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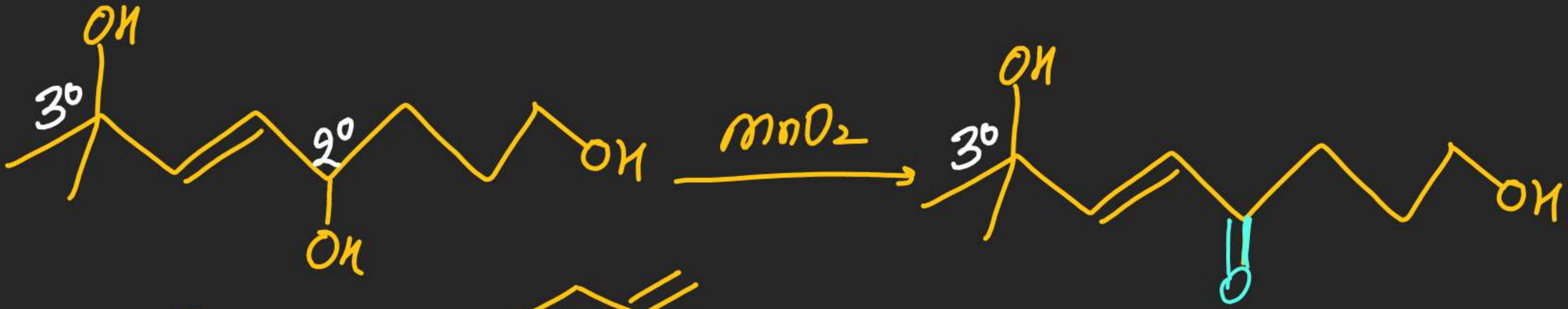
Note:- (1) MnO_2 interacts with $\pi\bar{e}$ cloud of Allylic & Benzylic $\pi\bar{e}$ density hence alcohol near to this site gets oxidised.

(2) Formation of Conjugated Product.

(14)



(15)

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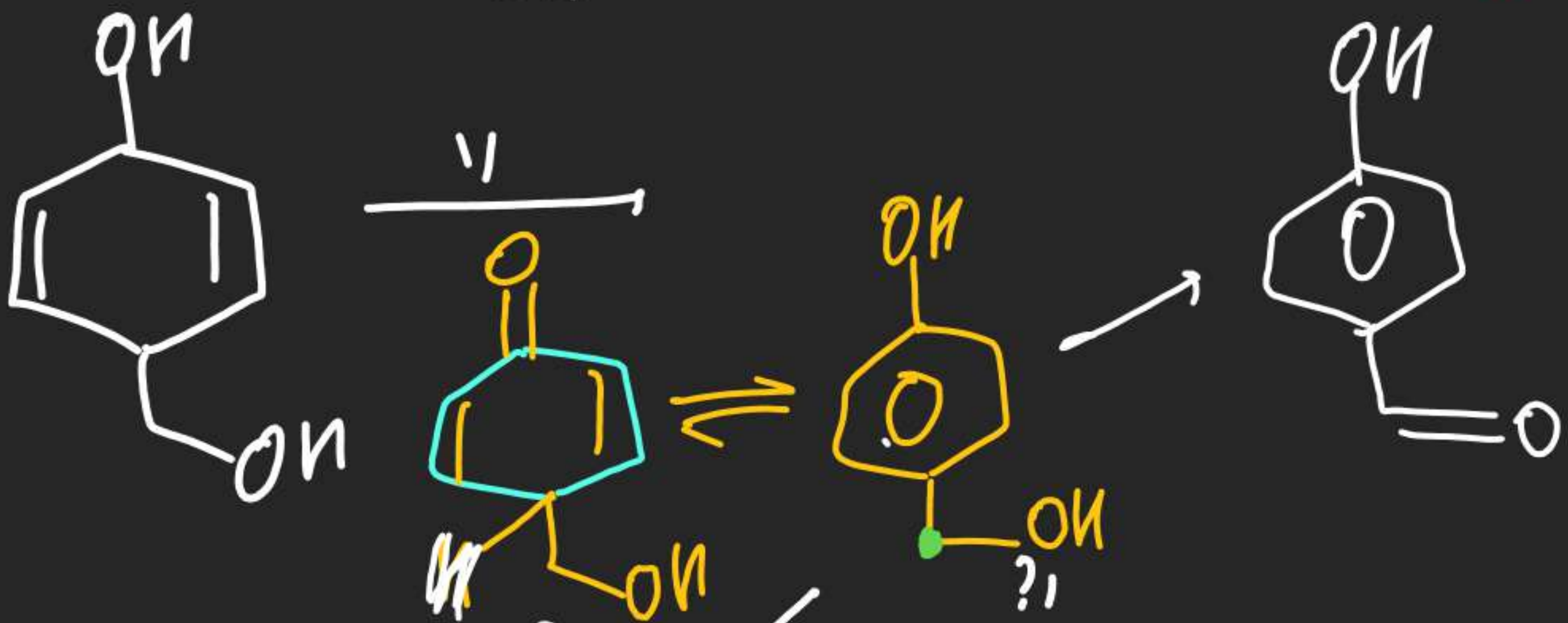
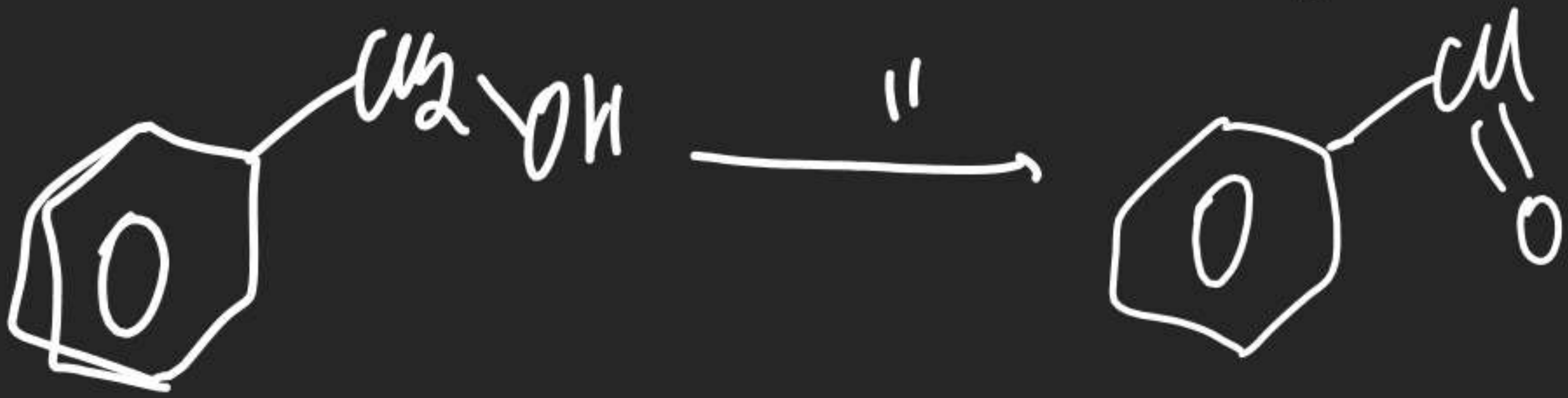
(16)

(17)



