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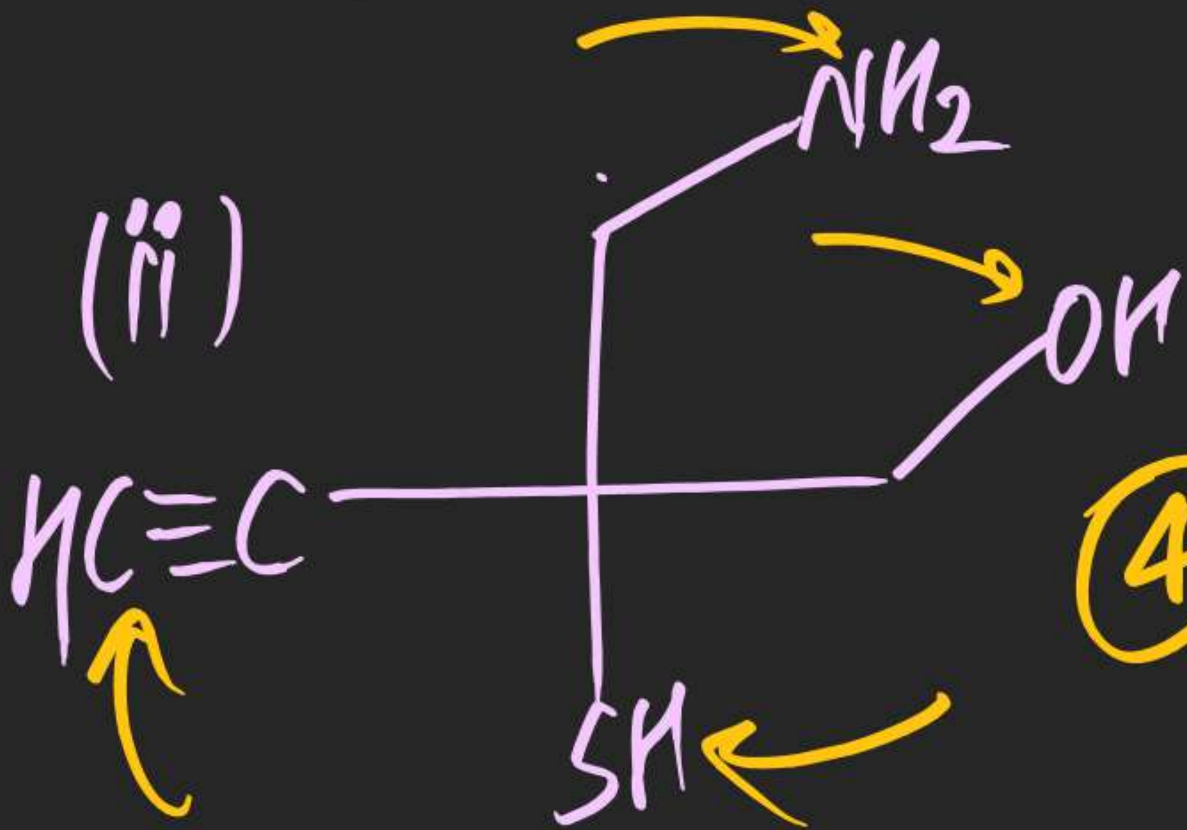
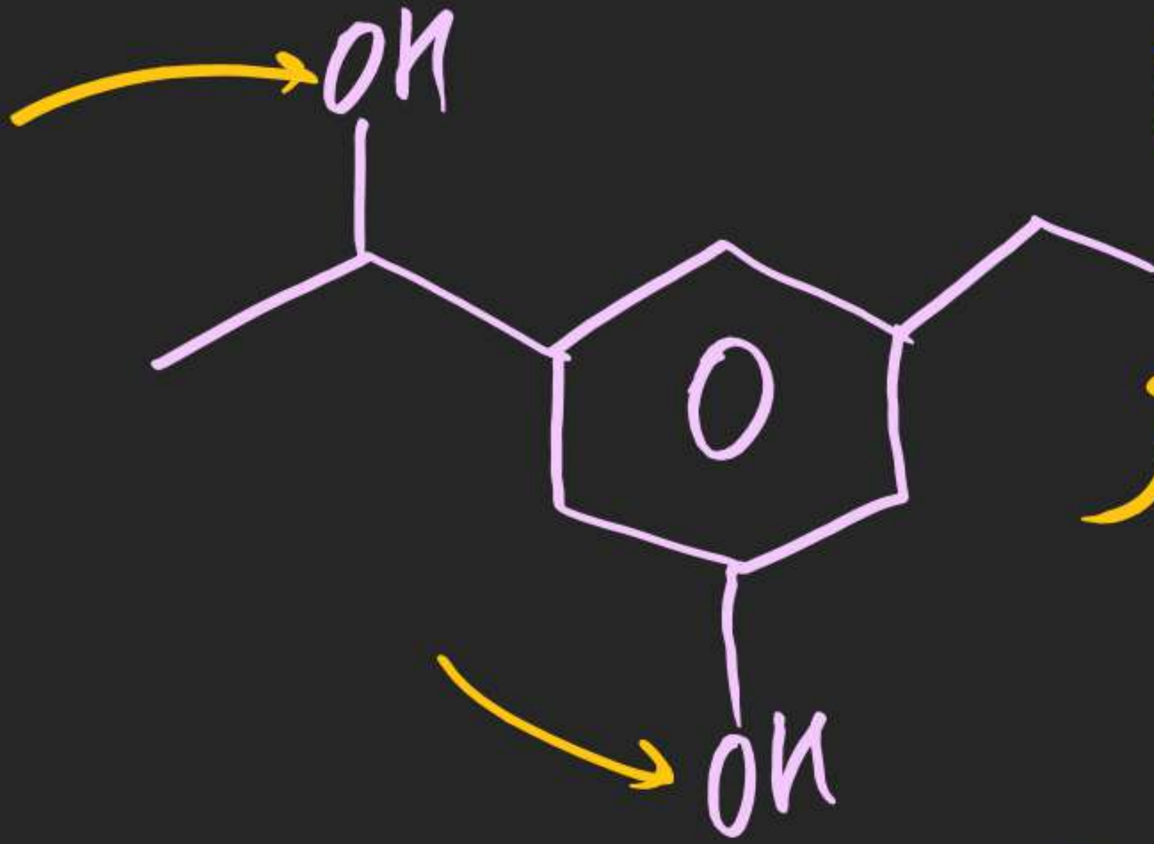
(14) Total no. of moles of R-MgX consumed by following

(i) 

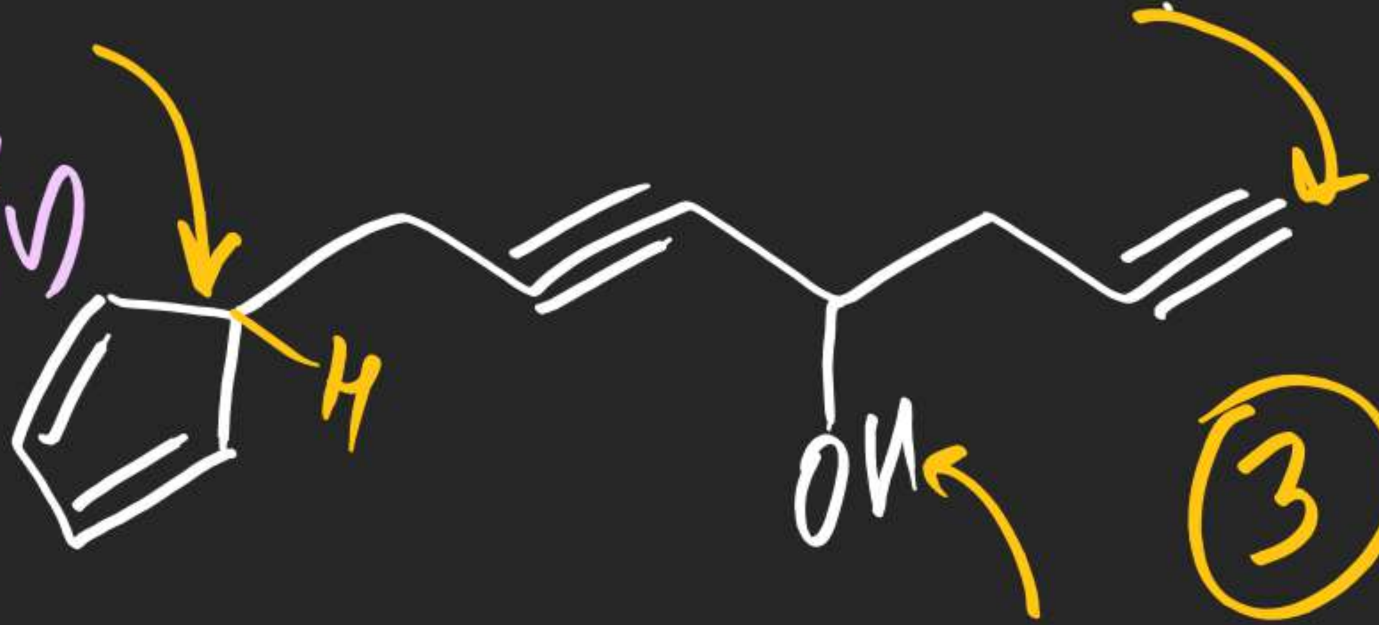
(3)

(ii) 

