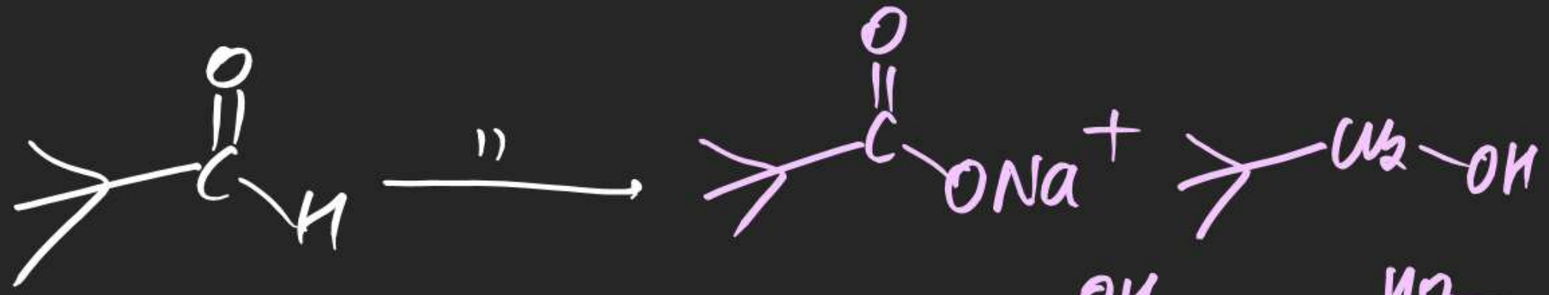
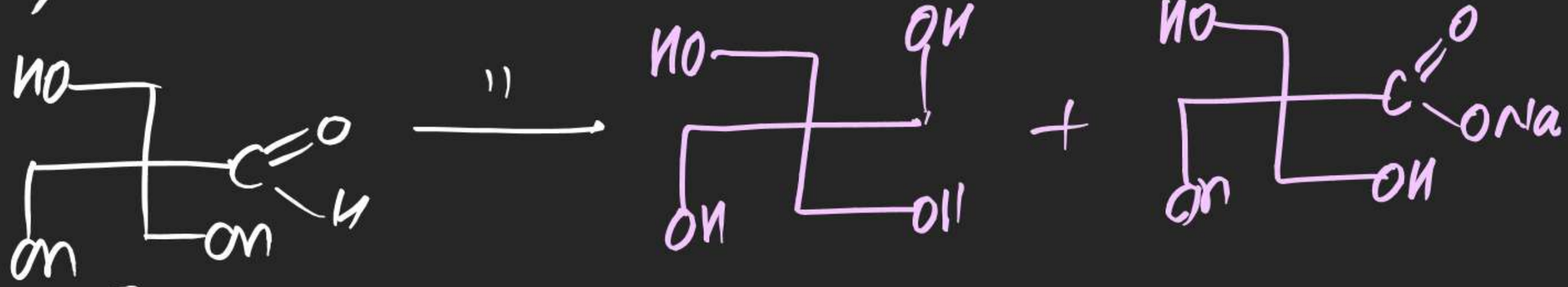
Nishant Jindal

(2) $Ph-\underset{\underset{H}{|}}{C}=O \xrightarrow[KOH]{Conc.} Ph-COO^{-}\overset{+}{N}a + Ph-CH_2-OH$

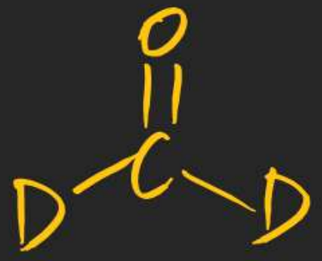
(3) 

(4) 

(5) 

(6) $CH_3-\underset{\underset{O}{||}}{C}-H \xrightarrow[NaOH]{Conc.} CH_3-CH_2-OH + \text{"P"}$ $(CH_3-COONa)$

(7)  $\xrightarrow[NaOH]{Conc.}$ $DCH_2-OH + D-COO^{\ominus}Na^{\oplus}$

(8)  $\xrightarrow[NaOH]{Conc.}$ $D_3C-OH + D-COO^{\ominus}Na^{\oplus}$

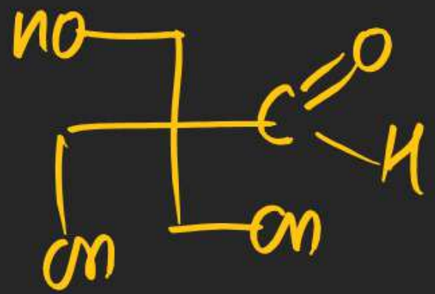
(9)  $\xrightarrow[NaOD]{Conc.}$ $DCH_2-OD + D-COO^{\ominus}Na^{\oplus}$