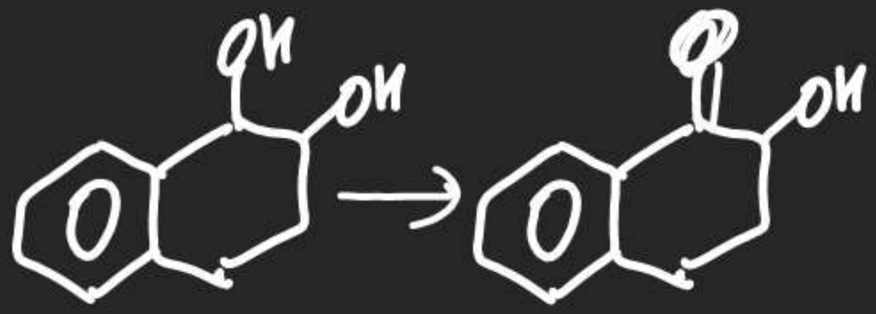
(18)

(19)



(20)

(21)



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(2) $\begin{array}{l} CH_2-OH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array} + \text{"x"}\ HIO_4 \longrightarrow \text{"y"}\ CH_2=O + \text{"z"}\ H-COOH + \text{"w"}\ CO_2$

$(x=2)$ $(y=2)$ $(z=1)$ $(w=0)$

(3) $\begin{array}{l} CH=O \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array} + \text{"x"}\ HIO_4 \longrightarrow CH_2=O + 2HCOOH$

Acid

$(x=2)$

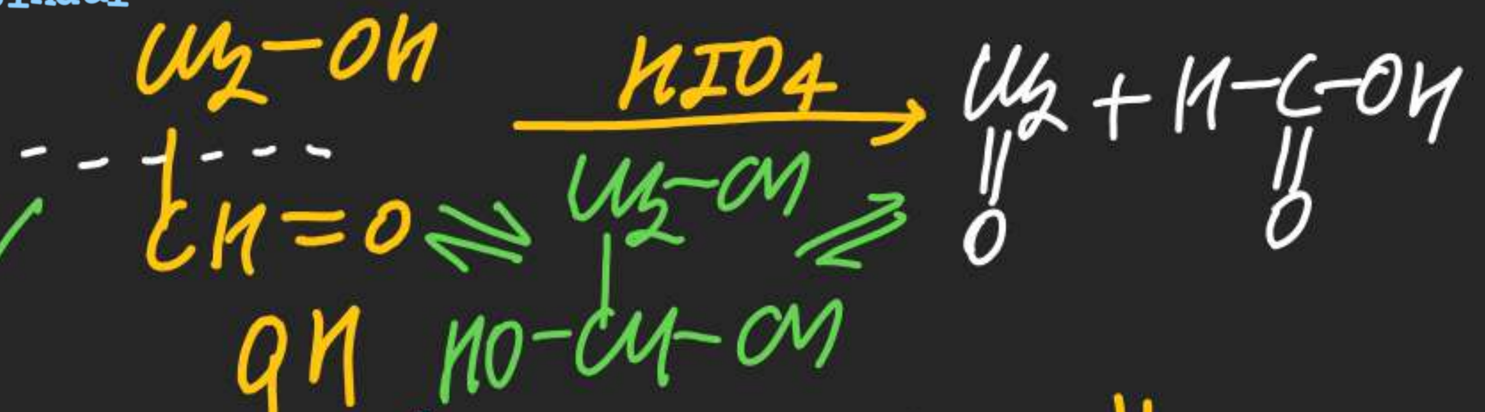
$(y=1)$ $(z=2)$ $w=0$

(4) $\begin{array}{l} CH_2-OH \\ | \\ C=O \\ | \\ CH_2-OH \end{array} + \text{"x"}\ HIO_4 \longrightarrow 2\ \begin{array}{c} CH_2 \\ \| \\ O \end{array} + CO_2$

$\begin{array}{c} CH_2-OH \\ | \\ HO-C-OH \\ | \\ CH_2-OH \end{array}$

$x=2$

(5)



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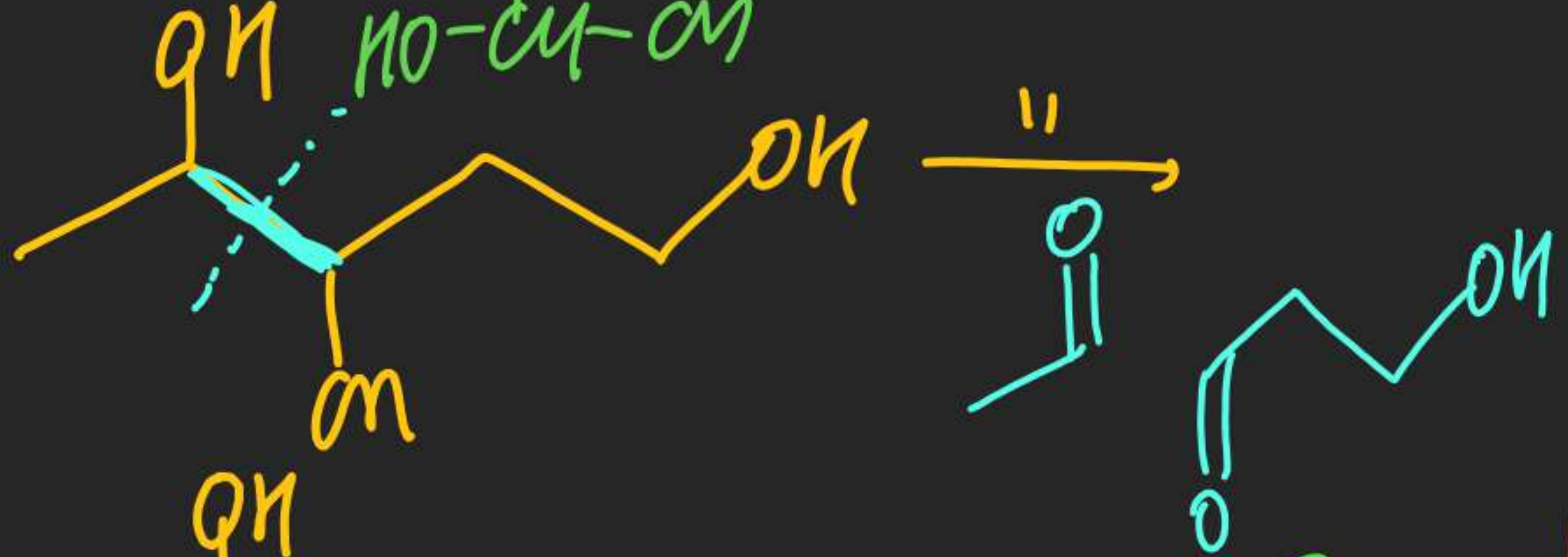
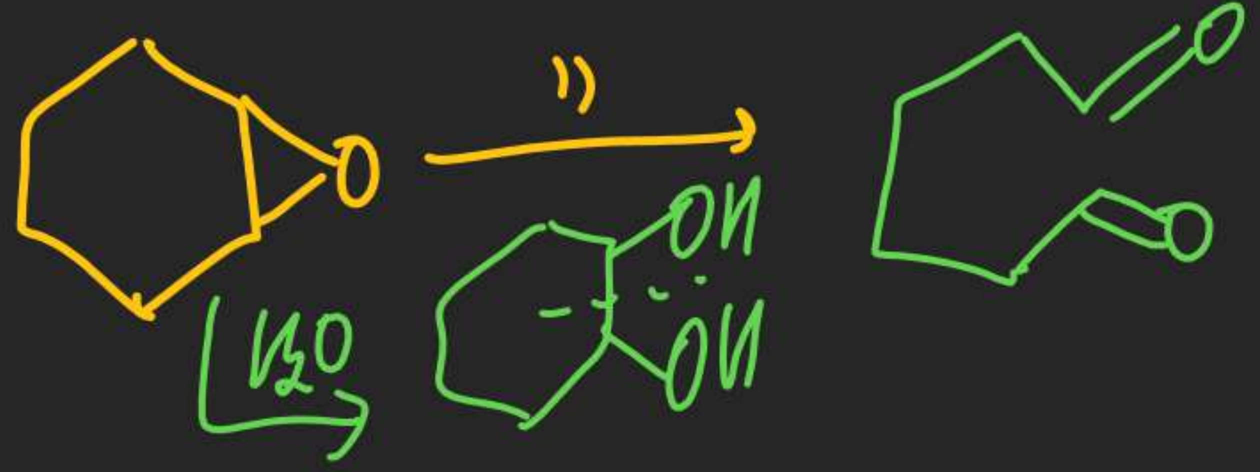


