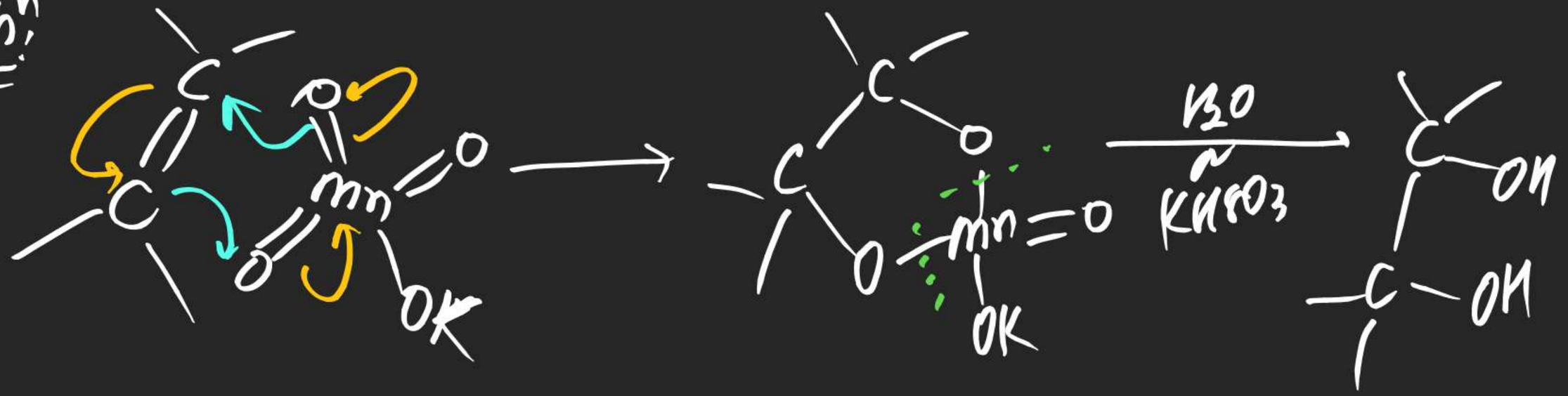
P may be (i) 1% Cold Dil Alkaline $KMnO_4$ (Bayer's Reagent) followed By H_2O
(ii) OsO_4 followed By $KHSO_3$
(iii) By Per Acid $R-CO_3H$ (Epoxidation) followed By Hydrolysis
(iv) Alkaline H_2O_2 followed By Hydrolysis.

(#) Oxidation By Cold $KMnO_4$ (Baeyer's Reagent):

⇒ Alkene on Rxn with cold $KMnO_4$ gives vic-diol as a Product followed by Hydrolysis

(1) $>C=C<$ —(Purple $KMnO_4$, 0°C)→ $-\overset{|}{C}(OH)-\overset{|}{C}(OH)-$

Mechⁿ:



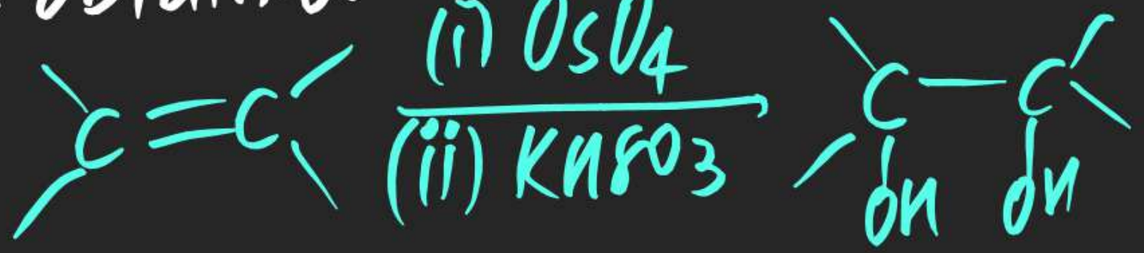
Note (i) Mn-Ester Intermidiate

M.I.P (ii) Syn Glycolisation

M.I.P (iii) Rxn of Bayer's Regent is Used in POC as a Test of Unsaturation
By decolouring purple colour of $KMnO_4$

(#) Oxidation By OsO_4 :-

$\Rightarrow$ vic-diol is obtained.

