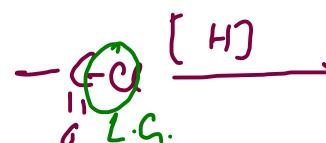
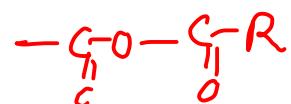
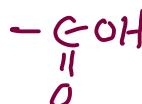
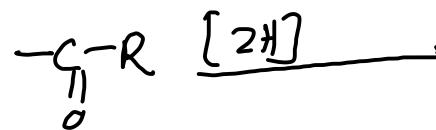
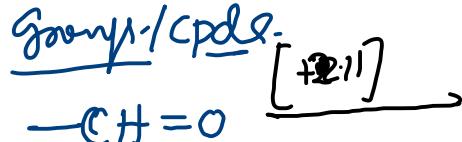
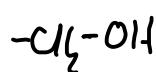


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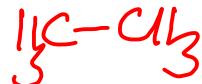
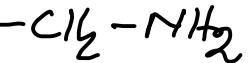
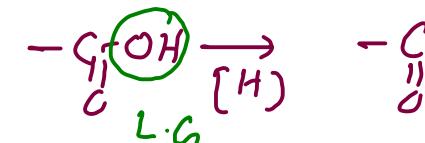
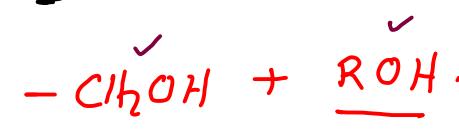
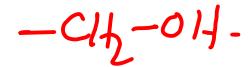
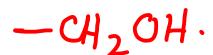
o Reduction: [+ Adding hydrogen or Lossing oxygen].

(e addition) + e → The system gets reduced.

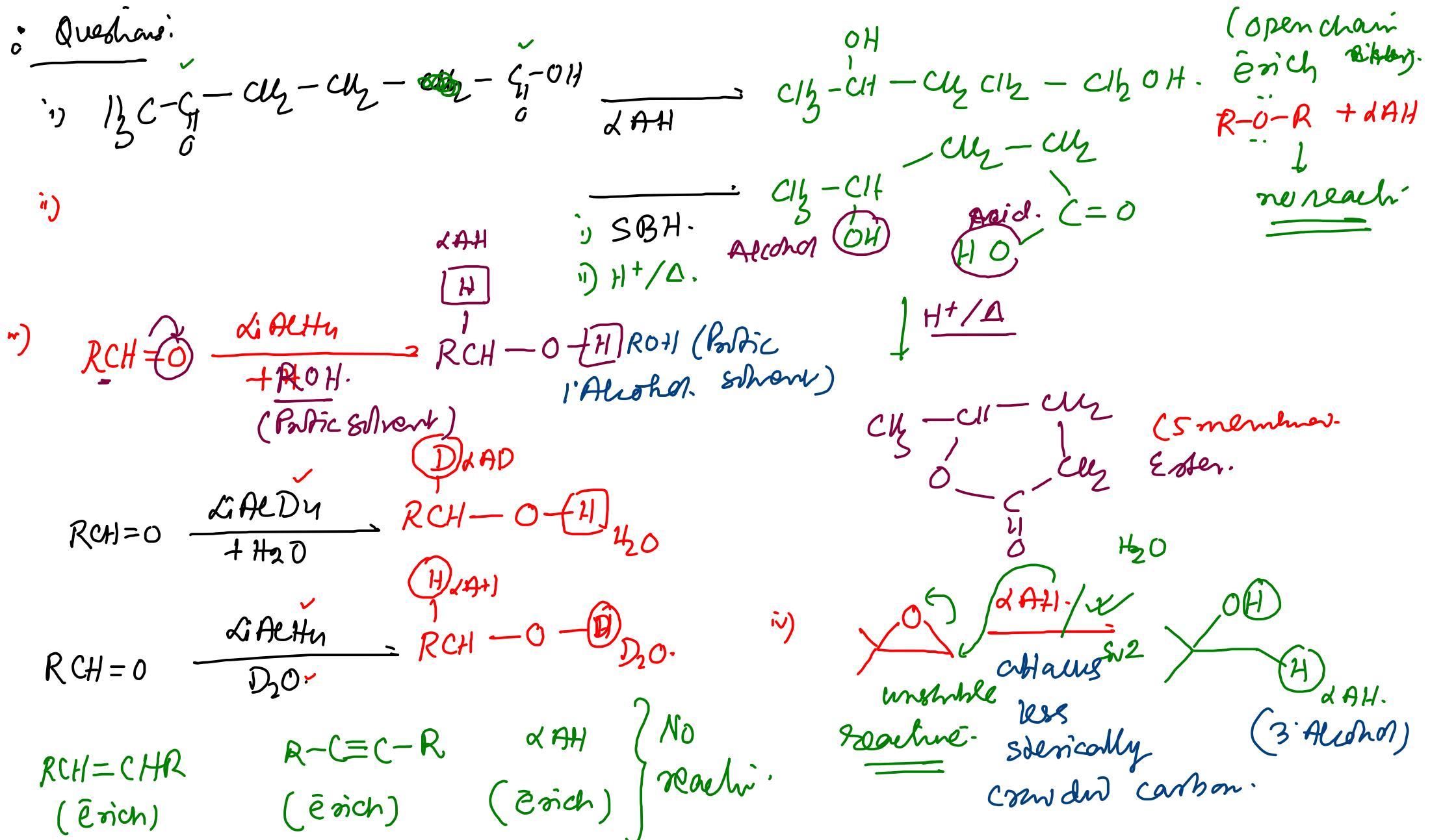
groups) c.p.d.e.