(7)

(8)



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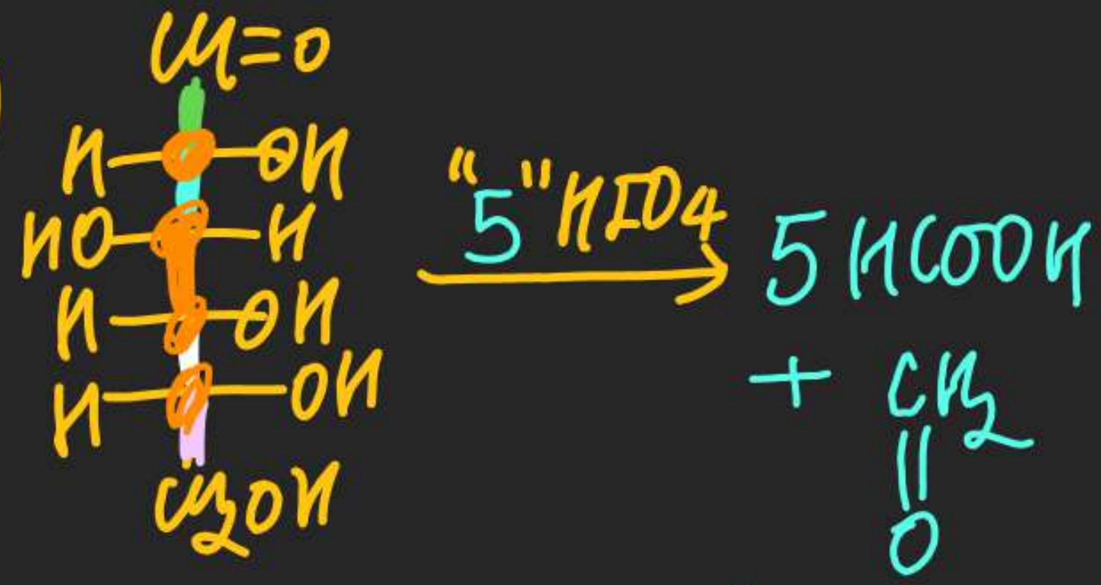

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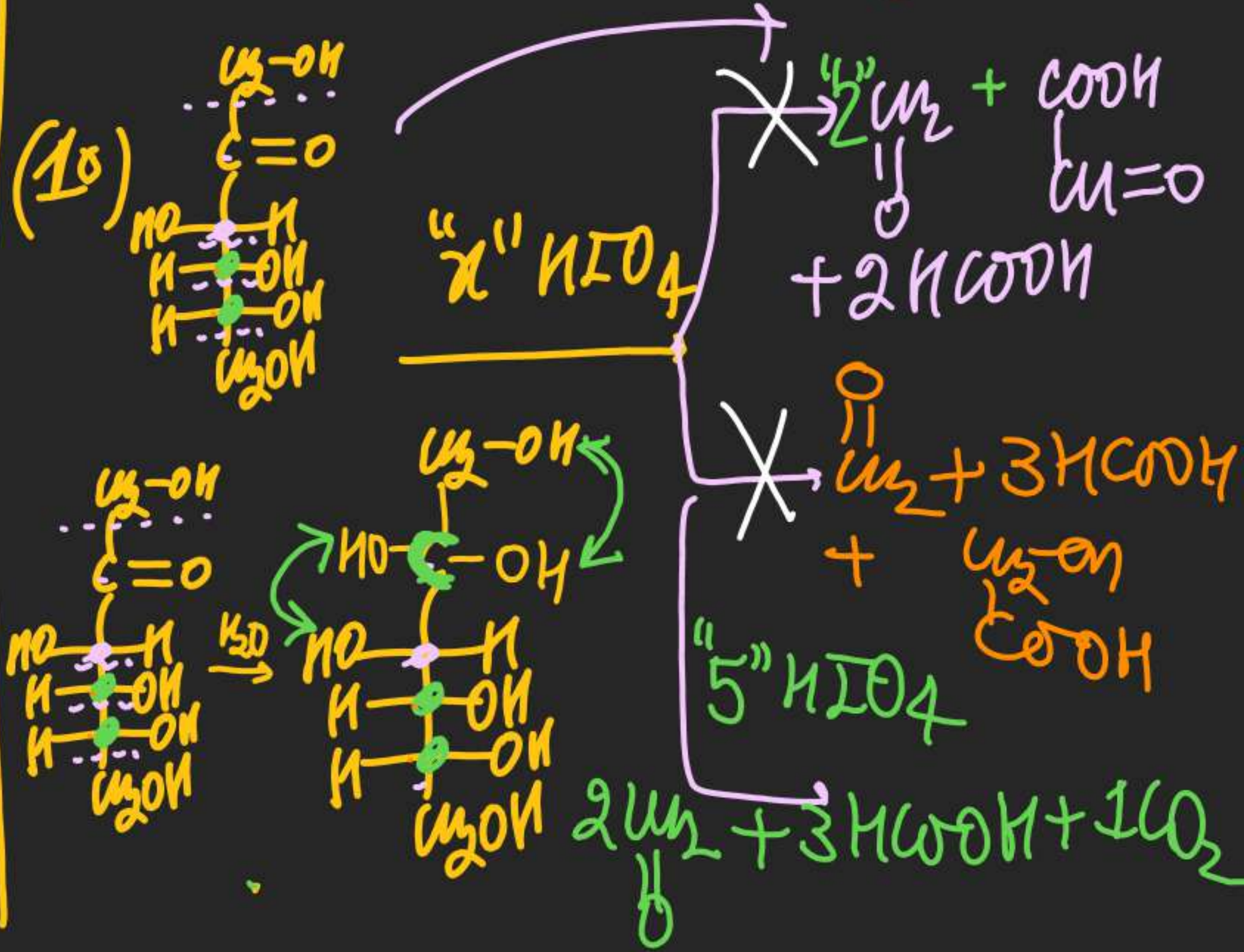