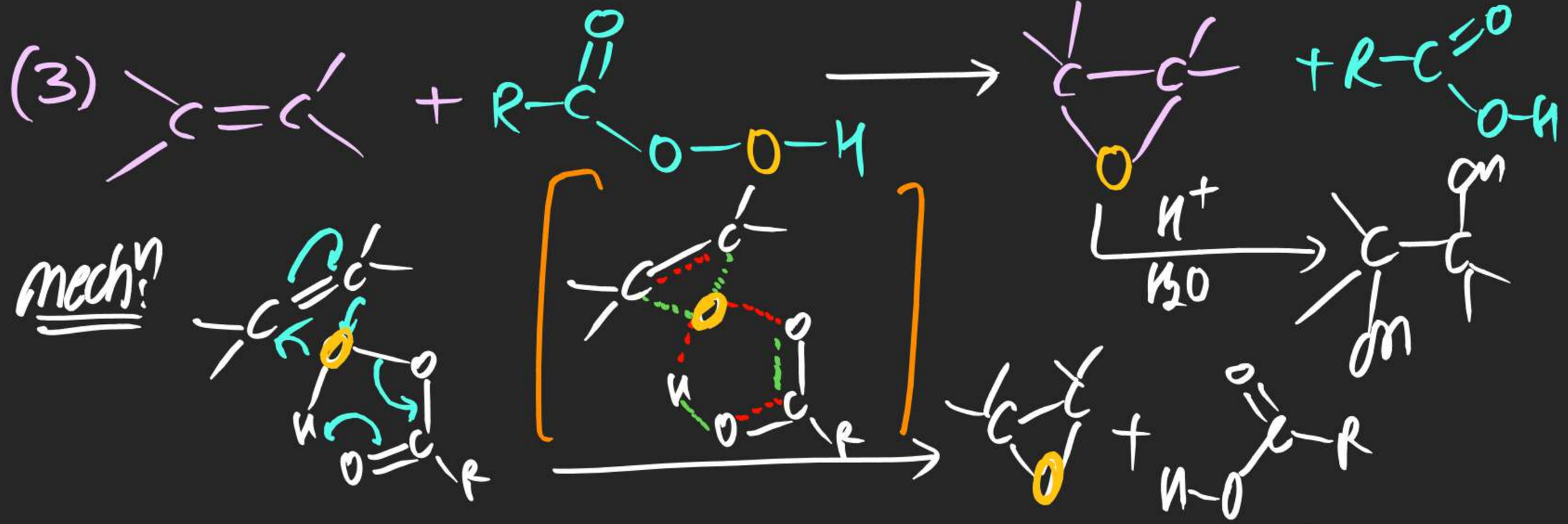
(2) 

mechⁿ :-

Note Syn Glycolisation.

(#) Glycolisation By Per Acid: (Epoxidation)

⇒ Alkene on Reaction with Per Acid gives Epoxide as a product which on Hydrolysis gives vic-diol as a Product.

(3) 