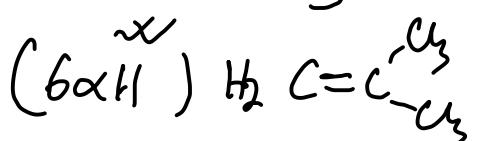
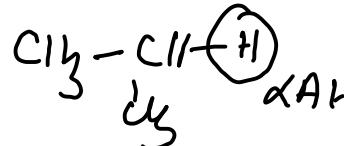
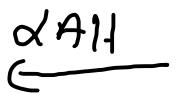
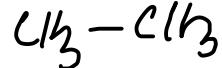
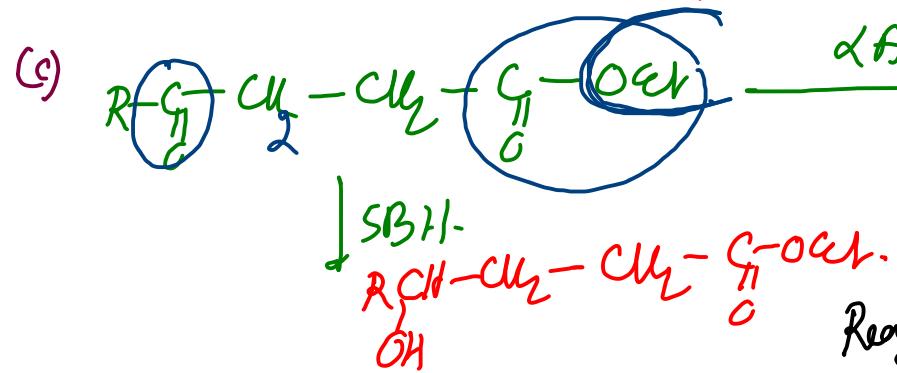
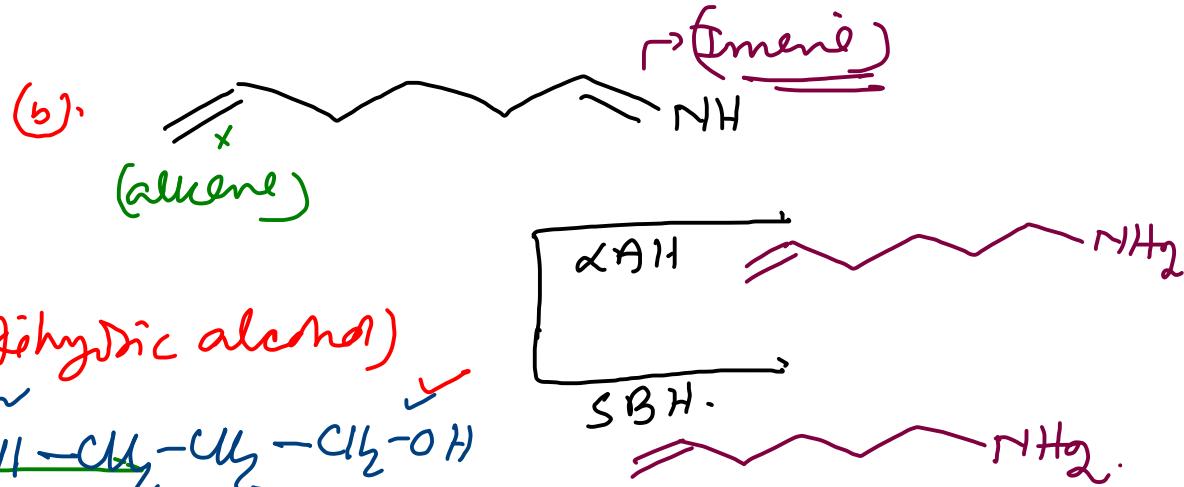
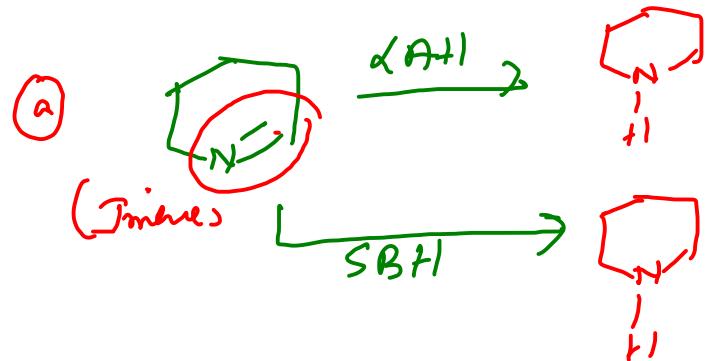
Reduced form.