4

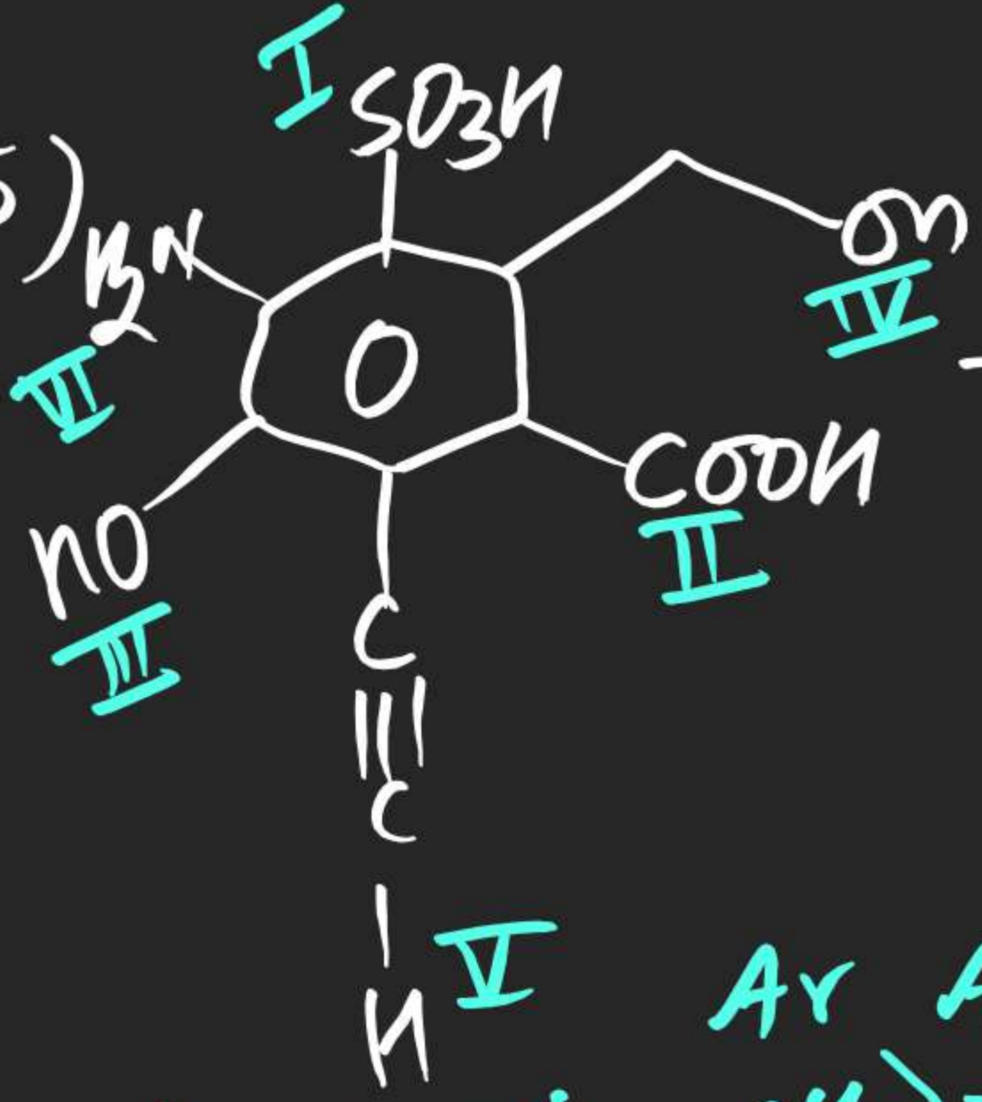
(iii) 

3

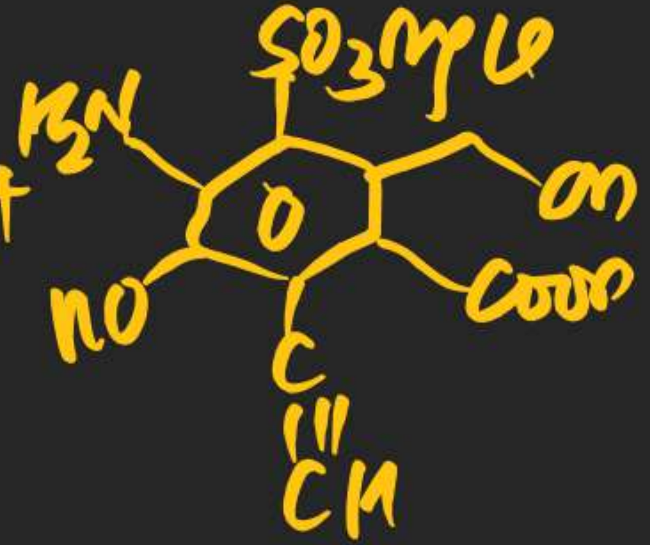
(iv) 

3

(15)



CH_3-MgCl (1eq) → CH_4 +



" (2eq)

" (3eq)

" (4eq)

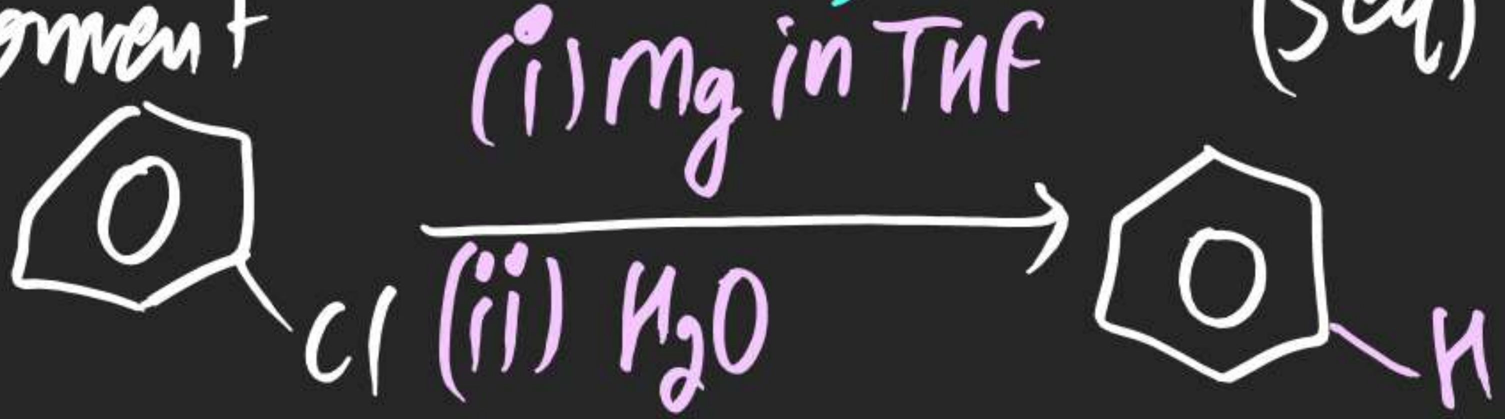
" (5eq)

Ar Aliphatic

$-SO_3H > -COOH > -OH > -OH > -C\equiv CH > -NH_2$

Comment

(16)



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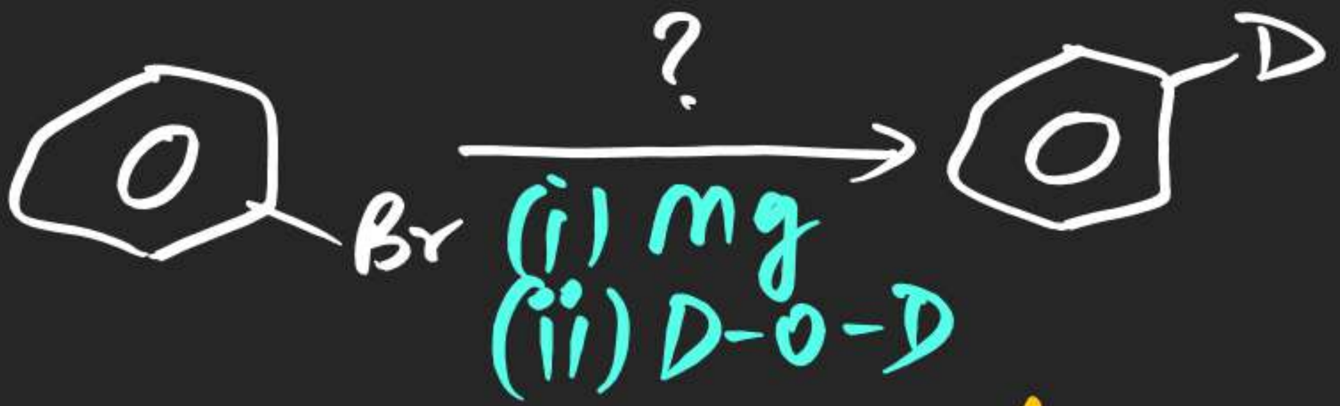
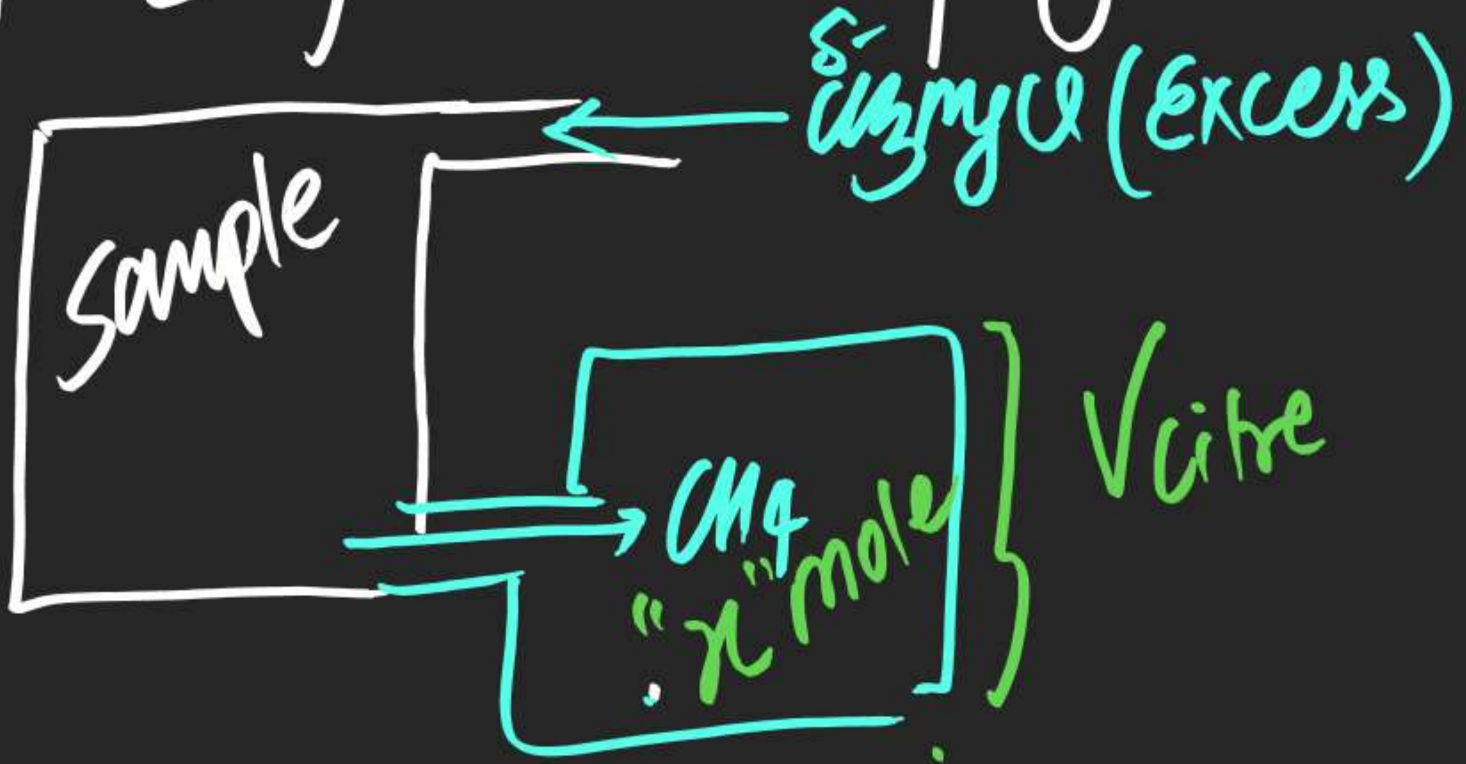
(17)