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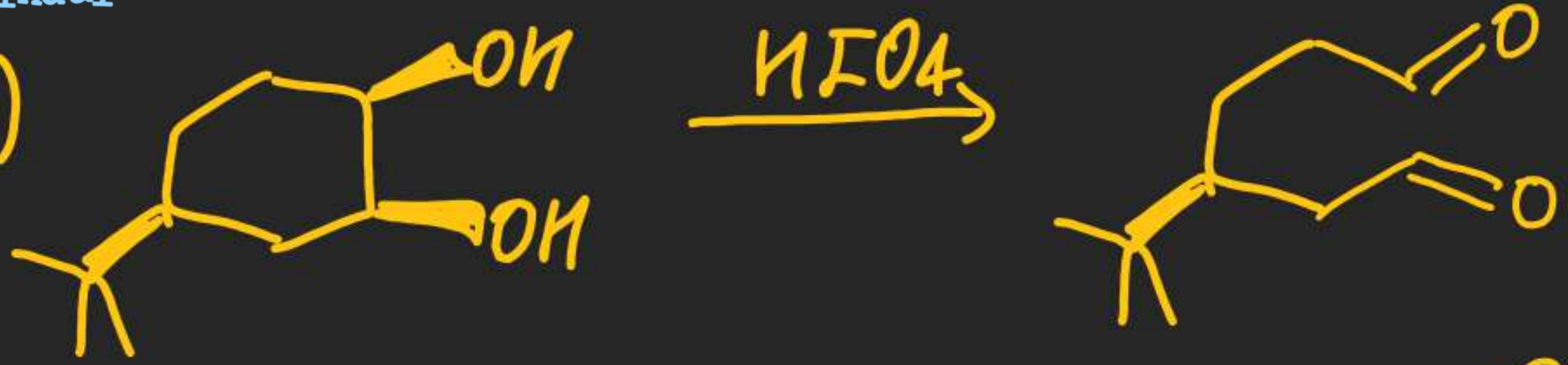

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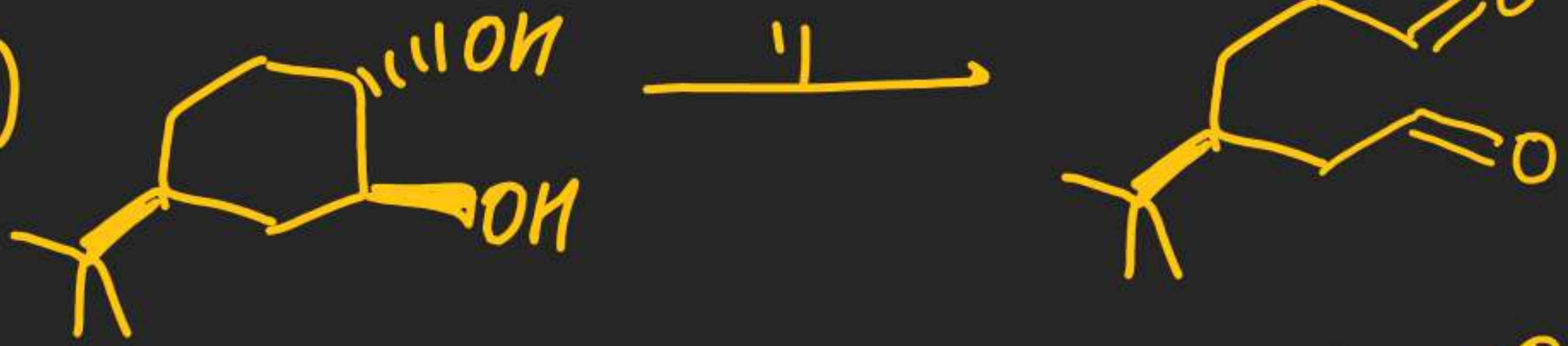
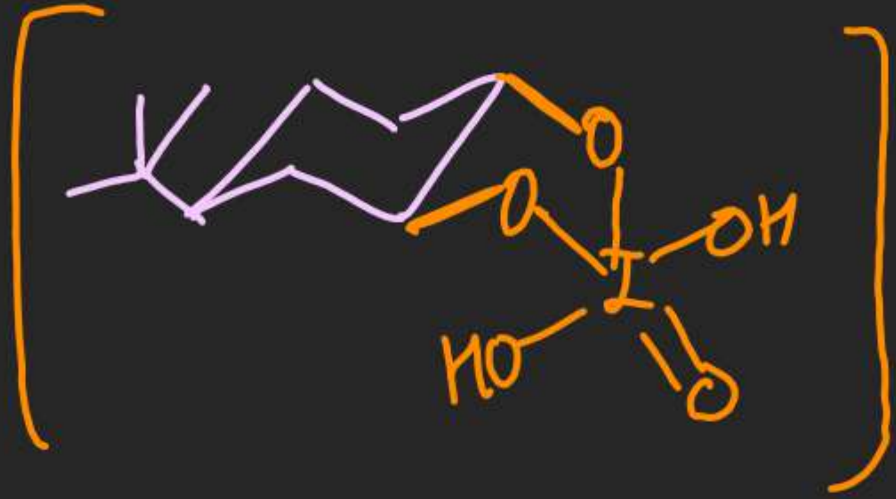
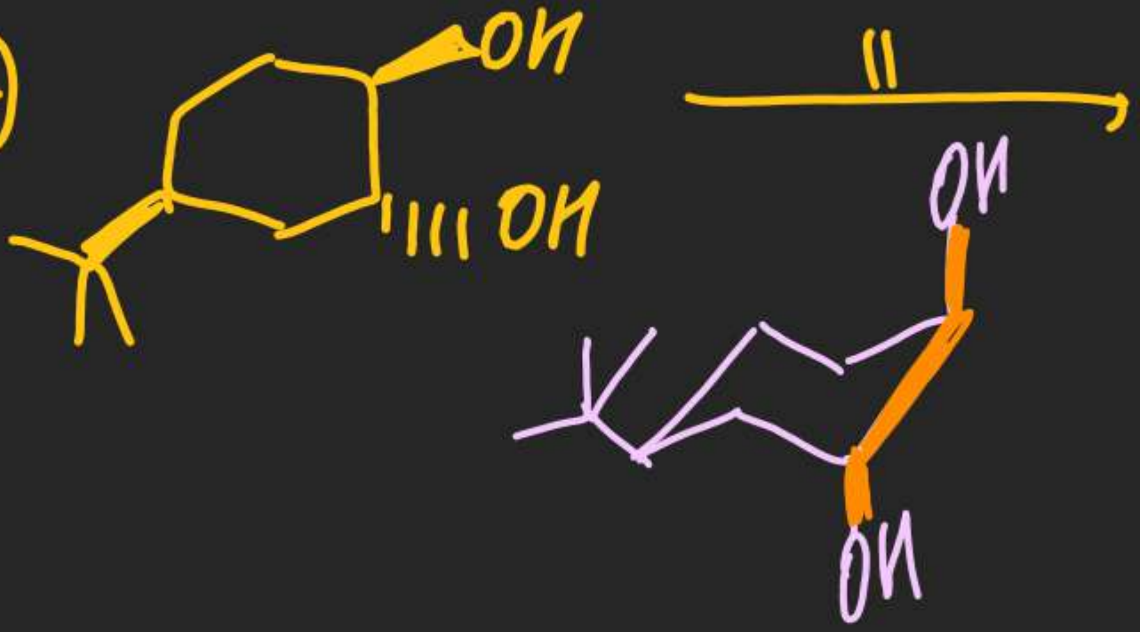




(13)

(14)



