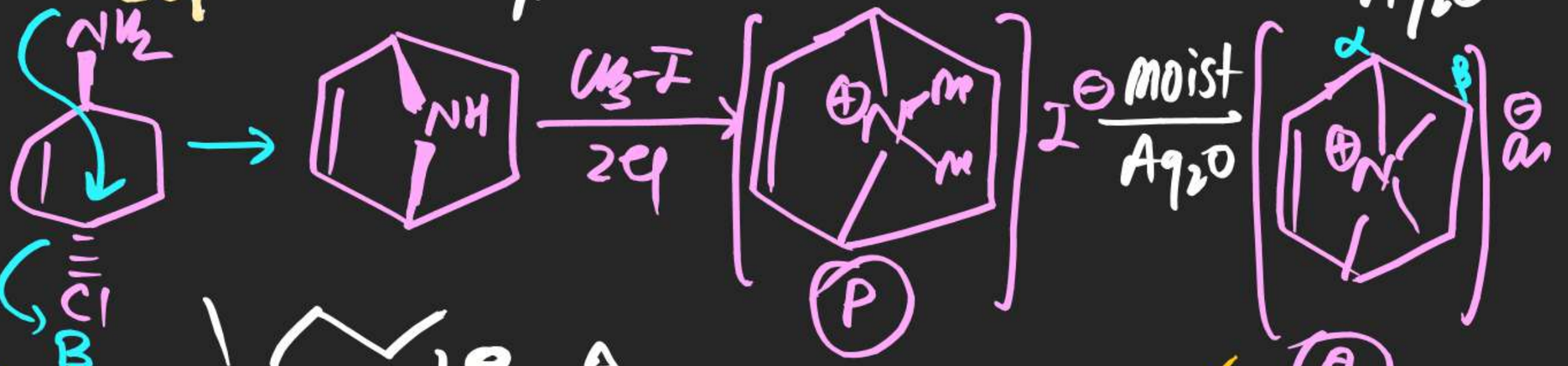
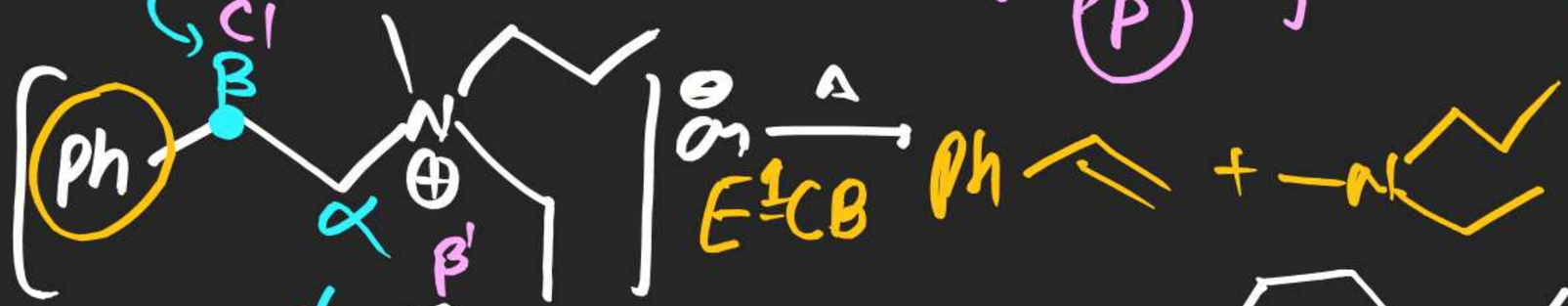
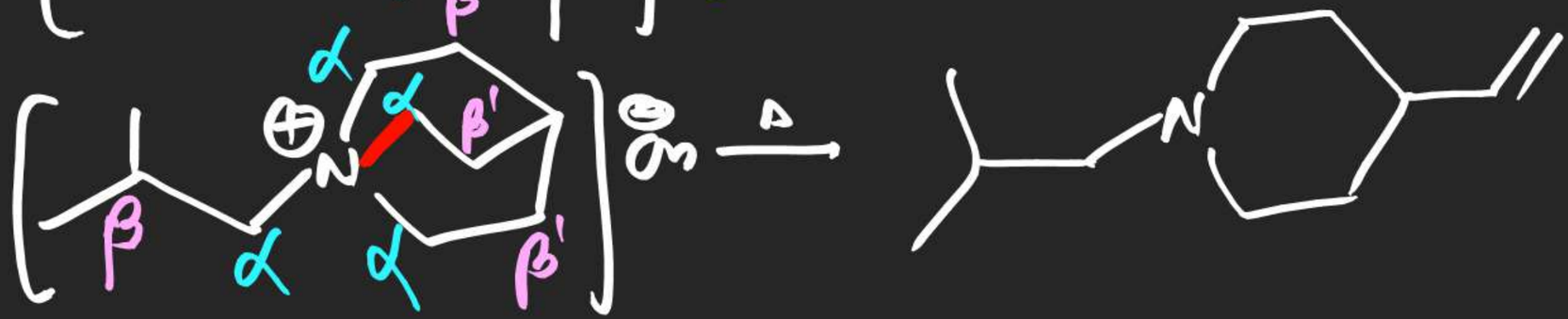
Nishant Jindal