Reduced form.



$\alpha\text{A}\text{H}$ (8th reducing agent)	$\text{LiAlH}_4$	$\text{NaBH}_4$ (sodium borohydride) <u><math>\text{SBH}</math></u>
$\text{S}\text{B}\text{H}$ (selective reducing agent)	<u>different reducing agents:</u> <u>(H<sup>-</sup> ion donor)</u>	
	$\text{LiAlH}_4^+$ lithium aluminum hydride ( $\alpha\text{A}\text{H}$ )	
$\text{RCH=O}$	✓	✓ $\text{R}-\text{C}\equiv\text{N}$
$\text{R}-\text{C}\equiv\text{R}$	✓	✓ $\text{R}-\text{C}\equiv\text{N}$
$\text{R}-\text{C}(\text{OH})$	✓	✗ $\text{RNH}_2$
$\text{R}-\text{C}\text{I}$	✓	✓ $\text{RCH}_2-\text{NH}_2$
$\text{R}-\text{C}(\text{OR}')$	✓	✗ $\text{RCH}=\text{CH}_2$
$\text{R}-\text{C}(\text{O})\text{O}-\text{C}\equiv\text{R}'$	✓	✗ $\text{R}-\text{H}$
	$\text{R}-\text{C}\equiv\text{N}$	
	$\text{RNH}-\text{CH}_3$ (2° Amine)	
	$\text{RNH}_2$	
	$\text{RCH}=\text{NH}_2$	
	$\text{R}-\text{C}\equiv\text{NH}-\text{CH}_3$	
	<u>N-alkyl substituted amide</u>	
	$\text{RCH}=\text{CHR}$	
	$\text{R}(\equiv\text{C})\text{R}$	
	$\text{RCH}_2-\text{NH}-\text{CH}_3$ (2° Amine)	
	$\text{R}-\text{X}$	
		✓ (1°/2°) $\text{R}-\text{H}$
		✓ (2°/3°) $\text{R}-\text{H}$