No oxidation

due to not formation

cyclic intermidiate

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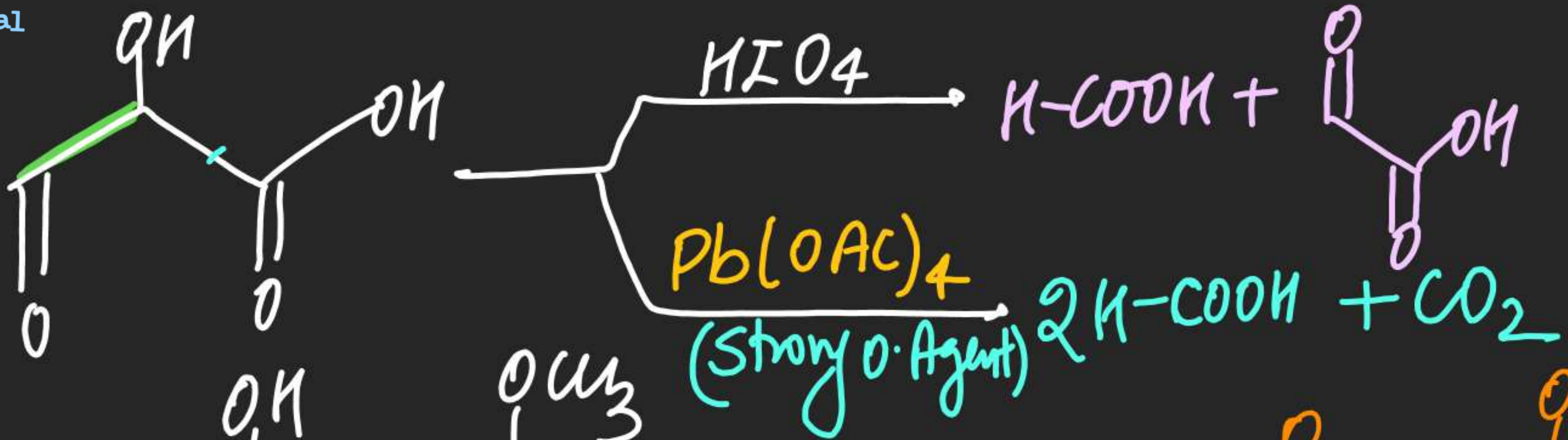
(15)



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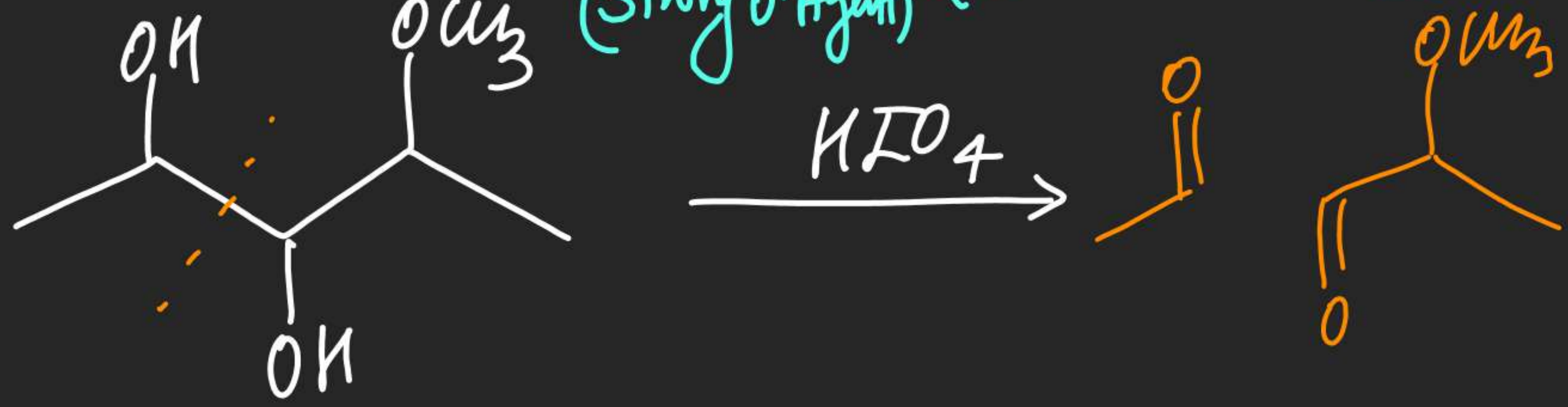

Note: This Reaction is used in POC for distinguishtion of vicinal functional groups.

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(7) By Schiff's Reagent :-

$$\text{P-Rosaniline Hydrogen chloride (Fuschin) (magneta)} \xrightarrow{SO_2} \text{Schiff's Reagent (disappear)} \xrightarrow{R-\overset{O}{\overset{\|}{C}}-H} R-\overset{O}{\overset{\|}{C}}-OH + \text{Pink Colour Restored}$$

Note :- Glucose doesn't give positive schiff's Test.

(8) By Calomal (Hg_2Cl_2) & Corrosive sublimate ($HgCl_2$);

$$R-CHO + 2HgCl_2 + H_2O \longrightarrow R-COOH + Hg_2Cl_2 + 2HCl$$

$$R-CHO + Hg_2Cl_2 + H_2O \longrightarrow R-COOH + 2Hg + 2HCl$$

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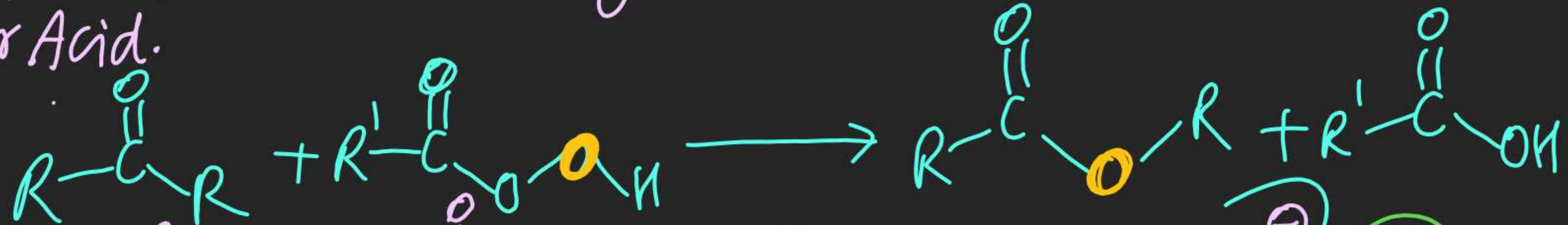
Oxidation of Ketone & Aldehyde:

⇒ Aldehyde gets oxidised easily than ketones.

(1) Bayer's villeger Oxidation:

⇒ In this oxidation ketone gets oxidised in to Ester By useing per Acid.

(1) 

mechn: 