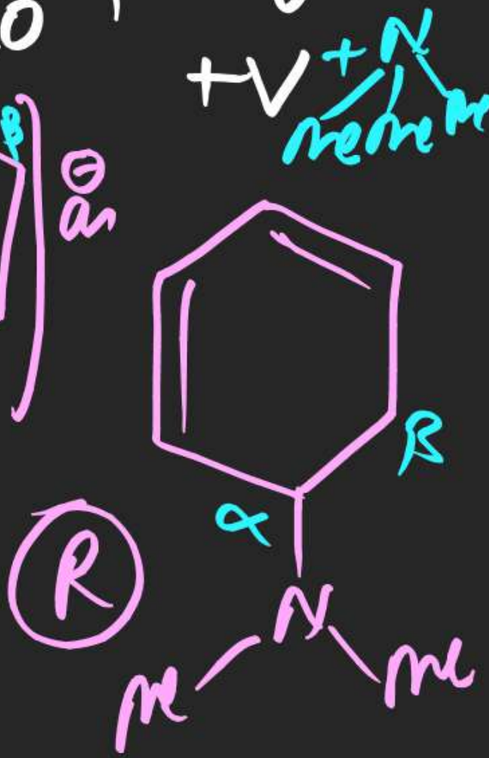
(14)  $\xrightarrow[2eq]{CH_3-I}$ P $\xrightarrow[Ag_2O]{moist}$ Q $\xrightarrow{\Delta}$ R $\xrightarrow[2eq]{CH_3-I}$ S $\xrightarrow[Ag_2O]{moist}$ T $\xrightarrow{\Delta}$ U

Soln:



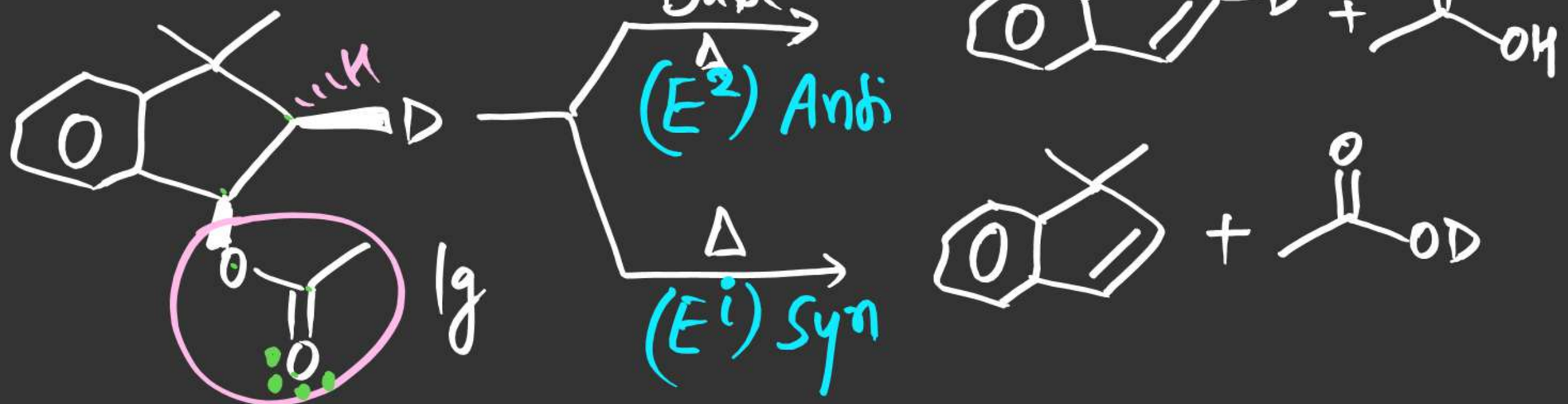
(15) 

(16) 



Note 5-mcts involved.