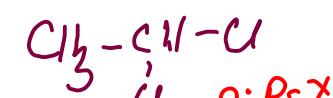


Reagent ?? which reduce all 3 types  $R-X \rightarrow R-H$

$\text{SBH} \cdot$  = no reaction.



(1°)  $R-X$



2°  $R-X$



3°  $R-X$



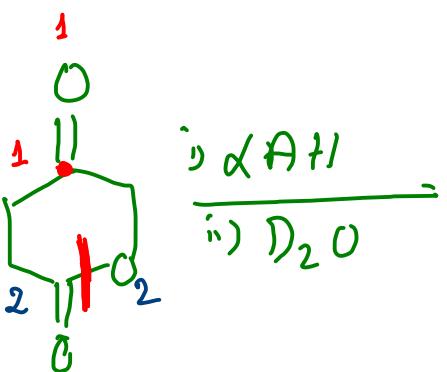
Ans:



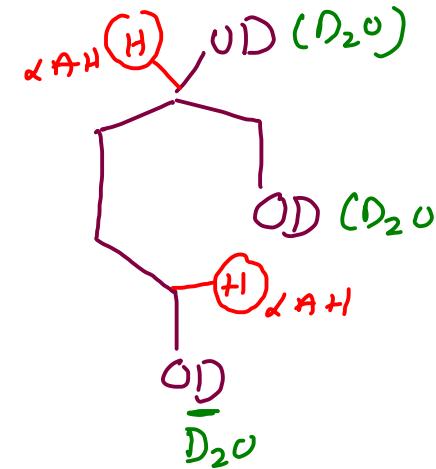
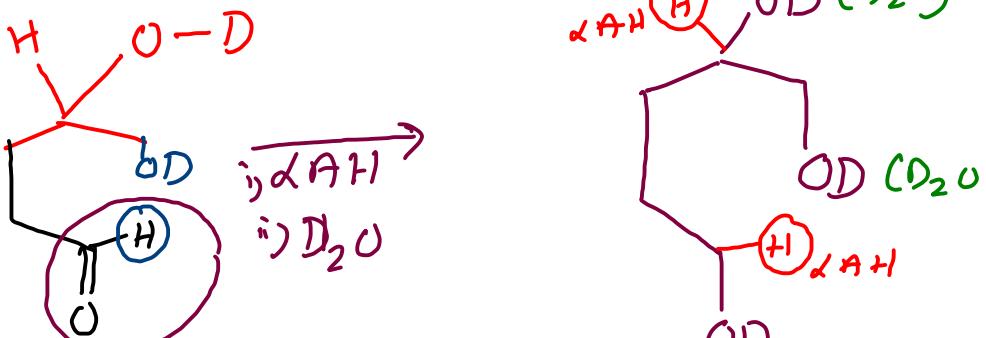
Triphenyl  
tin hydride



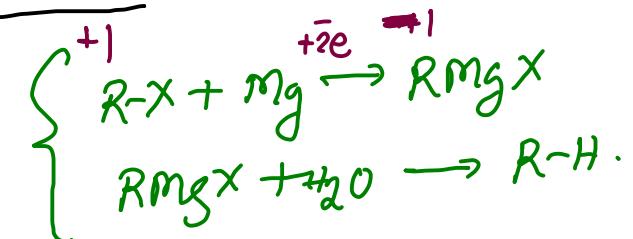
-1



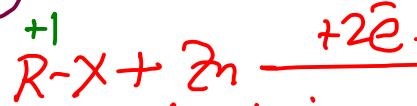
(ketone + cyclic ester)