(#) Zerwitnoff's Active Hydrogen determination method:-

⇒ Sample is contain "x" no. of Active/Acidic sites. we can find "x" By passing Excess of CH_3MgBr & analysing Volume of CH_4 gas liberated at STP

$$\boxed{x = \frac{V_{litre}}{22.4}}$$



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(18) Find Volume of CH_4 gas evolved at Rx^n b/w 118 gm of methyl magnesium Bromide with 13 gm of Ethyne at STP.

Soln:

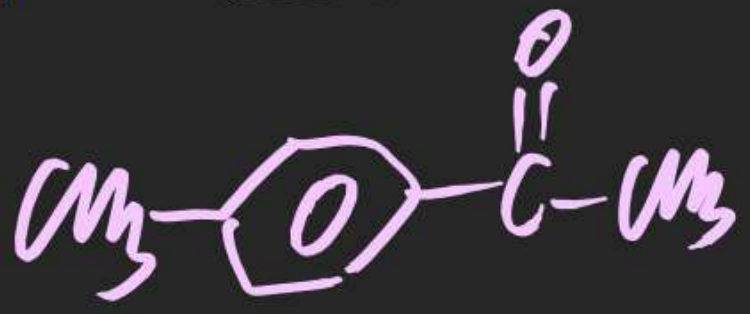
$$2\overset{\delta-}{CH_3}\overset{\delta+}{MgBr} + H-C\equiv C-H \longrightarrow 2CH_4 + BrMgC\equiv CMgBr$$

$t=0$ $\quad \frac{118}{118} = 1\text{ mole} \qquad \frac{13}{26} = 0.5\text{ mole}$

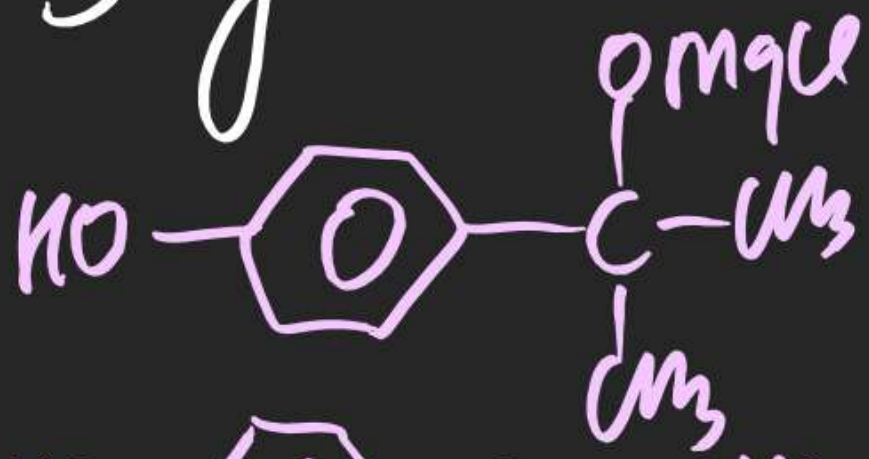
1 mole

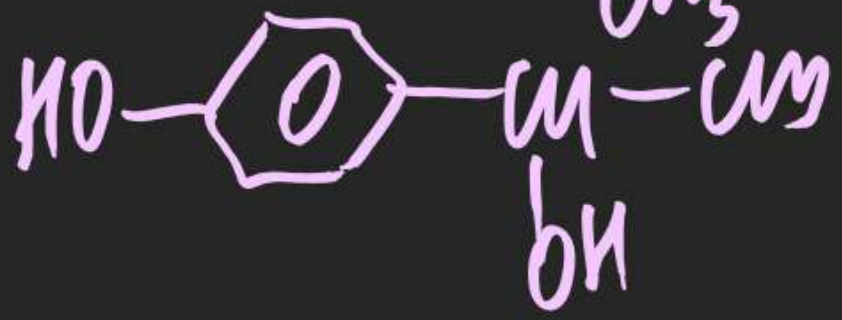
$\boxed{V_{litre} = 22.4\text{ litre}}$

(19)  Major Product

(A) 

(B) CH_4 ✓

(C) 

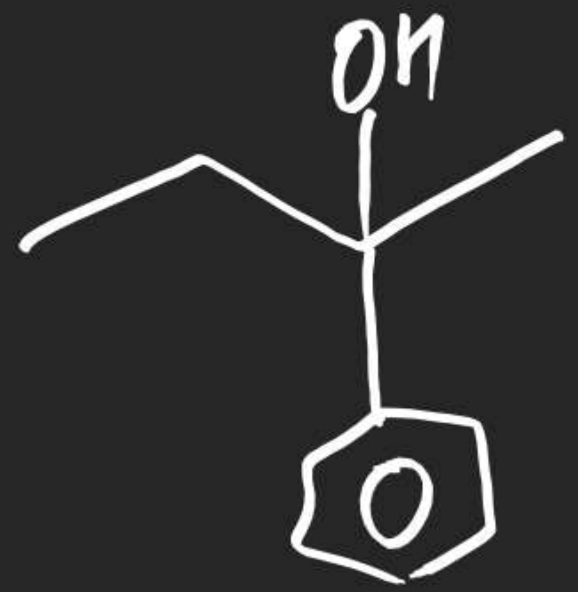
(D) 

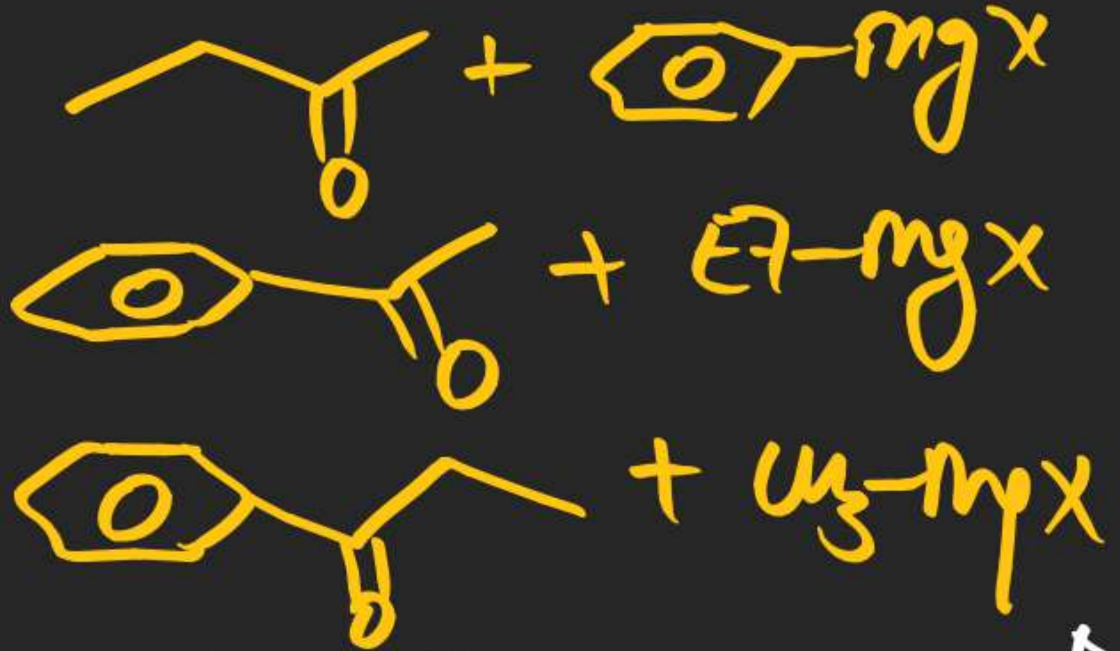
Note: (x) Ketone $\xrightarrow{G.R}$ 3° R–OH