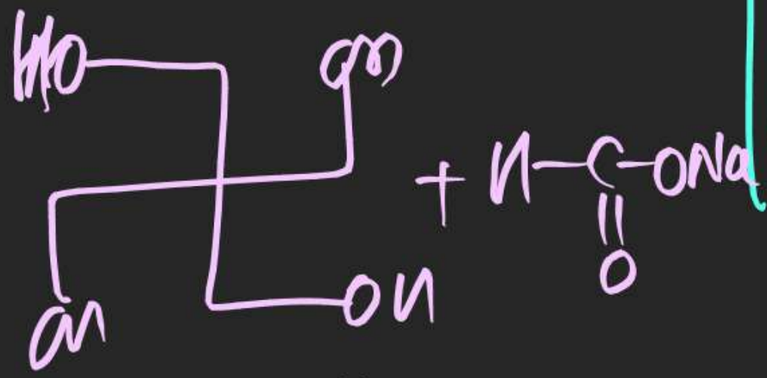
(#) Cross Cannizaro's Rxn :-

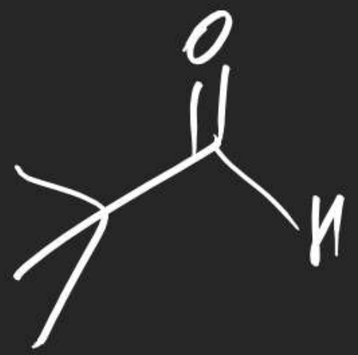
(10) $Ph-\underset{\underset{O}{\|}}{C}-H + H-\underset{\underset{O}{\|}}{C}-H \xrightarrow[K^+\bar{O}H]{Conc.} Ph-\underset{OH}{CH_2} + H-C(=O)-O^-K^+$

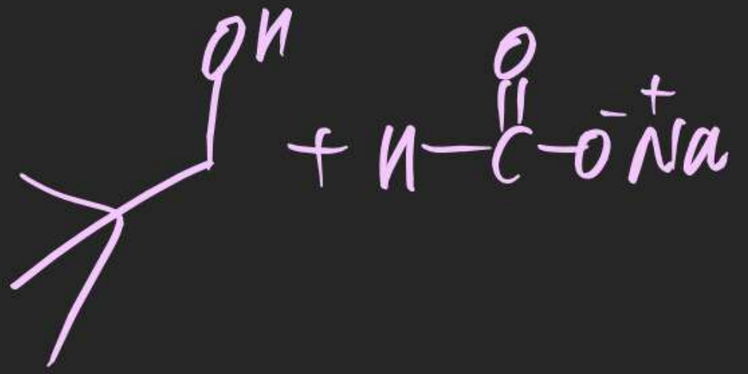
most ⇒ Acid
Electrophilic

less ⇒ Alcohol
electrophilic

(11) 

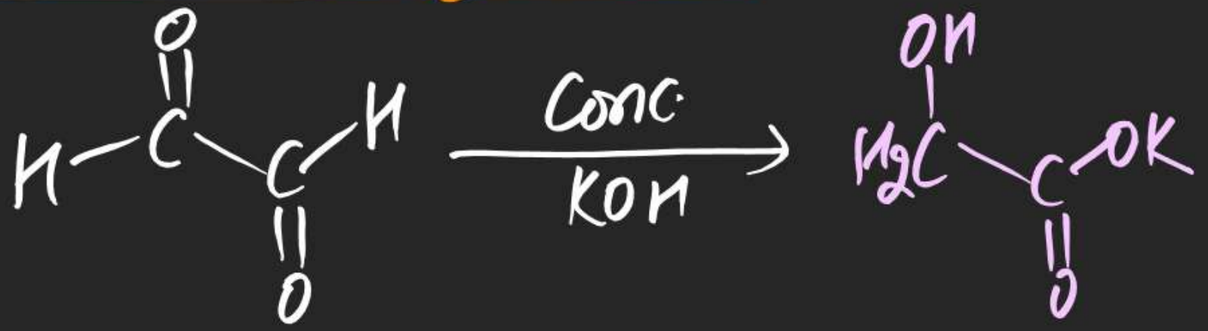
$+ H-\underset{\underset{O}{\|}}{C}-H \xrightarrow{\text{⁻⁻}}$ 

(12) 