(1)



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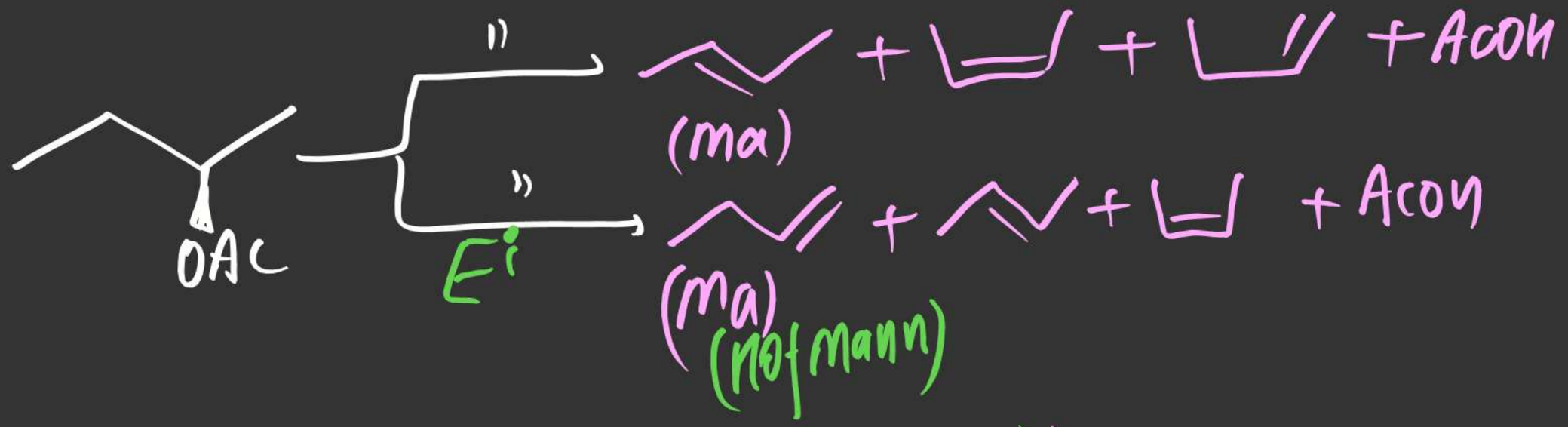
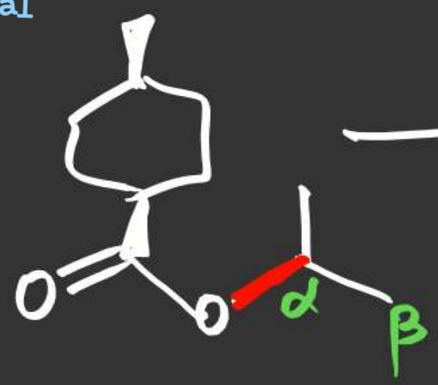
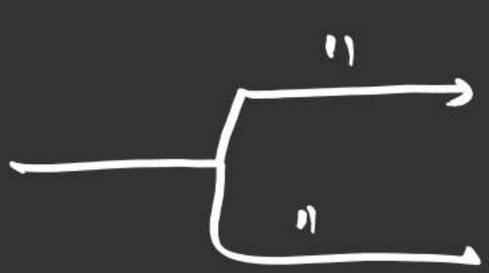
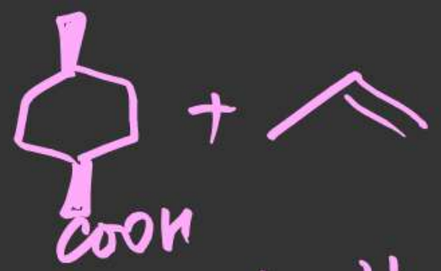


(3)