Aldehyde $\xrightarrow{''}$ 2° R–OH

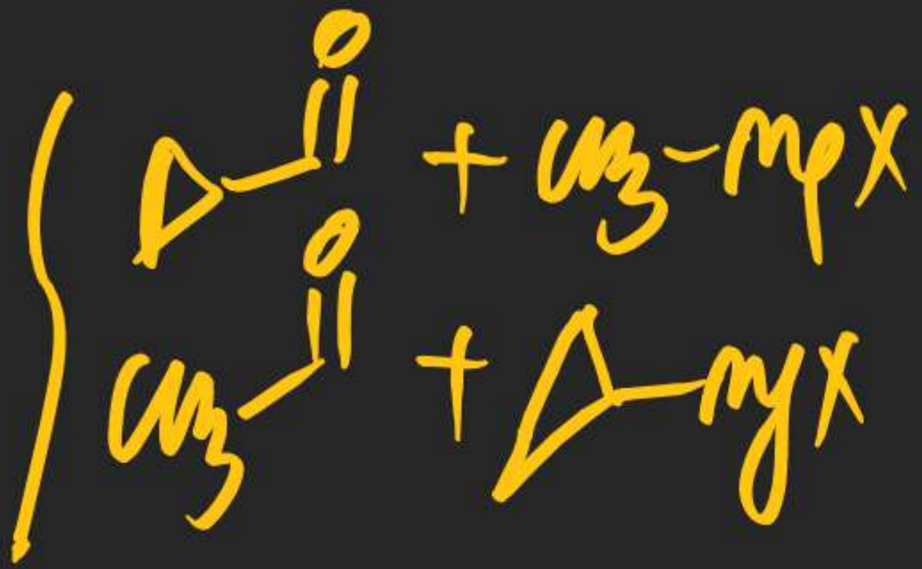
Except $H-\underset{\underset{O}{\|}}{C}-H$ $\xrightarrow{''}$ 1° R–OH

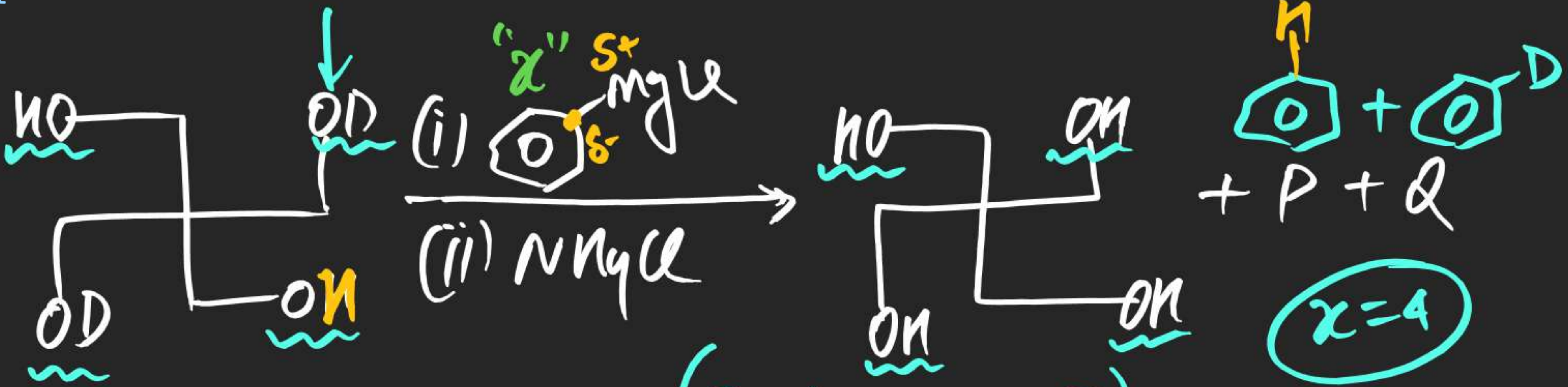
(26) Carbonyl Comp + G.R $\xrightarrow[\text{(ii) } NH_4Cl]{}$





(27) ?. + ?. $\xrightarrow[\text{(ii) } '']{}$



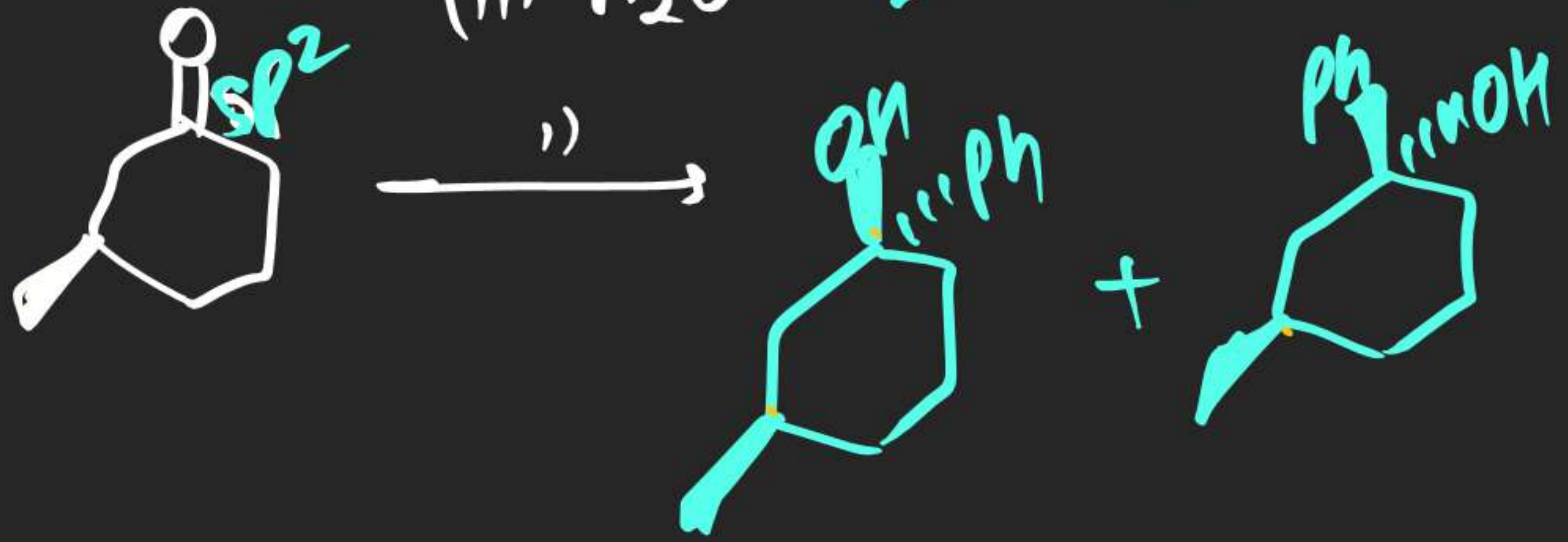
(29) 

$x = 4$

(Find $x_{min} = ?$)

(30) 

$2(\pm)$

(31) 

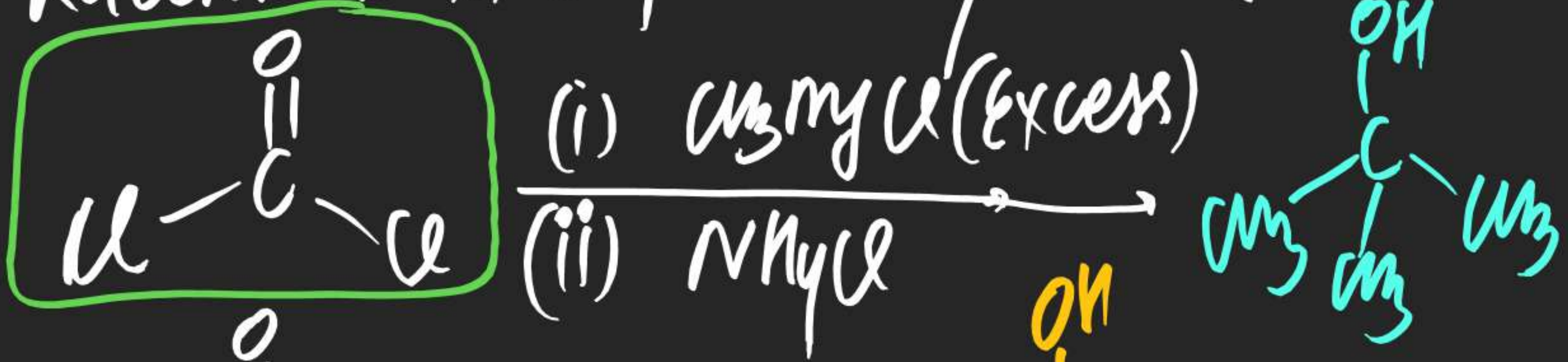
Diastereomeric mixture

(32)

2(GI)

(33) Total No. of Carbonyl compounds with mol. formula $C_6H_{12}O$ which on Rx^n with CH_3-MgCl gives Racemic mixture follwed By Acidification.

(34)



(35)

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Solⁿ (33)

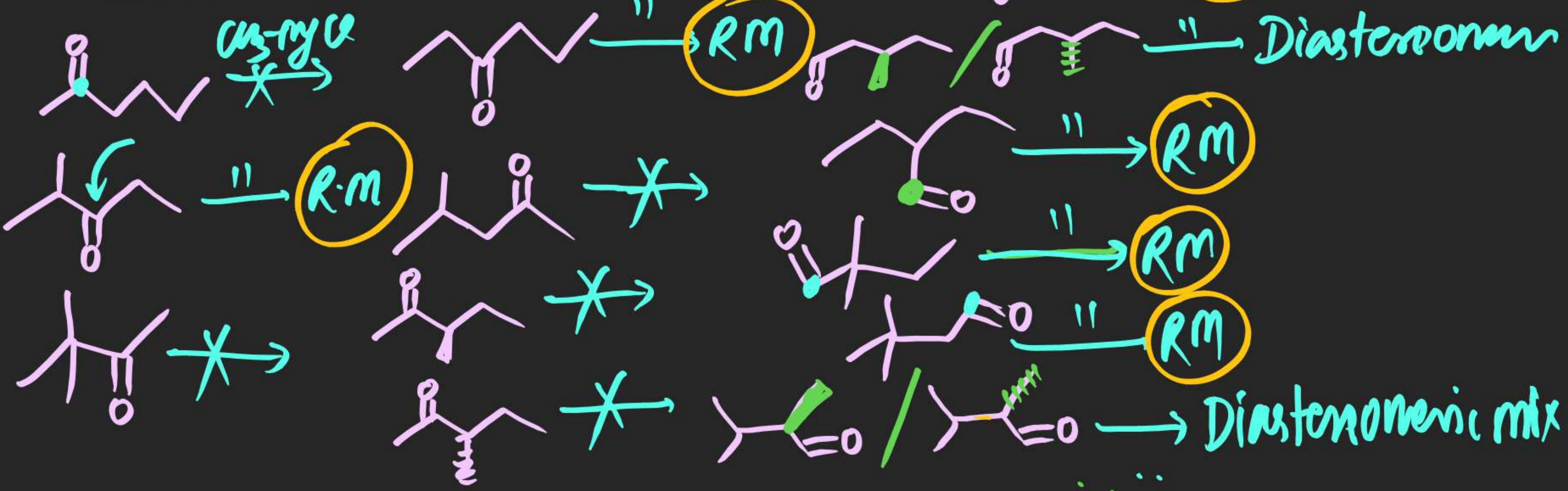
$C_6H_{12}O \xrightarrow[\text{(ii) } NH_4Cl]{\text{(i) } CH_3MgCl}$ Racemic mixture