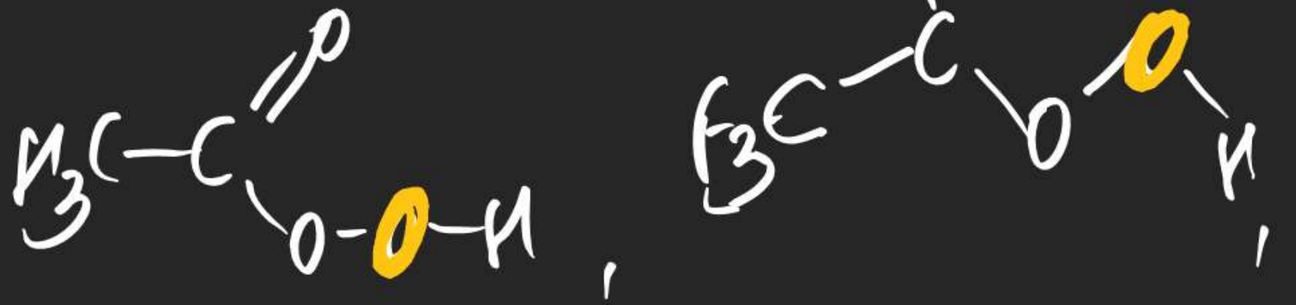
Mechn

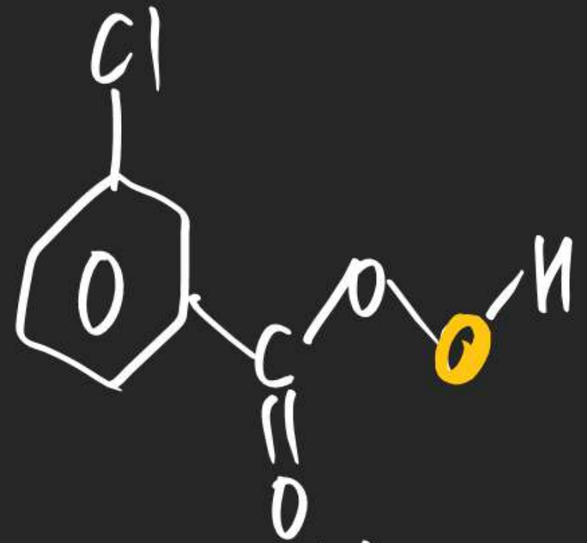
Nishant Jindal

Note (i) Epoxidation is Syn phenomenon

(ii) Glycolisation By Per Acid is Anti phenomenon.