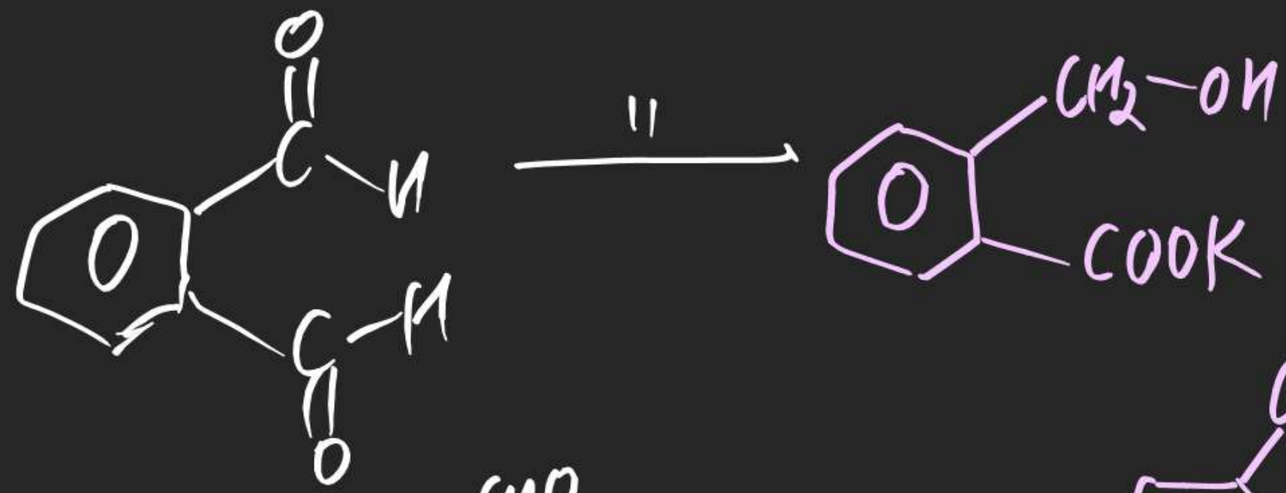
$+ H-\underset{\underset{O}{\|}}{C}-H \xrightarrow{\text{⁻⁻}}$ 

Intramolecular Cannizaro's Rxn.:

(13)



(14)



(15)

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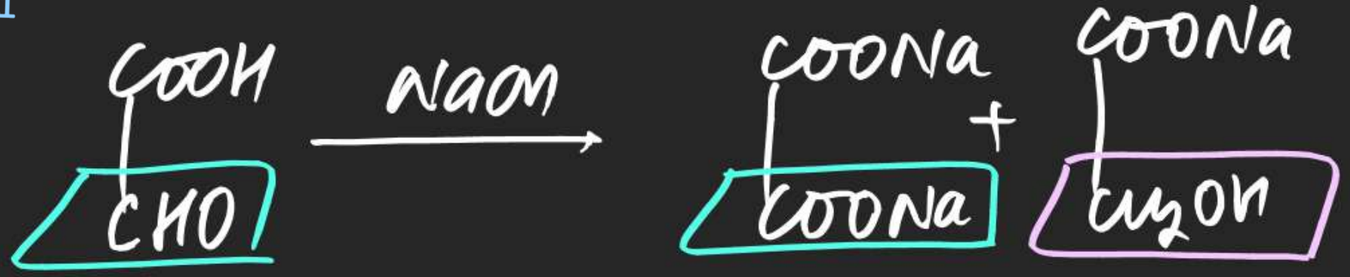
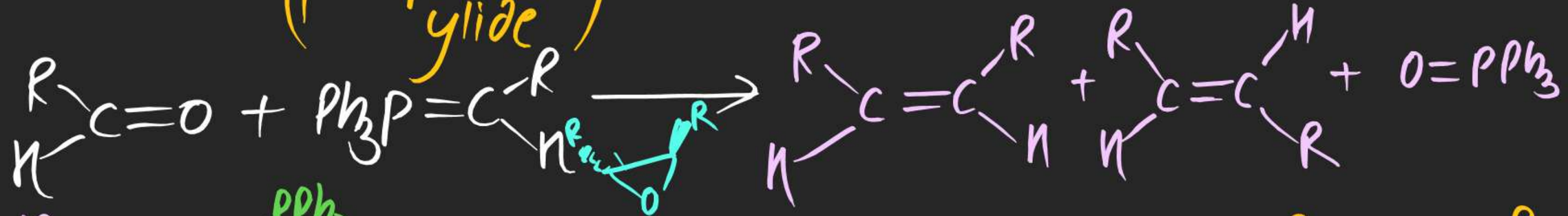
(16) 