• NCERT:  $R-X \rightarrow R-H.$  [2 process]. (1+<sub>n</sub> part)



Mg (reducing agent)



(reducing agent)

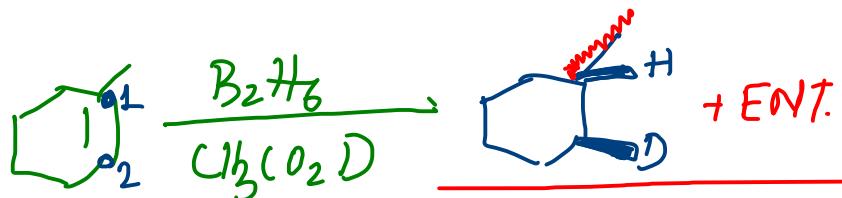
$-1$

(organometallic)  
since q carbon an



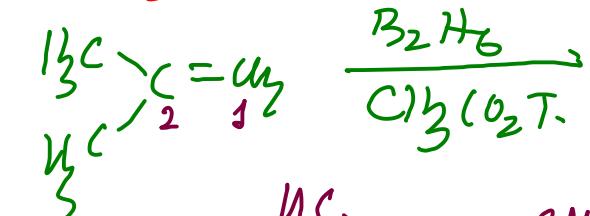
$\text{B}_2\text{H}_6$ : (diborane; 3 centric 2-e<sup>-</sup> bond) : some g  $\text{H}^-$   
 (e<sup>-</sup> deficient) selective reducing agent.

It can only reduce

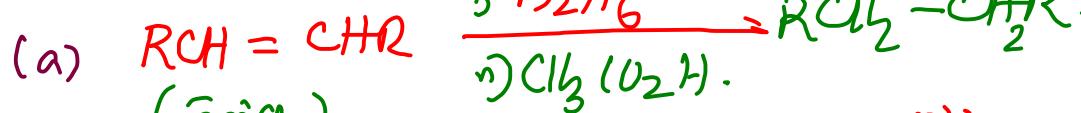


- i)  $\text{R}-\overset{\delta^+}{\underset{\text{C}}{\text{C}}}-\text{Cl}$  (x)
- ii)  $\text{R}-\overset{\delta^+}{\underset{\text{C}}{\text{C}}}=\text{NO}_2$  (x)
- iii)  $\text{R}-\overset{\delta^+}{\underset{\text{C}}{\text{C}}}=\text{X}$ . (x)

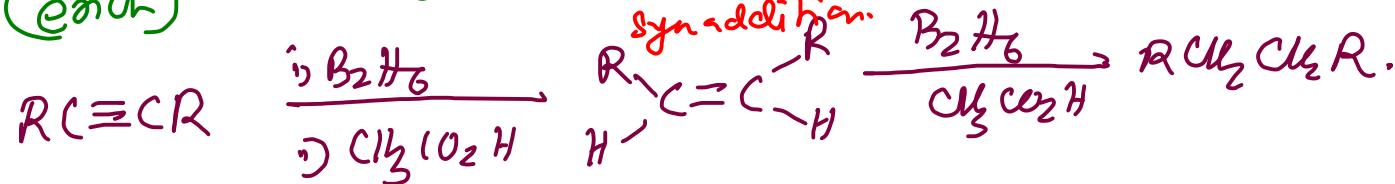
Highly e<sup>-</sup> deficient molecule.