(iii) Per Acid used:-



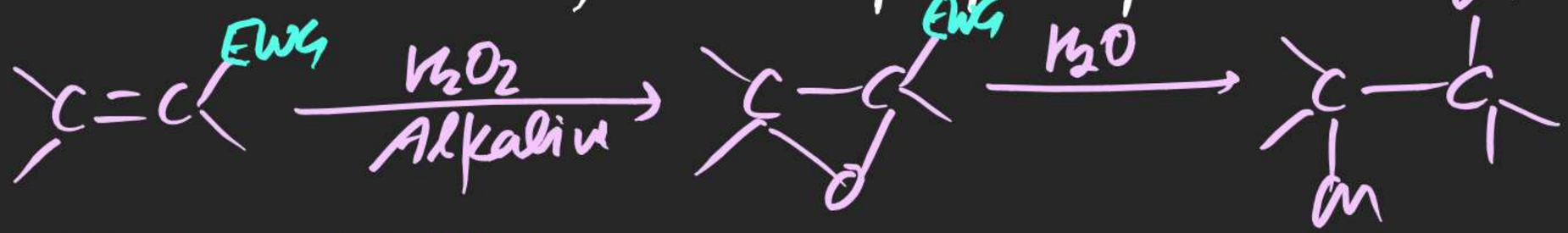


meta-chloroper Benzoic Acid

m-CPBA

(#) By alkaline H_2O_2 :-

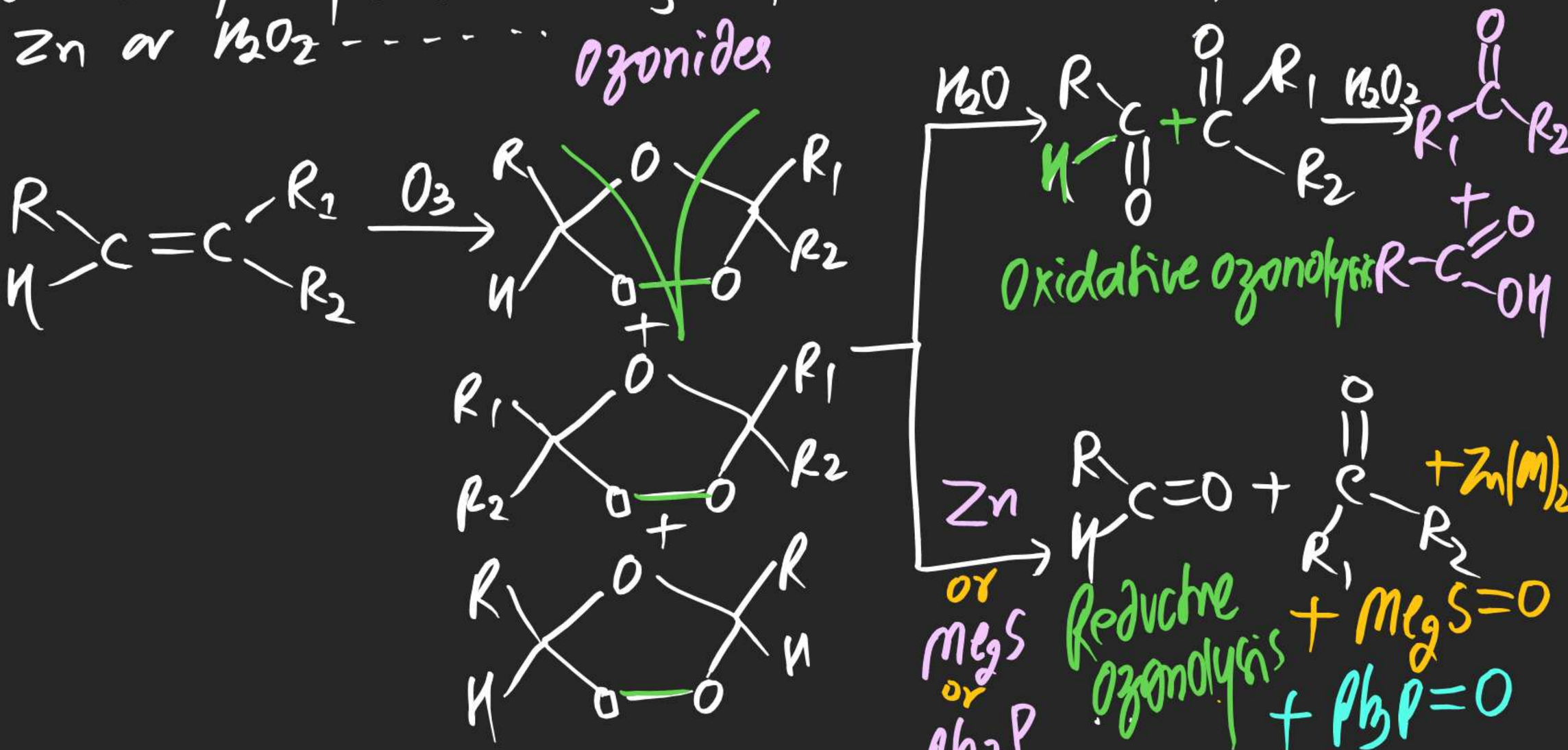
$\Rightarrow$ Vic-diol is obtained followed By Hydrolysis

(4) 

Note (1) Anti Glycolisation.

(#) Ozonolysis:-

⟹ Reaction of alkene with O_3 is known as ozonolysis followed by Zn or H_2O_2 ------ ozonides

(5) 

(6) $CH_2=CH_2$

(7) 

(8) 

(9) 

(10) 

(11) 

Cold $KMnO_4$

(i) OsO_4
(ii) $KHSO_3$

m-CPBA

(i) m-CPBA
(ii) H_2O

(i) O_3

O_3/Zn

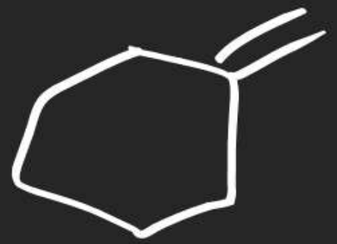
O_3/H_2O

Hot $KMnO_4$

Nishant Jindal

(12) 

(13) 

(14) 

(15)