7

DBE = 1 ($>C=O$)

$\boxed{\text{Ketone}}$

$\boxed{\text{Aldehyde}}$



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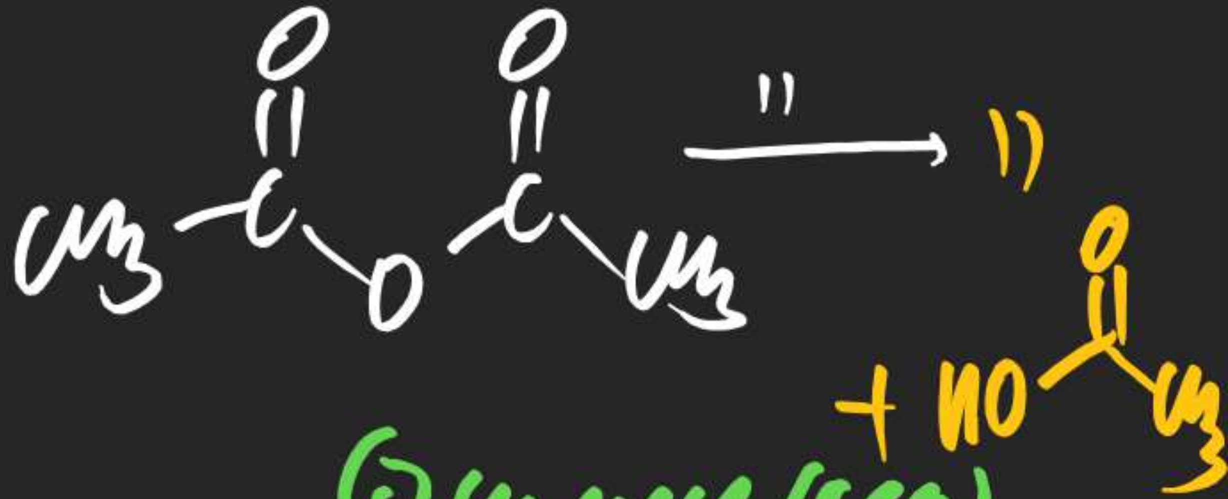
(36)

(40)

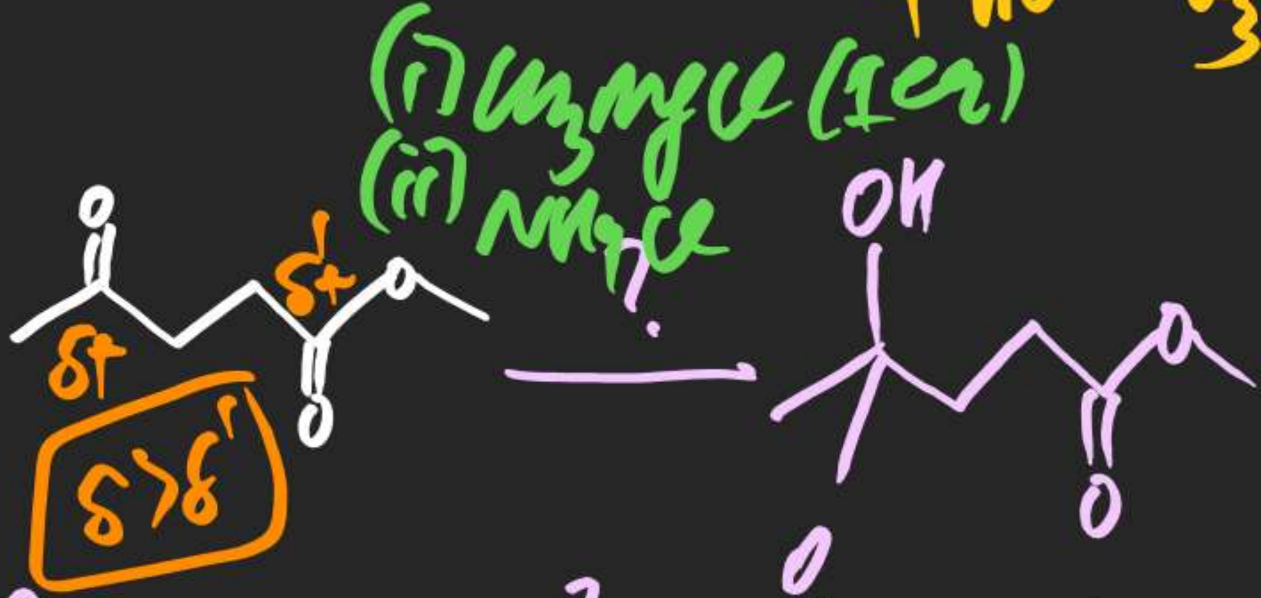
(37)

(41)



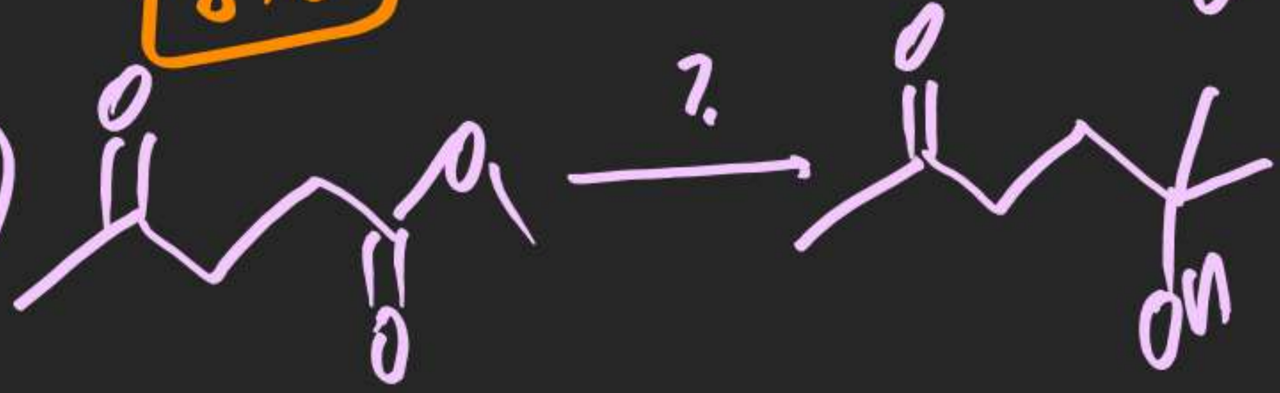
(38)

(42)



(39)

(43)



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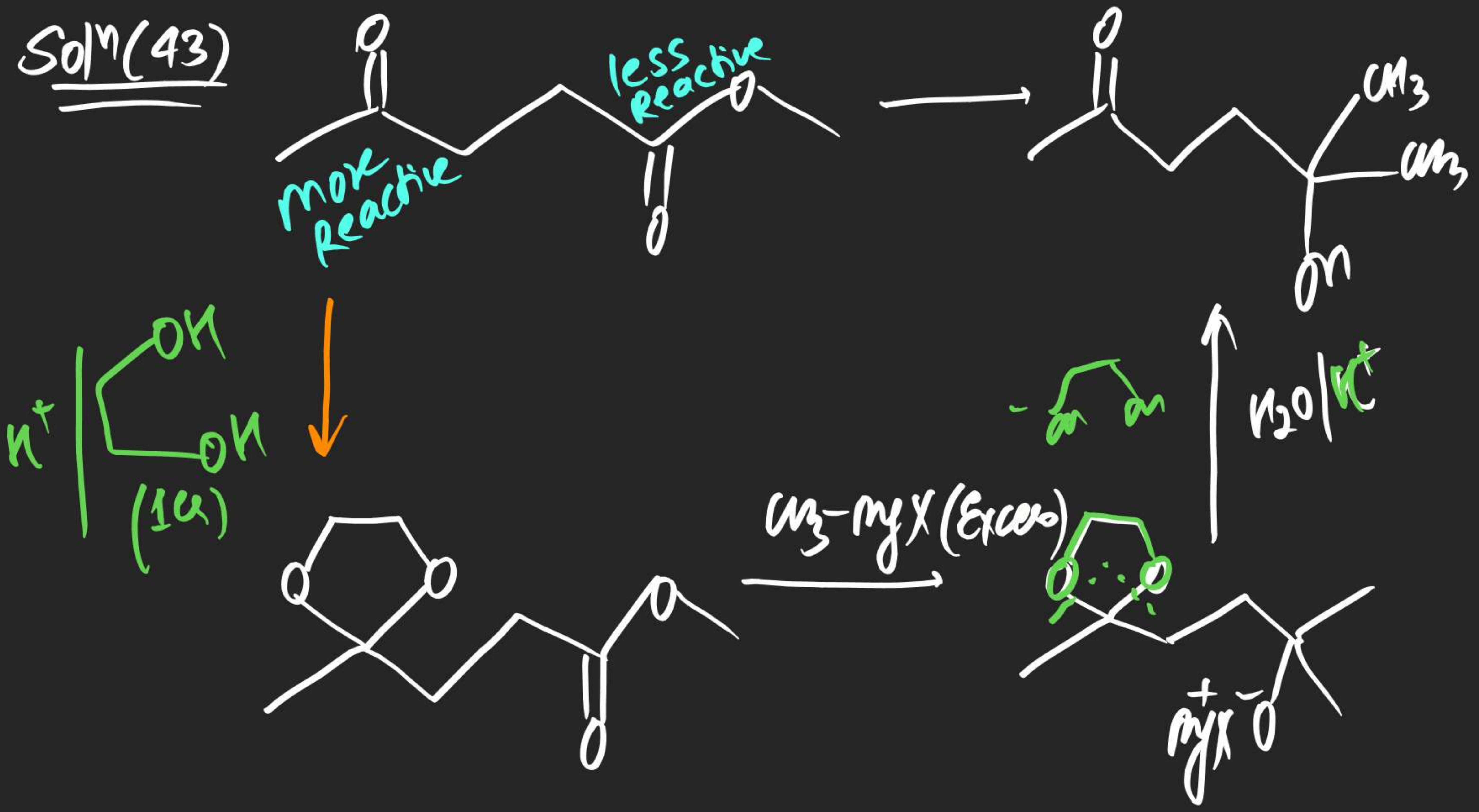
Soln(43)