(#) Perkin Reaction:-

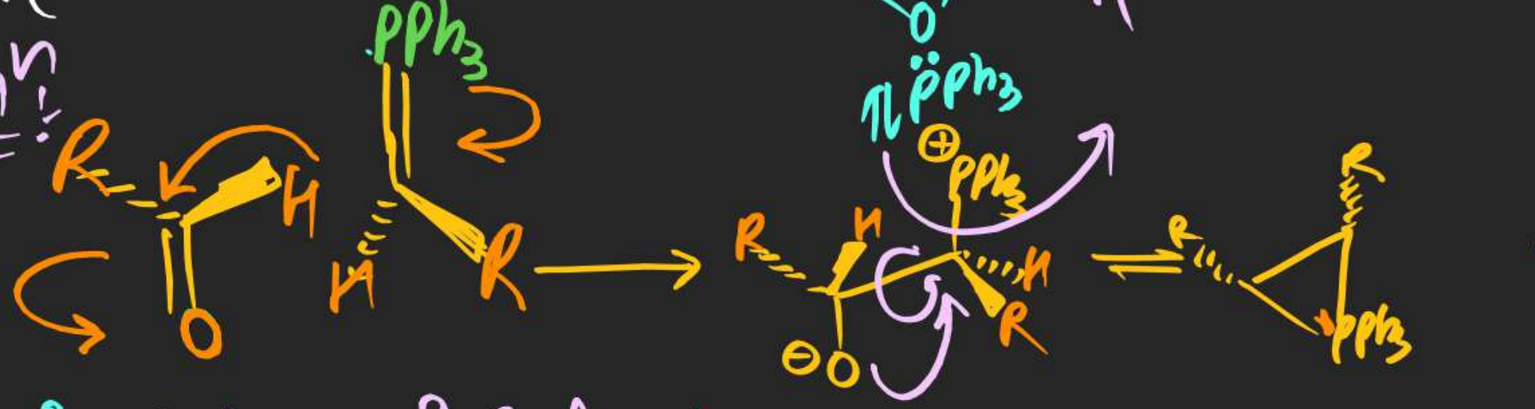
Nishant Jindal

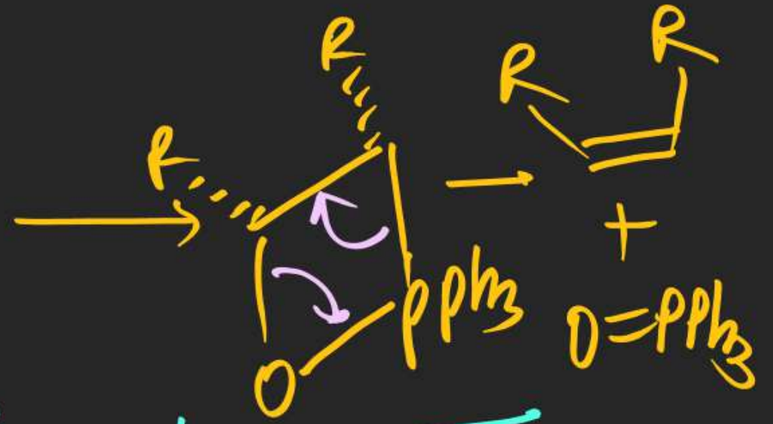
(1) 

(phosphorus ylide)

(2) 

Mechⁿ:





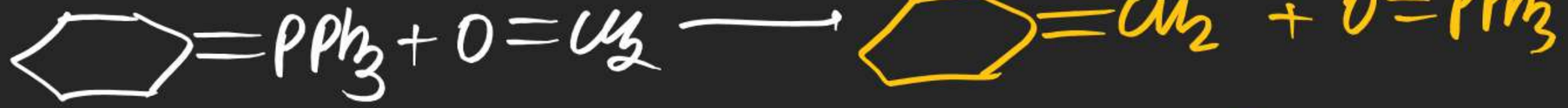
Note (i) Betaine & Cyclo - oxa phosphetane Both are intermediates

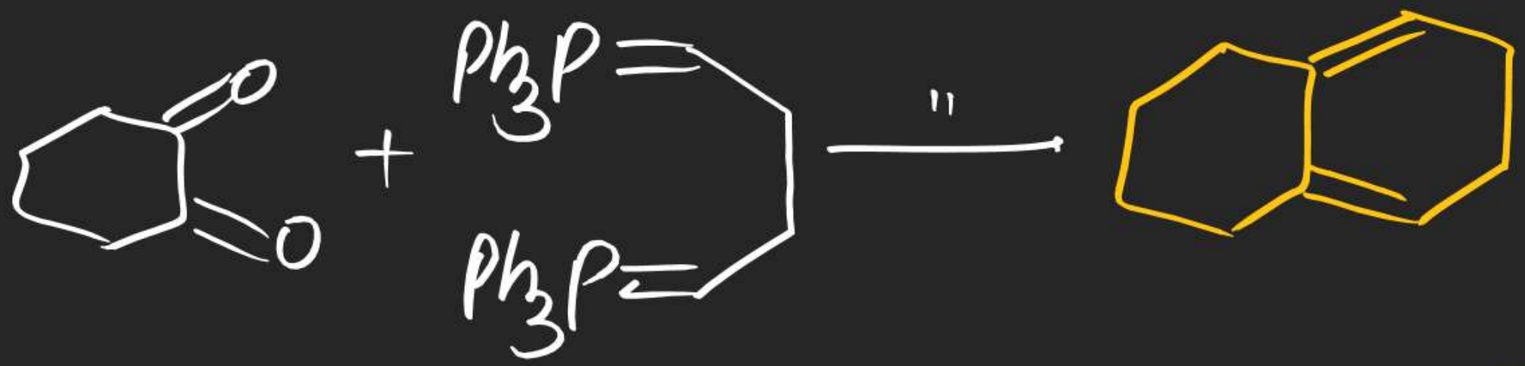
Betaine

Cyclo oxa phosphetane

(ii) Formation of P=O is driving force of Rxn.