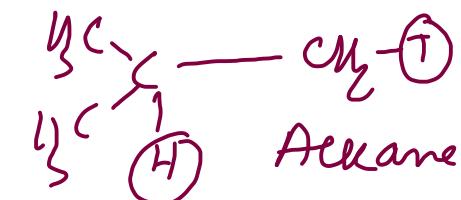
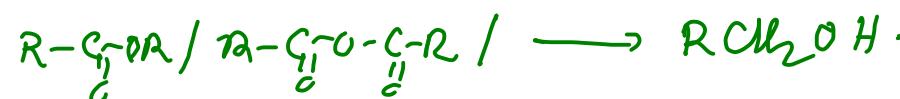
It can reduce

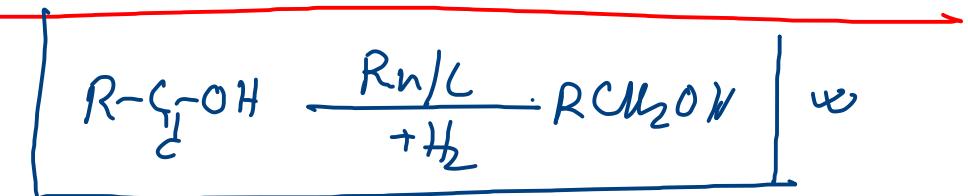
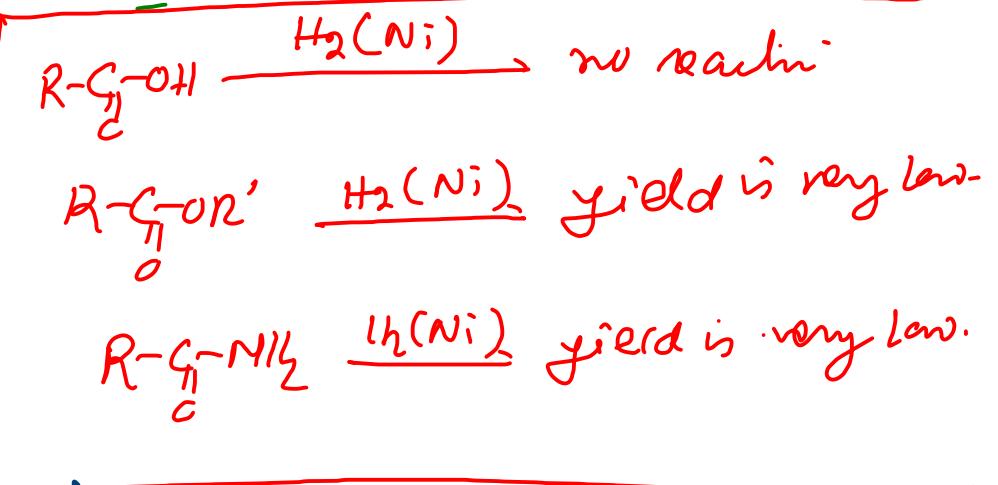
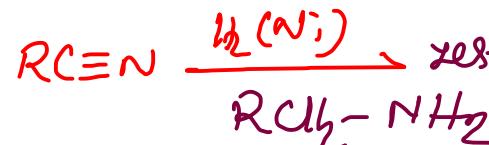
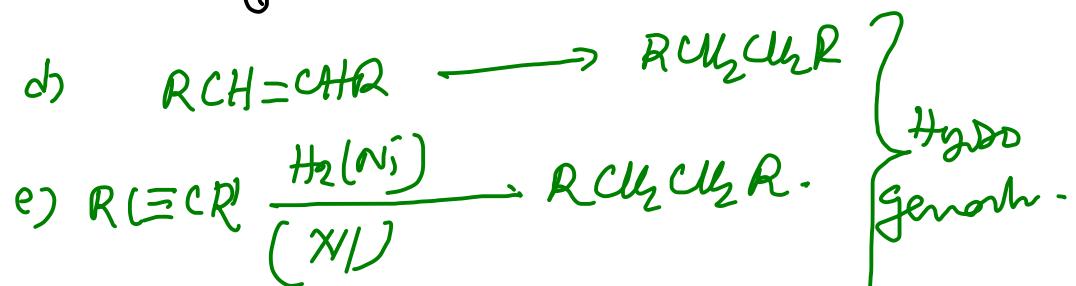
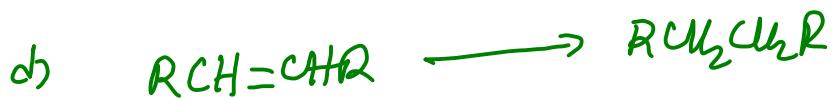
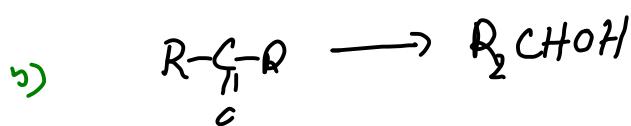
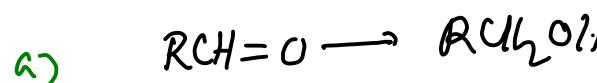
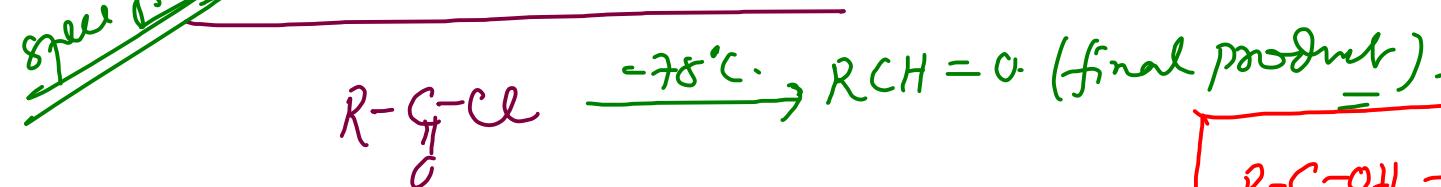