$R-\overset{O}{\overset{||}{C}}-OR + R'-COOH$

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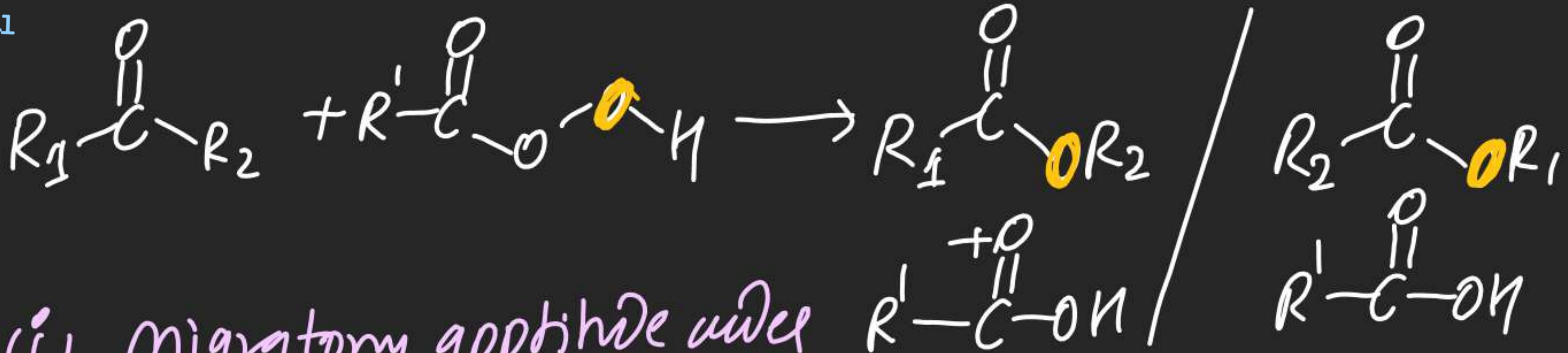
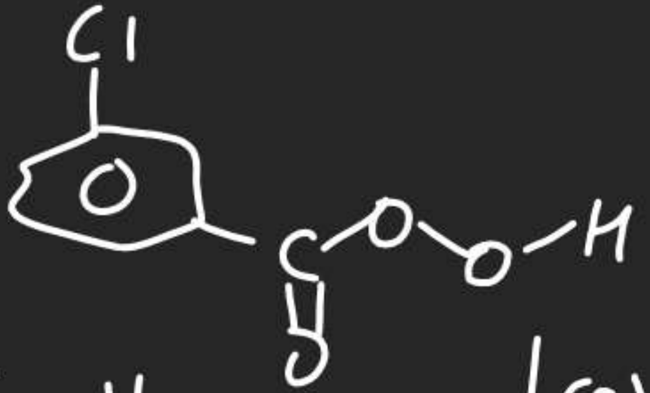
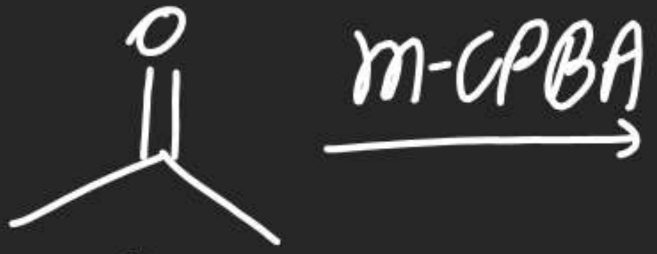
(2) 

Note (i) migratory aptitude order

$-H > 3^\circ > 2^\circ > Ar > 1^\circ > CH_3$

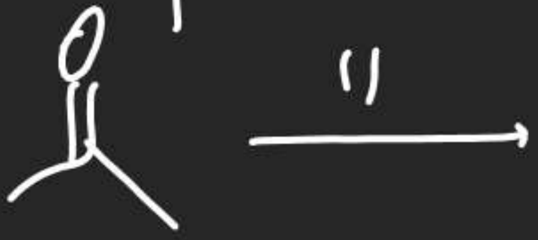
(ii) **Per Acid** CF_3-CO_3H, CH_3-CO_3H,  (m-CPBA)

(3) 

(4) 

(5) 

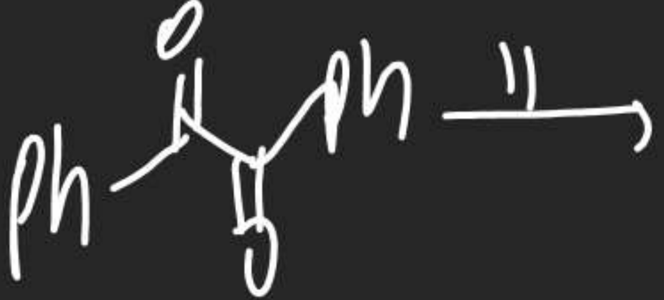
(6) 

(7) 

(8) 

(9) 

(10) 

(11) 

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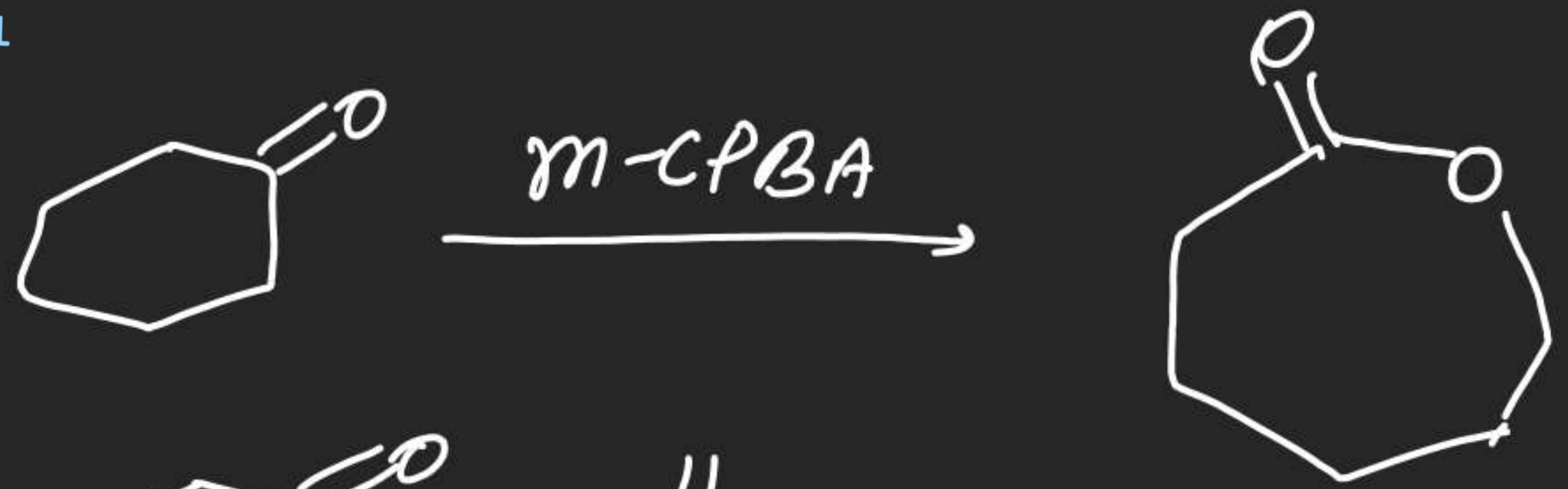
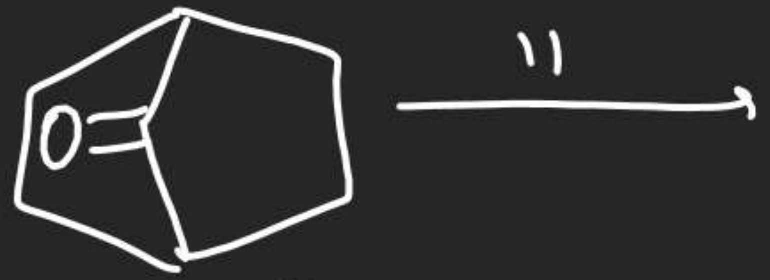
(12)



(13)

(14)