(3) 

(4) 

(5) 

(6) $Ph_3P=CH-CH_3 + O=C=O \longrightarrow CH_3-CH=C=O$

(7) 

(8) $Ph_3P=CH-CH_3 + O_2 \longrightarrow CH_3-CH=O$

$O=O$

(9) $\text{II} + \text{II} \longrightarrow CH_3-CH=CH-CH_3$

2 : 1

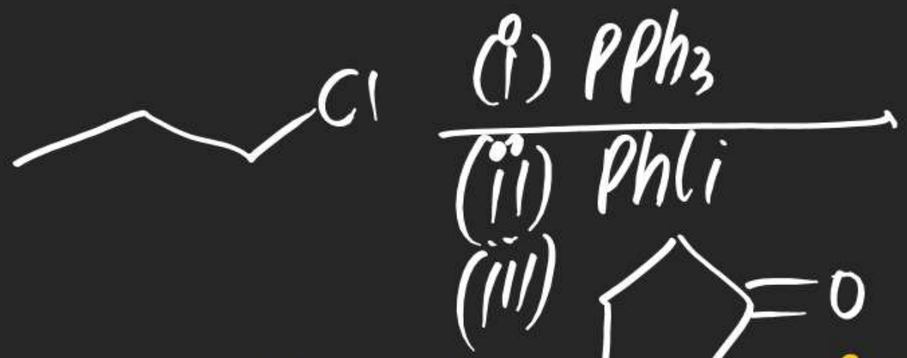
(10) $Ph_3P=CH-CH_3 + H_2O \longrightarrow CH_3-CH_3$

(11)  $+ Ph_3P \longrightarrow$

(12)  $+ Ph_3P \longrightarrow$

Nishant Jindal

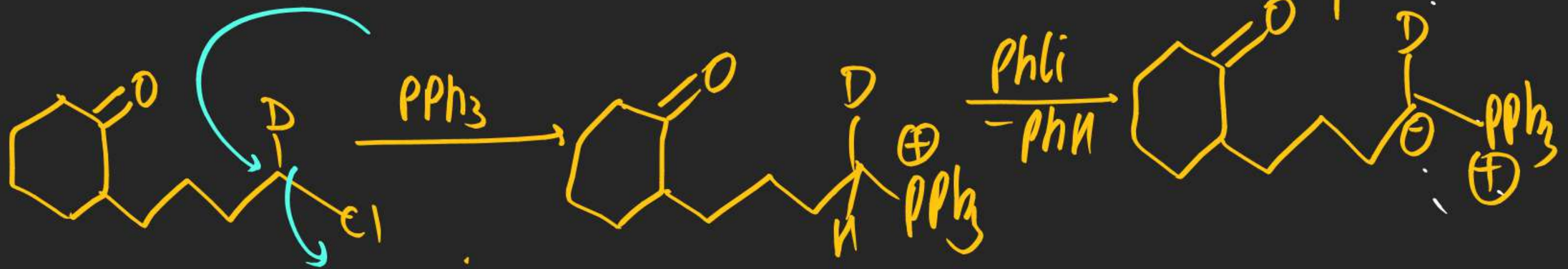
(13)



Soln

(14)

Soln:



(#) Physical properties of Hydrocarbon :- (Alkane, Alkene & Alkyne)

BP $\propto$ Surface Area

MP

Solubility

(#) Chemical properties of Hydrocarbon:

(#) Oxidation Rxn :

(1) Photohalogenation :- (1) $R-H + X_2 \xrightarrow{h\nu} R-X + H-X$

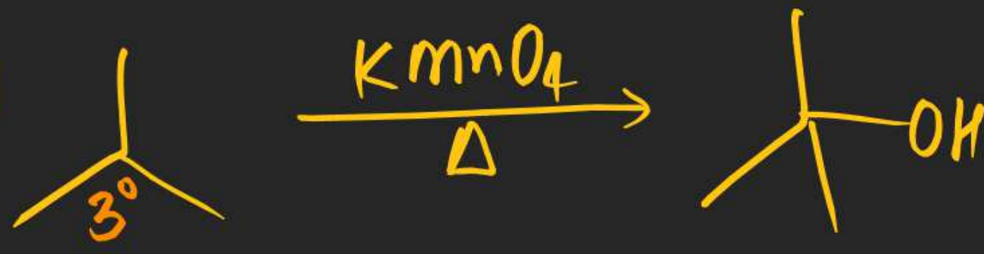
(2) Combustion :- (2) $C_xH_y + \left(x+\frac{y}{4}\right)O_2 \longrightarrow xCO_2 + \frac{y}{2}H_2O$

(3) $C_nH_{2n+2} + \left(\frac{3n+1}{2}\right)O_2 \longrightarrow nCO_2 + (n+1)H_2O$