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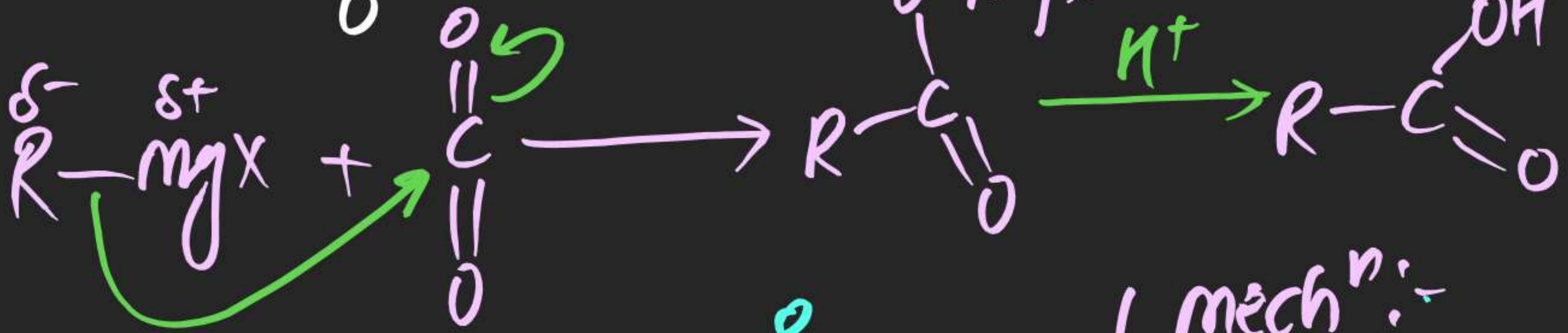
M.M. Imp:

(44) $R-MgX + O=C=O \xrightarrow[(ii)\ H^{\oplus}]{}$

mech^n:



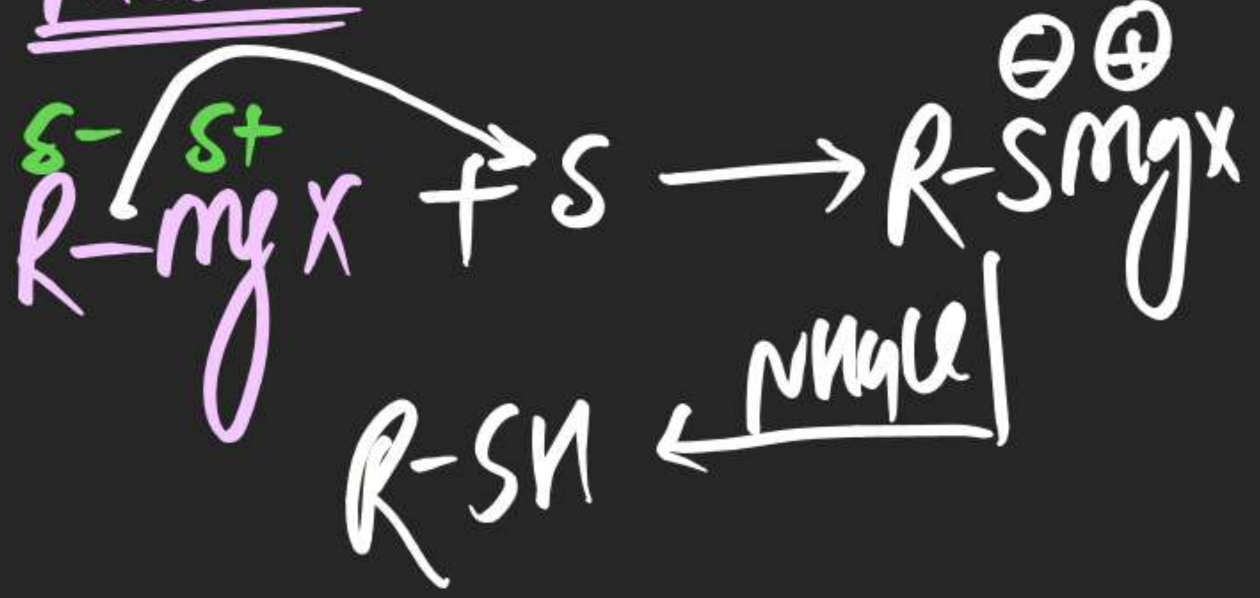
(45) $R-MgX + SO_2 \xrightarrow{''} R-S(=O)-OH$

(46) $R-MgX + CS_2 \xrightarrow{''} R-C(=S)-SH$

(47) $R-MgX + SO_3 \xrightarrow{''} R-S(=O)_2-OH$

(48) $R-MgX + S \xrightarrow{''} R-SH$

mech^n:



(49) $R-MgX + O_2 \xrightarrow[\text{''}]{}$

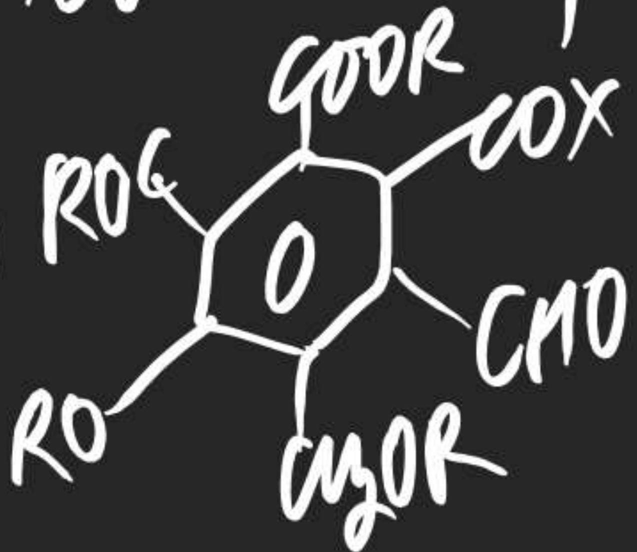
Mech^n? $\overset{\delta-}{R}-\overset{\delta+}{Mg}X + O=O \longrightarrow R-O-\overset{-}{O}\overset{+}{Mg}X \xrightarrow{NH_4Cl} R-O-O-H$

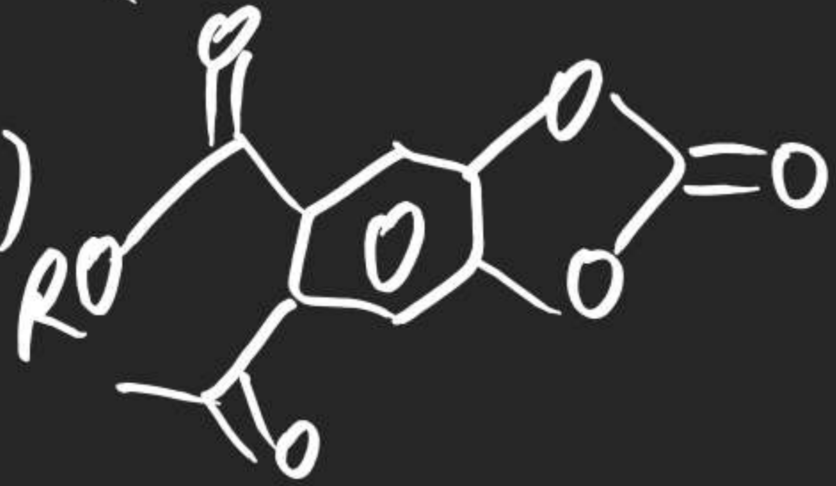
(50) $R-MgX + O_2 \xrightarrow[\text{''}]{}$

2 : 1

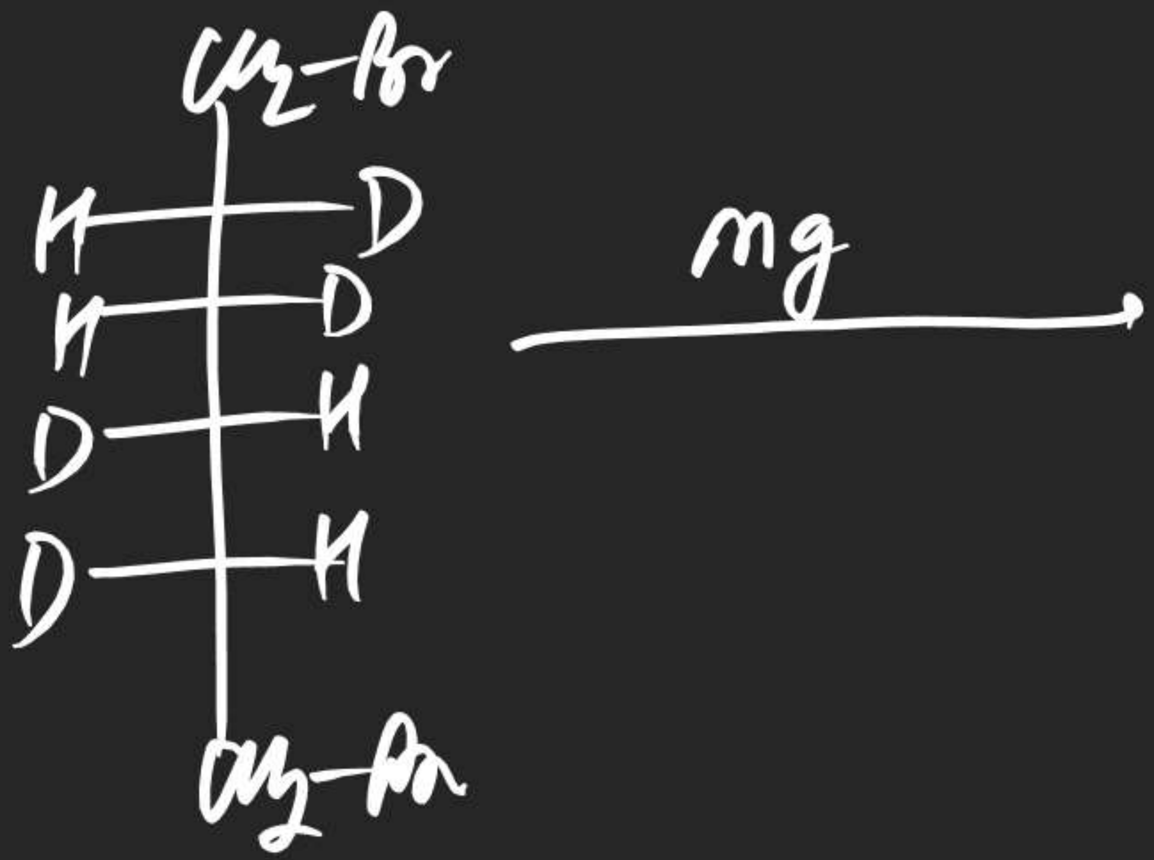
$\overset{\delta-}{R}-\overset{\delta+}{Mg}X + O=O \longrightarrow R-O-\overset{\ominus}{O}\overset{\oplus}{Mg}X \xrightarrow{\overset{\delta-}{R}-\overset{\delta+}{Mg}X} 2R-\overset{\ominus}{O}\overset{\oplus}{Mg}X \xrightarrow{NH_4Cl}$ $\boxed{2R-OH}$