(b)  $\text{R}\equiv\text{CR}$

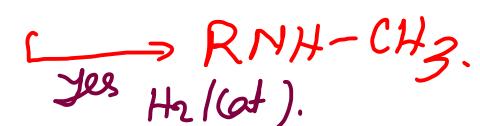


(yield is highest for  $\text{B}_2\text{H}_6$ )





Bnk in IIT always given,  $\text{H}_2$  can  
not reduce  $\text{RCu}_2\text{H}$

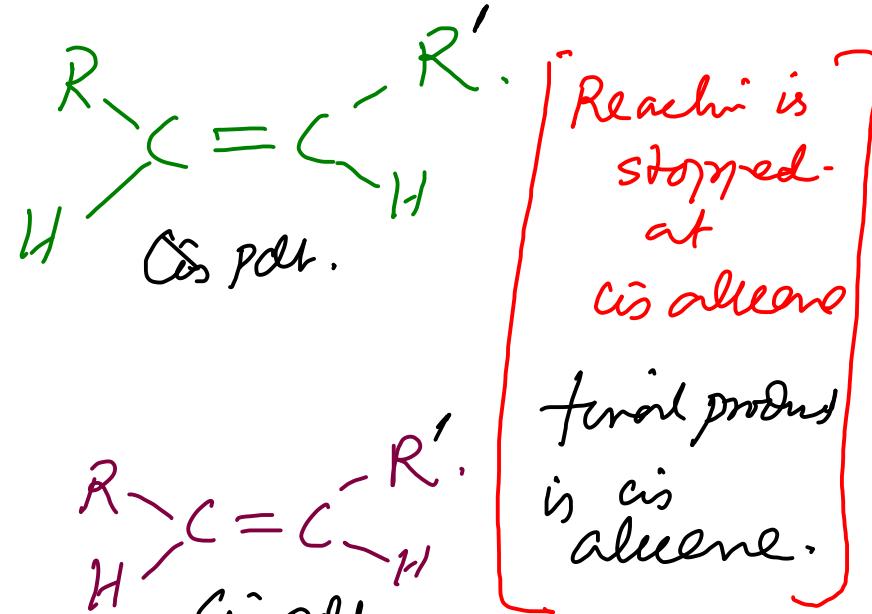


$R(\equiv C-R')$ ,  
always coming  
in IIT-JEE.