(4) $C_nH_{2n} + O_2 \longrightarrow$

(5) $C_nH_{2n-2} + O_2$

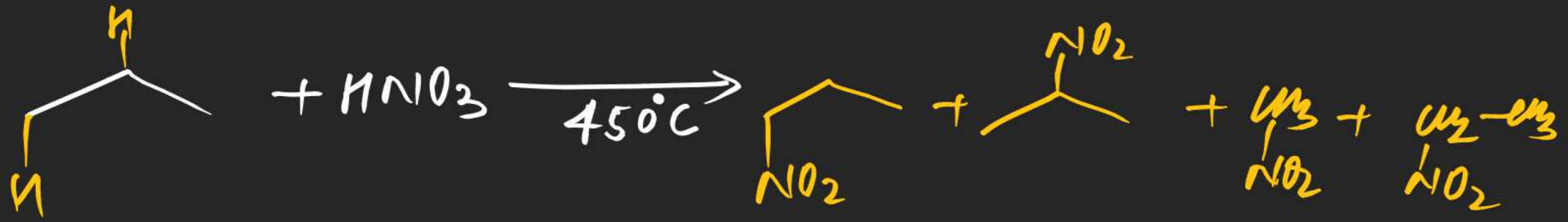
(#) By $KMnO_4$: (6)



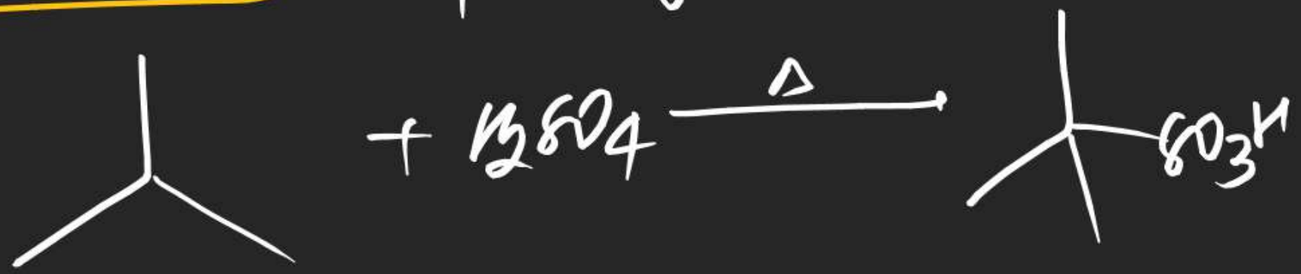
Note: $KMnO_4/\Delta$ can be used for distinguishing b/w 1&2 Butene

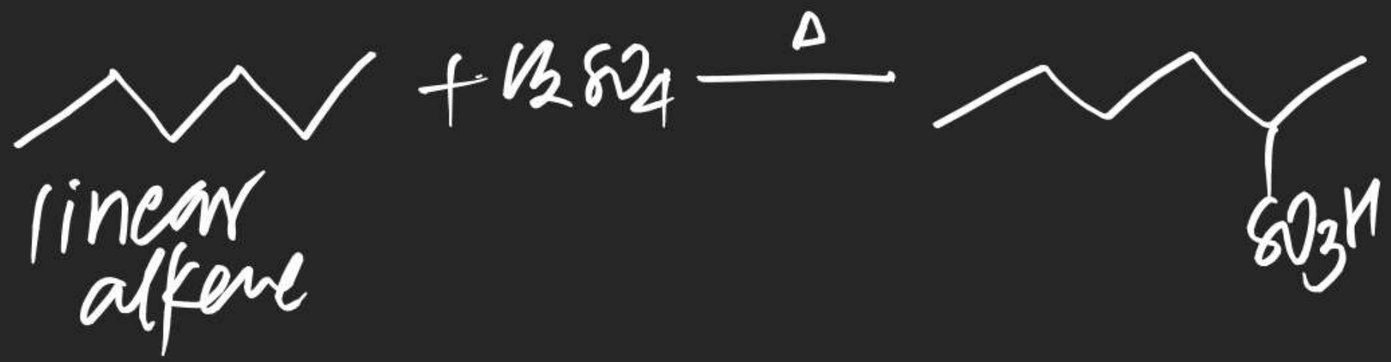
& Butane ( &)

(#) By Nitration: On nitration of alkane each possible Nitro alkane is obtained as a product

(7) 

(#) **By Sulphonation:** Alkane gets sulphonated at high Temp.

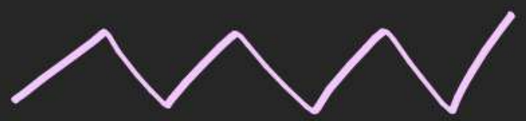
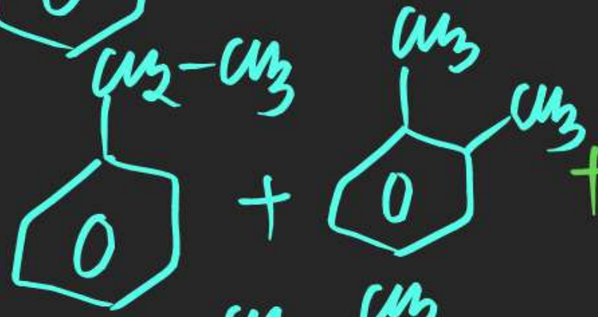
(8) 