(51) Total no. of moles of G.R consumed per mole of following

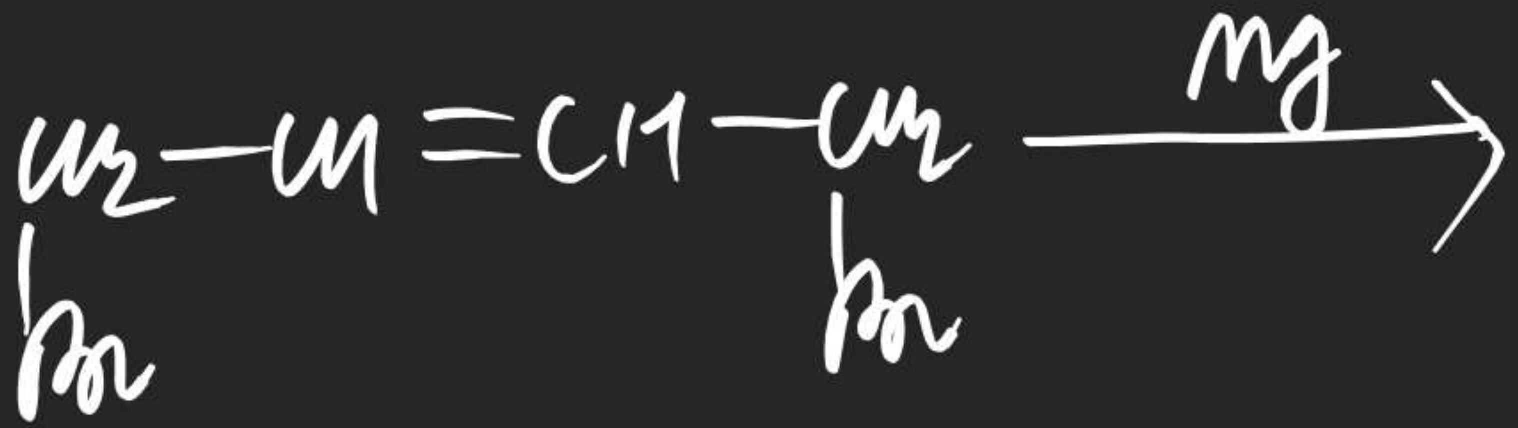
(a) 

(b) 

(84)

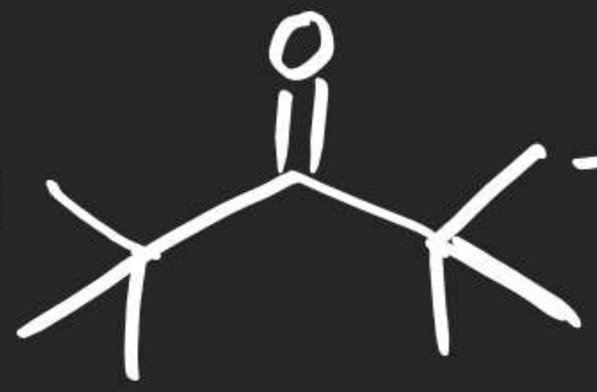


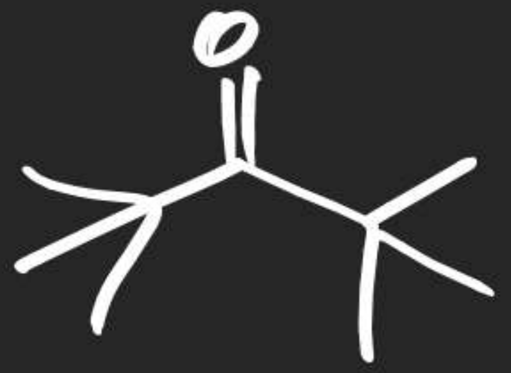
(85)



(86) $H_2N-Cl \xrightarrow[\text{(ii) } NH_4Cl]{\text{(i) } CH_3-MgX}$

(87) $H_2N-OEt \xrightarrow[\text{(ii) } NH_4Cl]{\text{(i) } CH_3-MgX}$

(88) (a)  $+ \; CH_3-MgCl \longrightarrow$ No Rxn

(b)  $+ \; (H_3C)_2CH-MgCl \longrightarrow$ Alcohol + "P"

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Reduction By Mettalic Hydrides :-

⇒ Lithium Aluminium Hydride

⇒ LAH

⇒ $Li[AlH_4]$

⇒ Nucleophilic Reducing agent

⇒ $LiAlH_4$ is very strong Reducing agent

$\boxed{LAH > SBH}$

⇒ LAH is not chemeoselective

⇒ order of Reactivity $R-\overset{\underset{\|}{O}}{C}-X > R-\overset{\underset{\|}{O}}{C}-H > R-\overset{\underset{\|}{O}}{C}-OR'$

No Rxn with SBH

⇒ LAH Can't Reduce
Alcohol / Amine / Ether / ordinary Alkene

⇒ LAH Reduces Cinamic double Bonds

$$Ph-\boxed{HC=CH}-\overset{\underset{\|}{O}}{C}-OH$$

⇒ Sodium Boro Hydride

⇒ SBH

⇒ $Na[BH_4]$

⇒ Nucleophilic Reducing agent

⇒ $NaBH_4$ is milder Reducing agent

⇒ SBH is Chemeoselective

⇒ SBH Reduces
Acid Halide, Aldehyde, Ketone
ozonide, halide, Imine.

Note: $LiBH_4$ Reduces all above along with Ester

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(1) $CH_3-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[\text{(ii) } H_2O]{\text{(i) } LiAlH_4} CH_3-CH_2-OH$

$CH_3-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[\text{(ii) } H_2O]{\text{(i) } NaBH_4} CH_3-CH_2-OH$

$\longrightarrow$

$\longrightarrow$

Mech^n:-

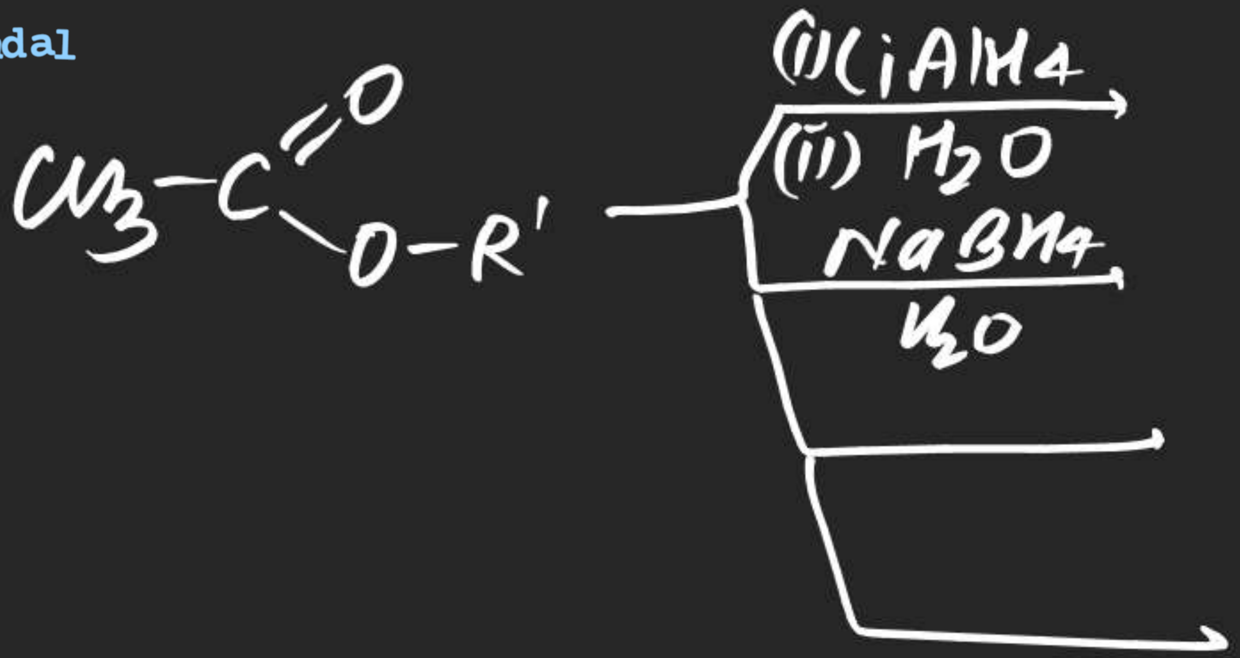
$$4\,CH_3-\overset{O}{\overset{\|}{C}}-Cl + LiAlH_4 \longrightarrow \left(CH_3-\overset{O^-}{\overset{|}{\underset{H}{\underset{|}{C}}}}-Cl\right)_4 LiAl \xrightarrow[-AlCl_3]{-LiCl} 4\,CH_3-\overset{O}{\overset{\|}{C}}-H$$