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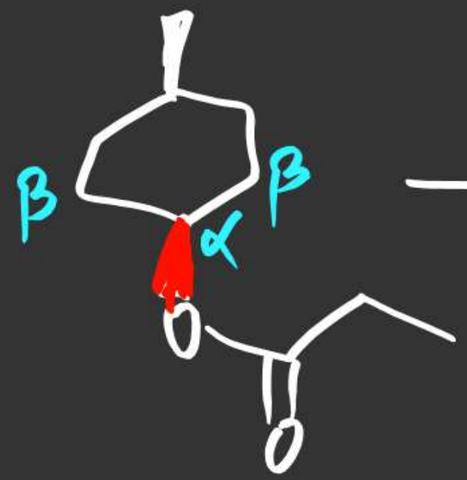
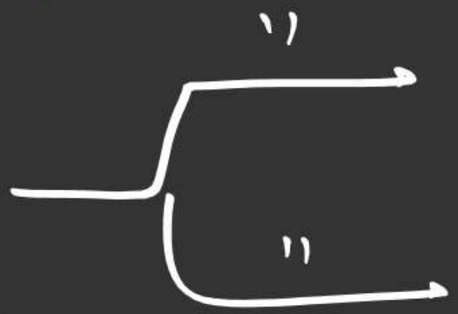
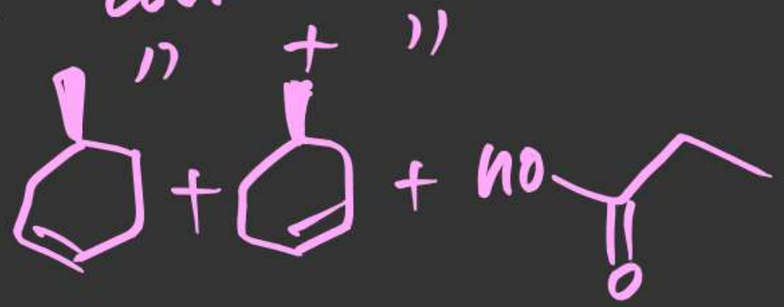
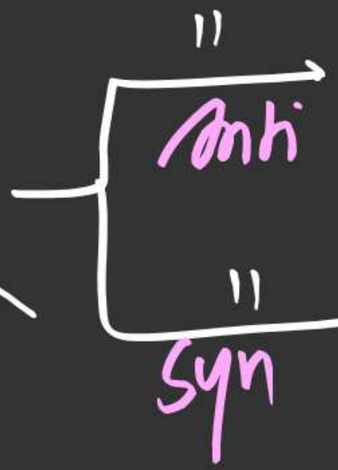






(5)



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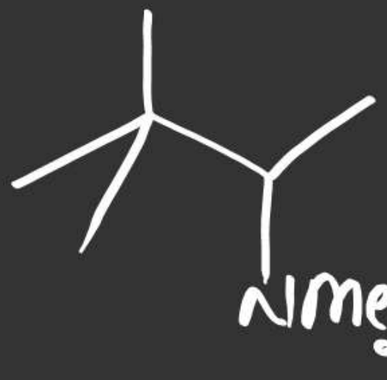
(6)  $\xrightarrow[(ii)\ \Delta]{(i)\ H_2O_2}$  + HO–N(Me)Me

(7) $CH_3-CH_2-OH \xrightarrow[\text{metal}]{Na}$ P  Q $\xrightarrow[SN2]{CH_3-CH_2-I}$ R $\xrightarrow{\Delta}$ S + T

$CH_3-CH_2-O^-Na^+$ $CH_3-CH_2-O-\overset{S}{\overset{\|}{C}}-S^-Na^+$

$CH_2=CH_2$ + $CH_3-{}^*CH_2-SH$ + COS

$CH_3-CH_2-O-\overset{S}{\overset{\|}{C}}-S-{}^*CH_2-CH_3$ (β, α)

(8)  $\xrightarrow[(ii)\ \Delta]{(i)\ H_2O_2}$  + Me_2N-OH

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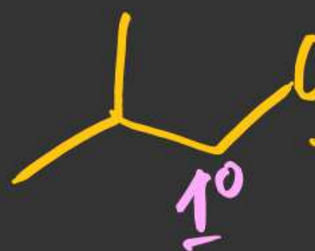
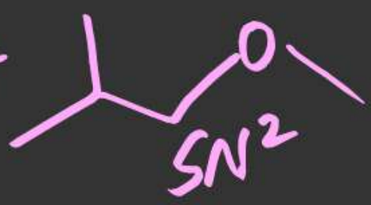
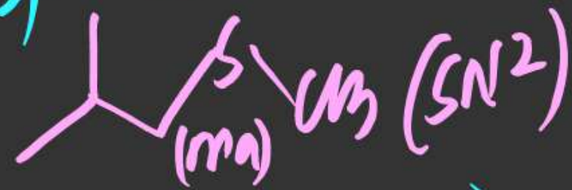
(1)  $NaOCH_3$ → 70% (ma) E_2 + 30% (mi) SN^2 $[E_2] > [SN^2]$