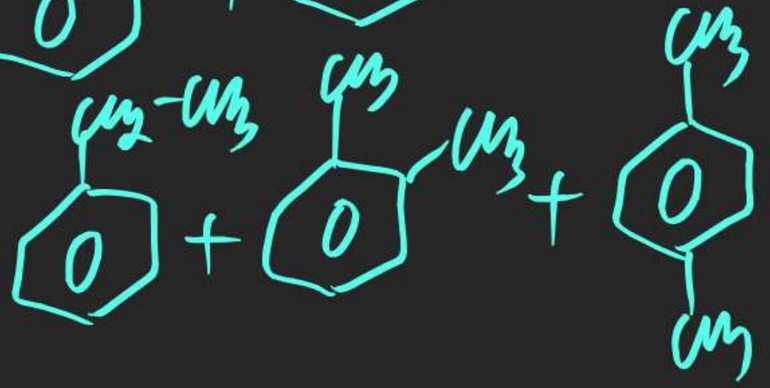
(9) 

(#9) Aromatisation : Alkane on Reaction with Al_2O_3, Cr_2O_3 ---- along with heat gives Aromatic product.

(10)  $\xrightarrow[\Delta]{Al_2O_3}$ 

(11)  $\xrightarrow[\Delta]{Cr_2O_3}$ 

(12)  $\xrightarrow{\Delta}$ 

(13)  $\xrightarrow{\Delta}$ 

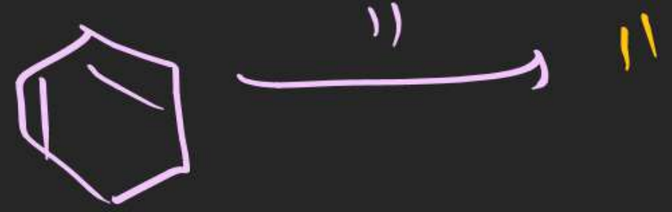
(#) Oxidation By Se or Pd/C :

⟹ Cycloalkene on Rxn with Se a Pd/C gets dehydrogenated (oxidised) & give Aromatic products.

(14) 

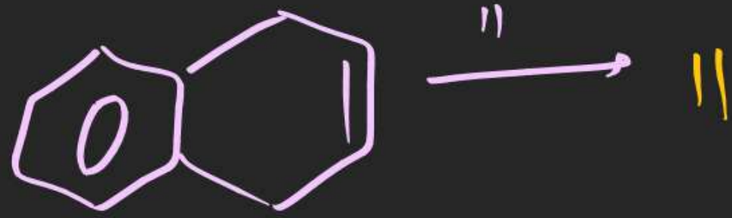
(15) 

(16) 

(17) 

(18) 

(19) 

(20) 

(#) **Isomerisation**:- when alkane gets treated with $AlCl_3/\Delta$ it gets isomerised.

(21) 

(#) **Cracking** Pyrolysis of higher alkane into smaller hydrocarbon is known as Cracking.

(22) 