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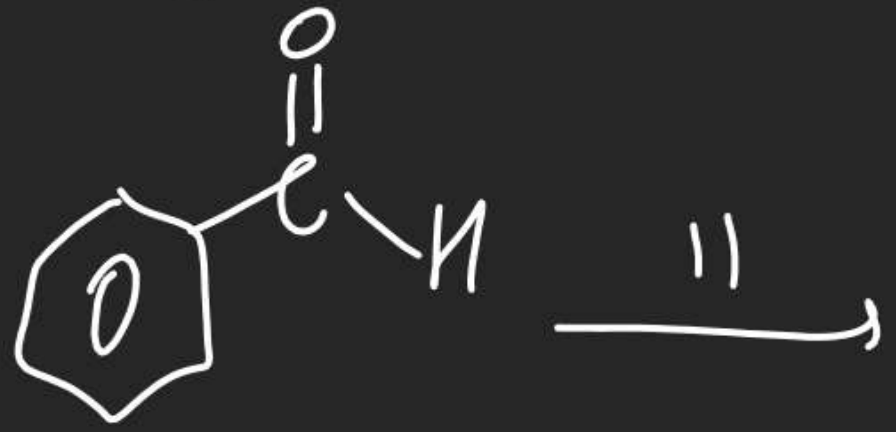
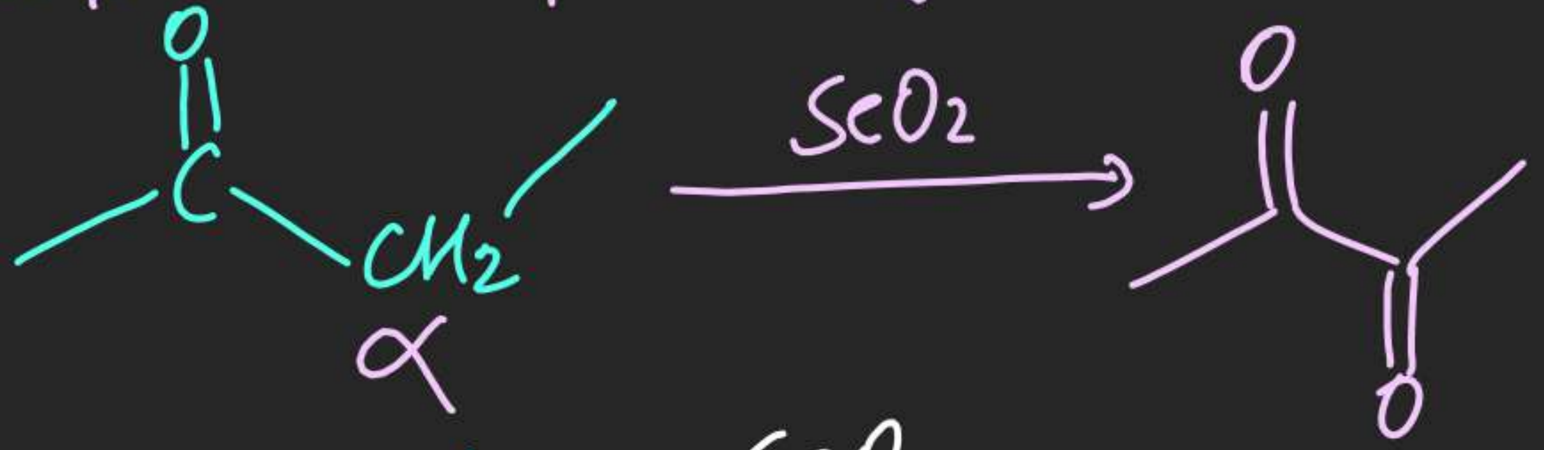


(2) By SeO_2 :-

⇒ It oxidises Active position (α-position) of $-\overset{O}{\overset{\|}{C}}-$ & Allylic position of a alkene

①


(2)


(Hydroxylation)

Note :- (i) Hydroxylation (oxidn) takes place towards Allylic site of most substituted side of Alkene.

(ii) order of preference of alkyl group

$$-CH_2- > -CH_3 > -\overset{|}{\underset{|}{C}}H$$

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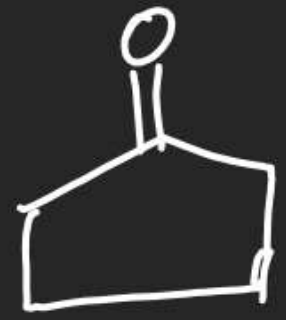
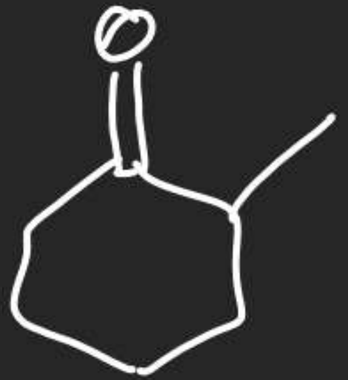
(3)  $+ SeO_2 \longrightarrow$

(4)  $+ SeO_2 \longrightarrow$

(5)  $+ SeO_2 \longrightarrow$

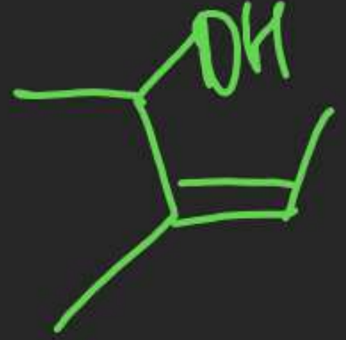
(6)  $+ SeO_2 \longrightarrow$

(7) $H_2C(COOR)_2 + SeO_2 \longrightarrow$

(8) $H_3C-CH=CH-CH_3 \xrightarrow{SeO_2}$

(9) $H_3C-CH_2-CH=CH-CH_3 \xrightarrow{SeO_2}$

(10)  $\xrightarrow{SeO_2}$ 

(11)  $\xrightarrow{SeO_2}$ 

(12)  $\xrightarrow{\text{''}}$

(13)  $\xrightarrow{\text{''}}$

(14)  $\xrightarrow{\text{''}}$

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(#) Oxidation of $>C=O$ in Drastic Condition:

*most stable Enol

Oxidative Ozonolysis

Popoff's Rule: Acc. to this Rule smaller Alkyl group must be present with $-\overset{O}{\overset{\|}{C}}-$ carbon in product.

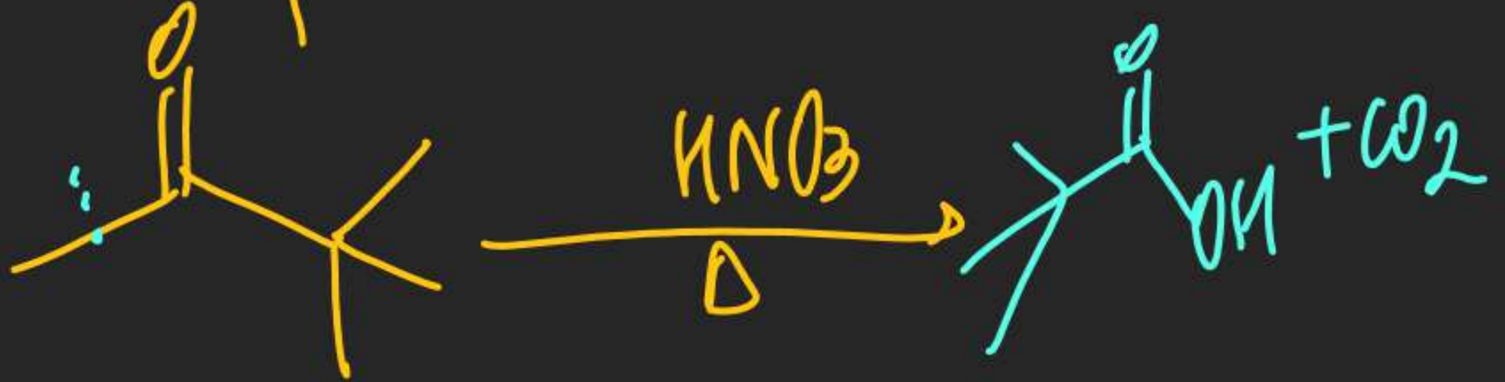
(1) $H_3C-\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow[\Delta]{HNO_3} H_3C-\overset{O}{\overset{\|}{C}}-OH + CO_2$