\* Lindlar catalyst  
 $Hg(Pd-BaSO_4)$   
Poisoned with  
Quinoline.

Lindlar Catalyst.

( $Hg Pd-CaCO_3$  poison  
with S + Quinoline)



Other uses of Lindlar  
Catalyst

Rosenmund  
reduction.

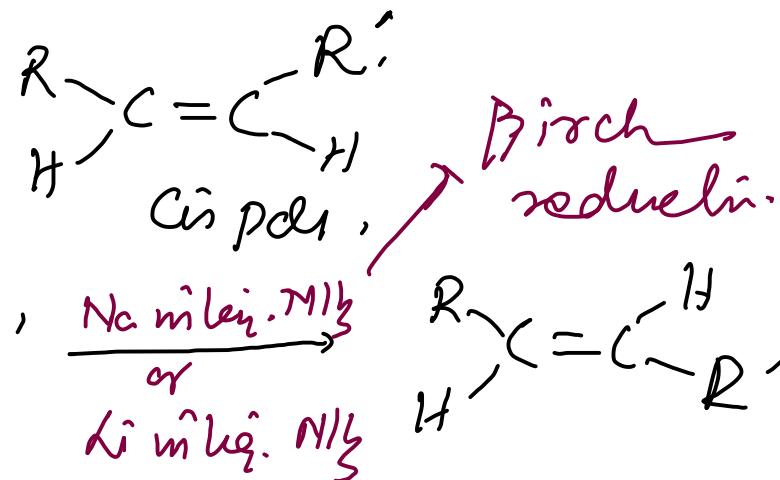
$R-GCl \xrightarrow[Hg(Pd-BaSO_4)]{Poisoned\ with\ Quinoline}$

P-2 Catalyst-

$\underline{Hg(Ni_2B)}$

$\rightarrow RCH=O$  (final pdt)

$R(\equiv CR')$



- Reductive
- i)  $\alpha\text{AlH}$  ( $\text{diAlH}_3$ ) can not reduce  $(=C, \equiv C)$ ;  $3 \cdot R-X \longrightarrow \text{Alkene}$ .
- ii)  $\text{SBH}_2$  ( $\text{NaBH}_3$ ) only reduce.  $\text{RCHO}, \text{RCOR}, \text{RCOCl}, \text{RCH}=\text{NH}_2 \quad 2 \cdot / 3 \cdot R-X$
- iii)  $\text{TPH}$ . ( $\text{Ph}_3\text{SnH}$ ) all  $R-X \longrightarrow R-H$ .
- iv)  $\text{Mg} + \text{H}_2\text{O}$  all  $R-X \longrightarrow R-H$
- v)  $\text{Zn} + \text{Cl}_3\text{CO}_2\text{H}$ . all  $R-X \longrightarrow R-H$ .
- vi)  $\text{B}_2\text{H}_6$ .  $\checkmark$   $\text{RCHO}, \text{RCOR}; \text{RCO}_2\text{V}; \text{RCO}_2\text{Et}, (=C; \equiv C)$  [Diametathesis  $\text{B}_2\text{H}_6$   
can not reduce  $\text{RCOCl}, \text{RNNO}_2$   
 $R-X$ .]
- vii)  $\text{LiAlH}(\text{OtBu})_3$   $-78^\circ\text{C}$ .  $\text{RCOCl} \longrightarrow \text{RCHO}$ .
- viii)  $\text{H}_2(\text{Ni})$  can't reduce  $\text{RCO}_2\text{H}, \frac{\text{RCO}_2\text{R}, \text{RCO}_2\text{NHC}_6\text{H}_5}{\text{yield is low}} \quad x_i) \text{ Na in liq. NH}_3$  } Alkene  
ix) Lindlar catalyst } or  $\text{div in liq. NH}_3$ . } Tons  
x)  $\text{P-2}$  catalyst }  $\Rightarrow$  Cisaldehyde. } Cisalene