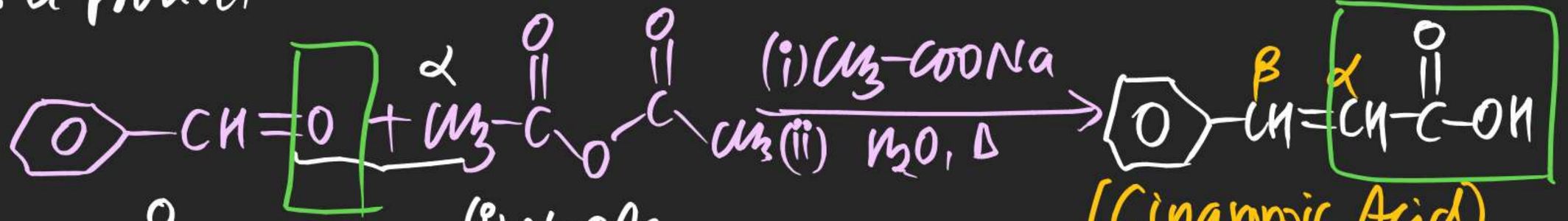
(#) **Octane No.** Petrol - - - - →

(#) **Cetane No.** diesel - - - -

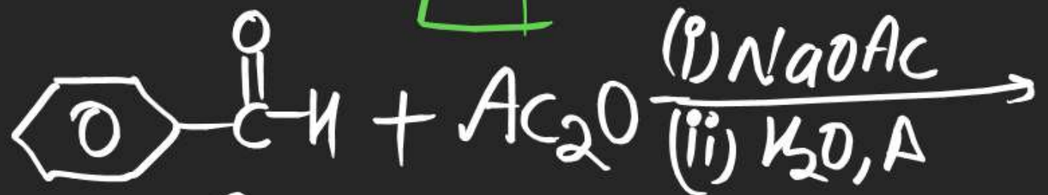
Nishant Jindal

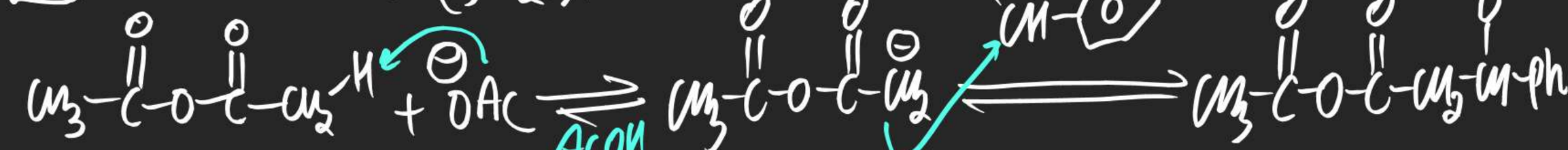
Perkin Reaction :-

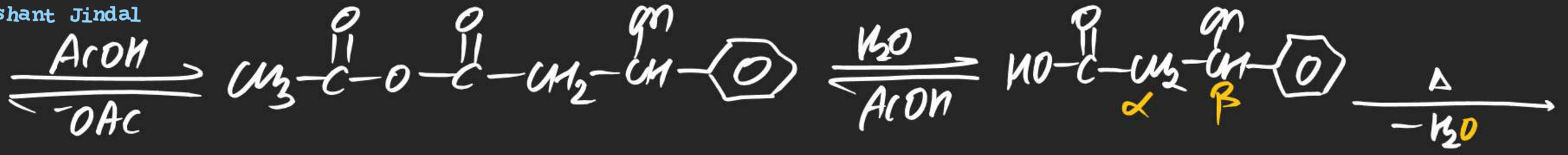
⟹ In this Reaction Aromatic aldehyde / Aromatic acid an hydride is treated with aliphatic acid anhydride in presence of sodium salt of same aliphatic Acid, which gives α,β unsatrated Carboxylic Acid as a Product

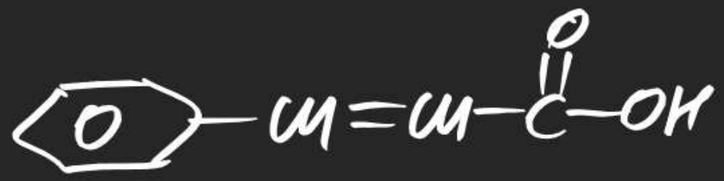
(1) 

(Cinammic Acid)

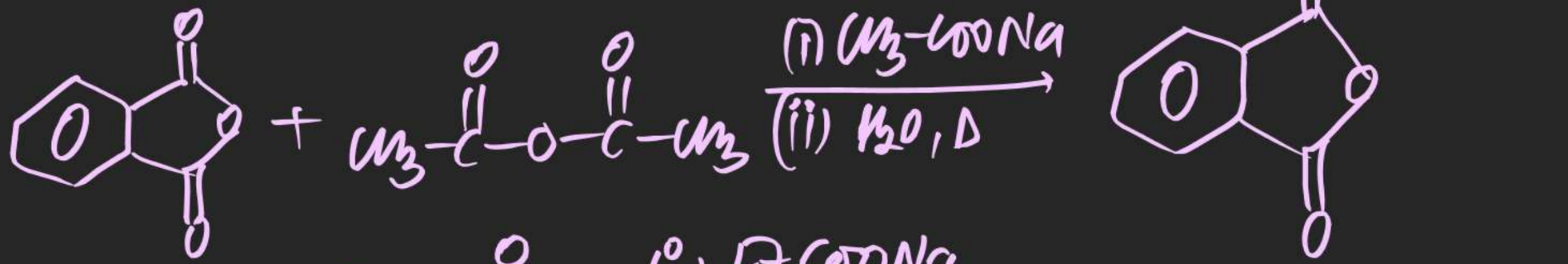
(2) 

Mechⁿ 

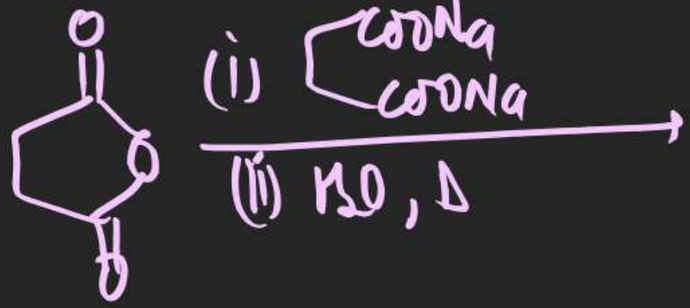




(3)



(4) $Ph-CH=O + (CH_3-CH_2-CO)_2O \xrightarrow[(ii)\ H_2O,\ \Delta]{(i)\ Et\text{-}COONa}$

(5) $Ph-CH=O +$  $\xrightarrow[(ii)\ H_2O,\ \Delta]{(i)\ CH_2(COONa)_2}$

Nishant Jindal

(#) Claisen Condensation:-