(2) $H_3C-\overset{O}{\overset{\|}{C}}-CH_2-CH_3 \xrightarrow[\Delta]{HNO_3}$ "2" $CH_3-\overset{O}{\overset{\|}{C}}-OH$

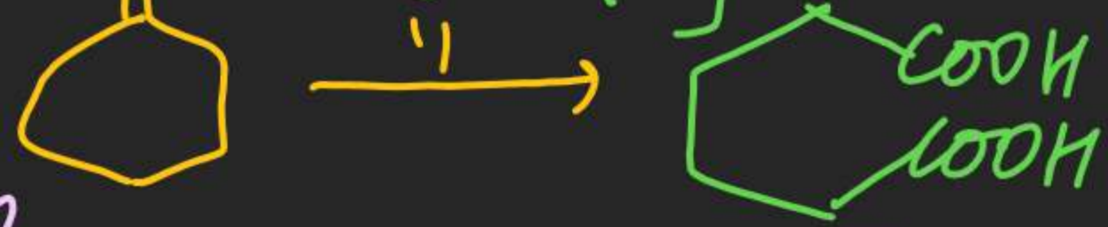
$\cancel{\rightarrow}\ CH_3-CH_2-\overset{O}{\overset{\|}{C}}-OH + CO_2$

(3)

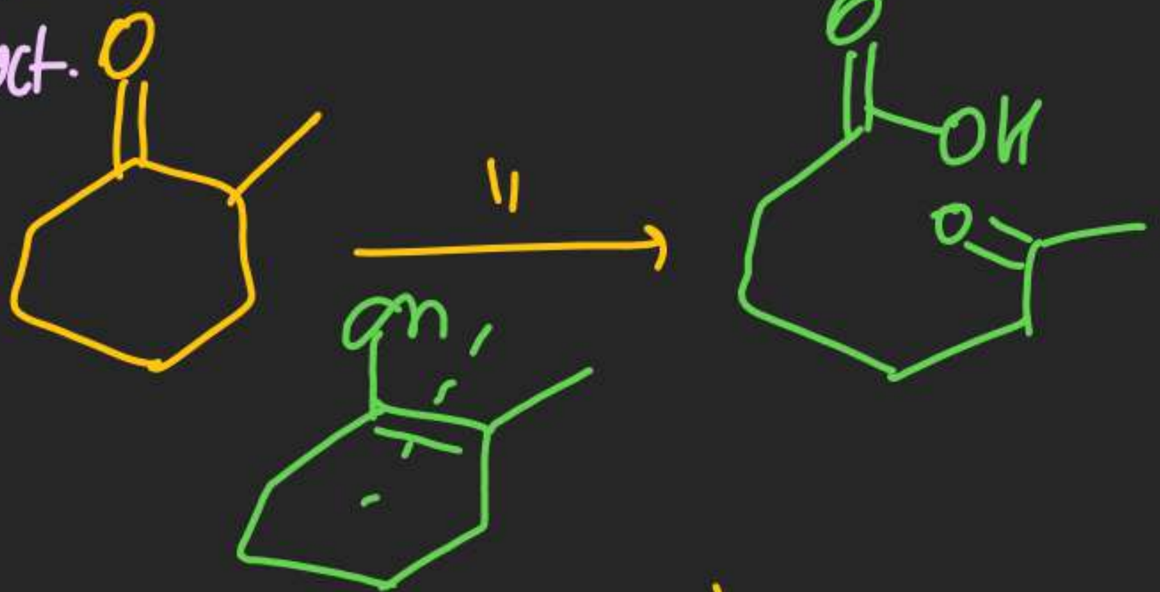
(4)



(5)



(6)



(7)

Nishant Jindal

Compound	Tollen's	Fehling	Compound	Tollen's	Fehling
(1) Aliphatic Aldehyde $R-CH=O$ $CH_3-CH=O$ $C_6H_5-CH_2-CH=O$	(+) $R-COO^{\ominus}$ $CH_3-COO^{\ominus}$ $C_6H_5-CH_2-COO^{\ominus}$	(+) $R-COO^{\ominus}$ $CH_3-COO^{\ominus}$ $C_6H_5-CH_2-COO^{\ominus}$	(3) Ketone $R-\overset{O}{\overset{\parallel}{C}}-R$	(−)	(−)
(2) Aromatic Aldehyde $Ar-CHO$ C_6H_5-CHO	(+) $Ar-COO^{\ominus}$ $C_6H_5-COO^{\ominus}$	(−)	(4) Carboxylic Acid $R-COOH$ Except $H-\underset{\underset{O}{\parallel}}{C}-OH$	(−) (+) CO_3^{2-}	(−) (+) CO_3^{2-}

Note:- Tollens & *Fehling both can be used for distinguishtion b/w Ketone & Aldehyde

IMP Note: Fehling solution is used for distinguishtion b/w Aliphatic & Aromatic Aldehyde.

(5) Hemi Acetal $R(H)C(O\text{-}H)(O\text{-}R')$	(+) $R\text{-}COO^{\ominus}$ + $R'\text{-}OH$	(+) $R\text{-}COO^{\ominus}$ + $R'\text{-}OH$
(6) Acetal $R(H)C(O\text{-}R')(O\text{-}R'')$	(−)	(−)
(7) Hemi Ketal $R(R)C(O\text{-}H)(O\text{-}R')$	(−)	(−)
(8) Ketal $R(R)C(O\text{-}R')(O\text{-}R')$	(−)	(−)

IMP

(9) α-Hydroxy Ketone	(+)	(+)
$R\text{-}\overset{\alpha}{C}H(OH)\text{-}C(=O)\text{-}H$	$R\text{-}CH(OH)\text{-}COO^{\ominus}$	$R\text{-}CH(OH)\text{-}COO^{\ominus}$
$R\text{-}C(=O)\text{-}\overset{\alpha}{C}H_2(OH)$	$R\text{-}CH(OH)\text{-}COO^{\ominus}$	$R\text{-}CH(OH)\text{-}COO^{\ominus}$
$R\text{-}C(=O)\text{-}\overset{\alpha}{C}H(OH)\text{-}R'$	$R\text{-}C(=O)\text{-}C(=O)\text{-}R'$	$R\text{-}C(=O)\text{-}C(=O)\text{-}R'$
(10) α-Hydroxy Hemi Ketal	(+)	(+)
$R\text{-}\overset{\alpha}{C}H(OH)\text{-}C(R')(OR')(OH) \longrightarrow R\text{-}CH(OH)\text{-}C(=O)\text{-}R' + R'\text{-}OH$	$R\text{-}C(=O)\text{-}C(=O)\text{-}R'$ + $R'\text{-}OH$	$R\text{-}C(=O)\text{-}C(=O)\text{-}R'$ + $R'\text{-}OH$

(11) $Ph{-}NH{-}OH \xrightarrow{Ag_2O} Ph{-}N{=}O + 2Ag + H_2O$

(12)

Tartaric Acid

Tartonic Acid

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(A) Carbonyl sheat complete
Except - (Named Reaction)

(B) BB (Alkyl Halide)
Complete.