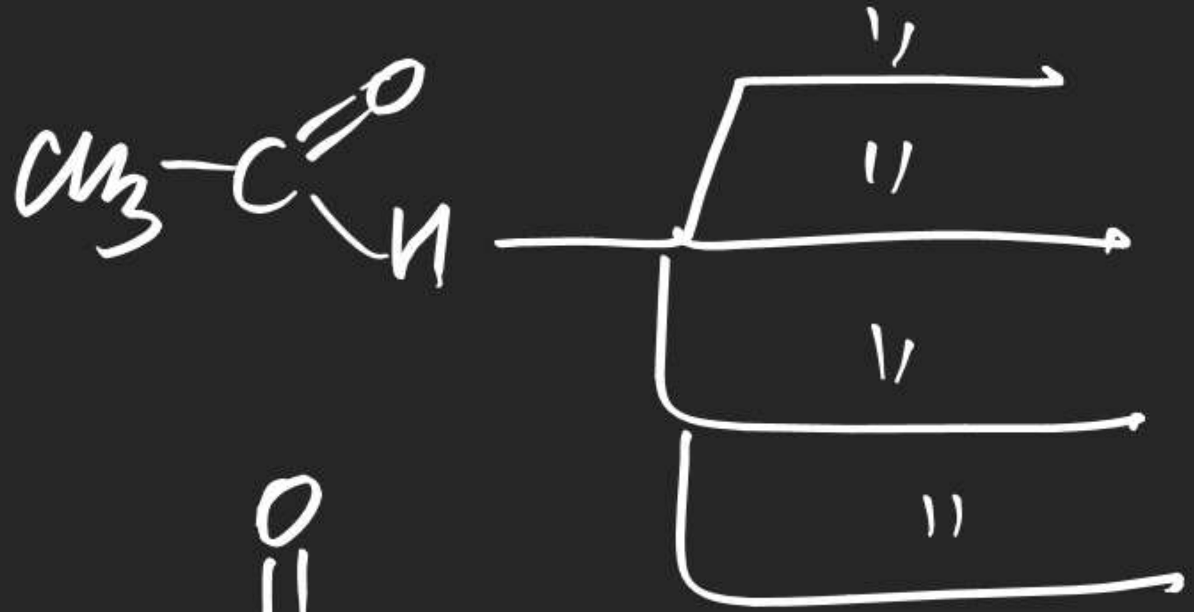
Unstable Tetrahedal Complex

$$4\,CH_3-\overset{O}{\overset{\|}{C}}-H + LiAlH_4 \longrightarrow \left(CH_3-\overset{O^-}{\overset{|}{\underset{H}{\underset{|}{C}}}}-H\right)_4 LiAl \xrightarrow[-LiOH,\ -Al(OH)_3]{4\,H_2O} 4\,CH_3-\overset{OH}{\overset{|}{CH_2}}$$

Stable Tetrahedral Complex

$$2\,CH_3-\underset{O}{\underset{\|}{C}}-Cl + LAH \longrightarrow 2\,CH_3-CH_2-OH$$

(2) 

(3) 

(4) 

(5) $CH_3-\overset{O}{\overset{\|}{C}}-OH \xrightarrow{LiAlH_4}$

$\xrightarrow{NaBH_4}$

$\xrightarrow[\text{(ii) } H_2O]{\text{(i) } B_2H_6}$

(6) $CH_3-\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}}-CH_3 \xrightarrow[\text{(ii) } H_2O]{\text{(i) } LiAlH_4}$

(7) $CH_3-\overset{O}{\overset{\|}{C}}-NR_2 \xrightarrow{''}$

(8) $CH_3-\underset{O}{\underset{\|}{C}}-NHR \xrightarrow{''}$

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(9) $CH_3-\overset{O}{\overset{\|}{C}}-NH_2 \xrightarrow{\quad '' \quad}$

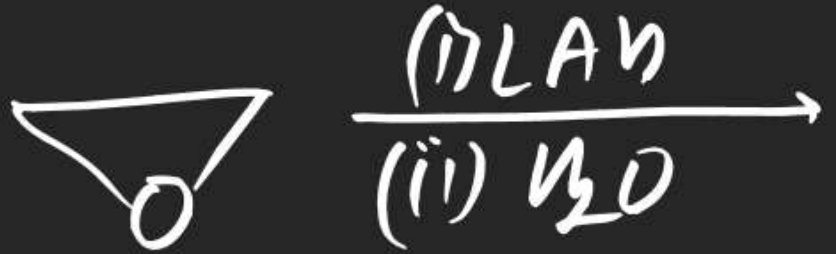
(10) $CH_3-CH_2-N_3 \xrightarrow{\quad '' \quad}$

(11) $CH_3-CH=NH \longrightarrow \begin{cases} \xrightarrow{\quad '' \quad} \\ \xrightarrow{\quad SBH \quad} \end{cases}$

(12) $CH_3-C\equiv N \xrightarrow[(ii)\ H_2O]{(i)\ LAH}$

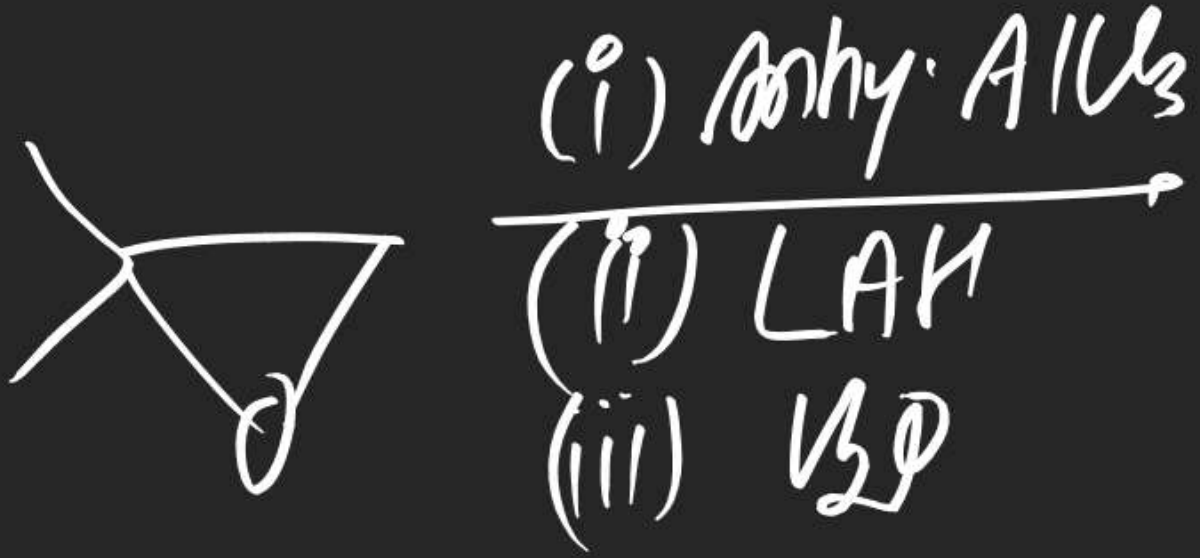
(13) $CH_3-CH_2-NO_2 \xrightarrow{\quad '' \quad}$

(14)



(15)

(16)



(17)

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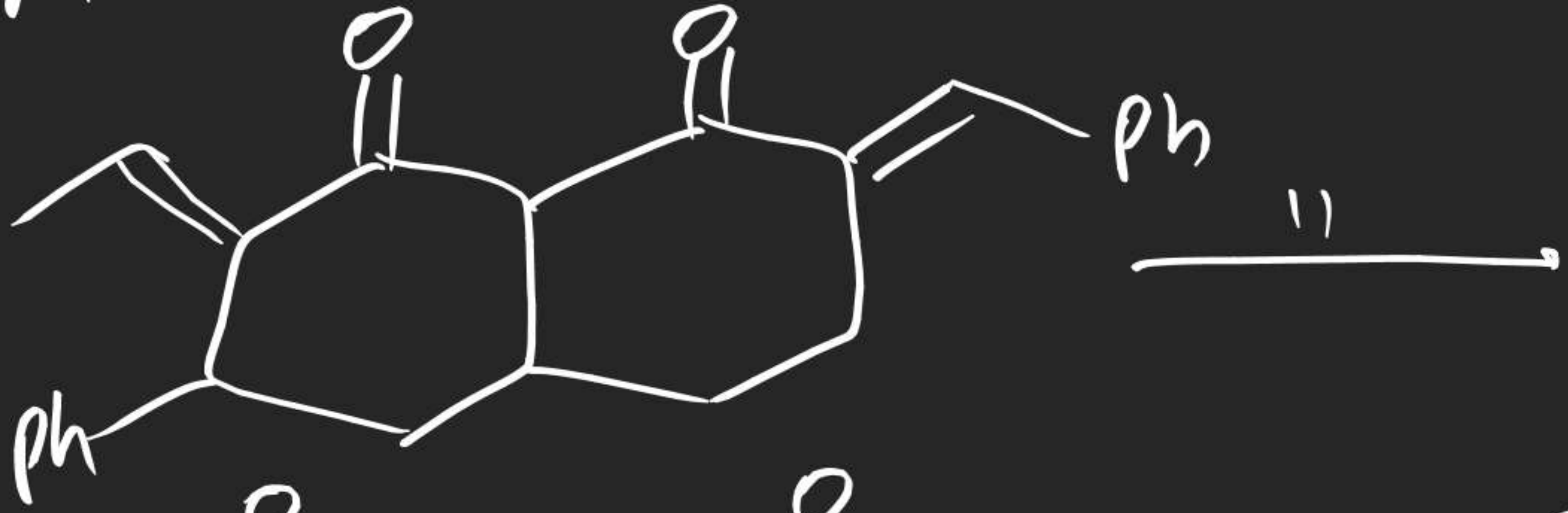
(18)

(19)



(20)

(A) LAH

(D) R_2Cd

(B) SBH (Ans)

(C) R-MgX