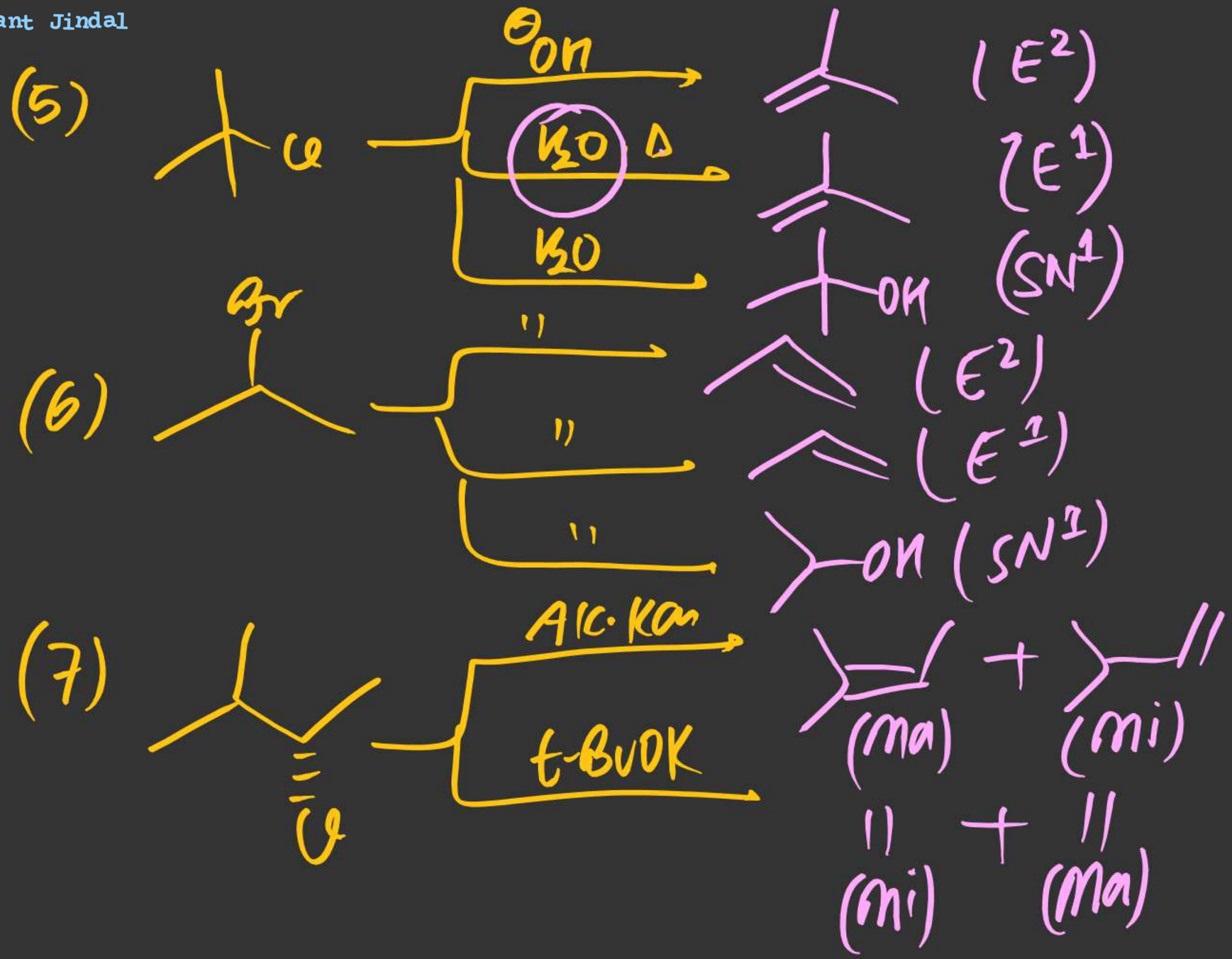
(2)  $Na^+ \bar{O}CMe_3$ → 94% (ma) E_2 + 6% (mi) SN^2 $[E_2] >> [SN^2]$

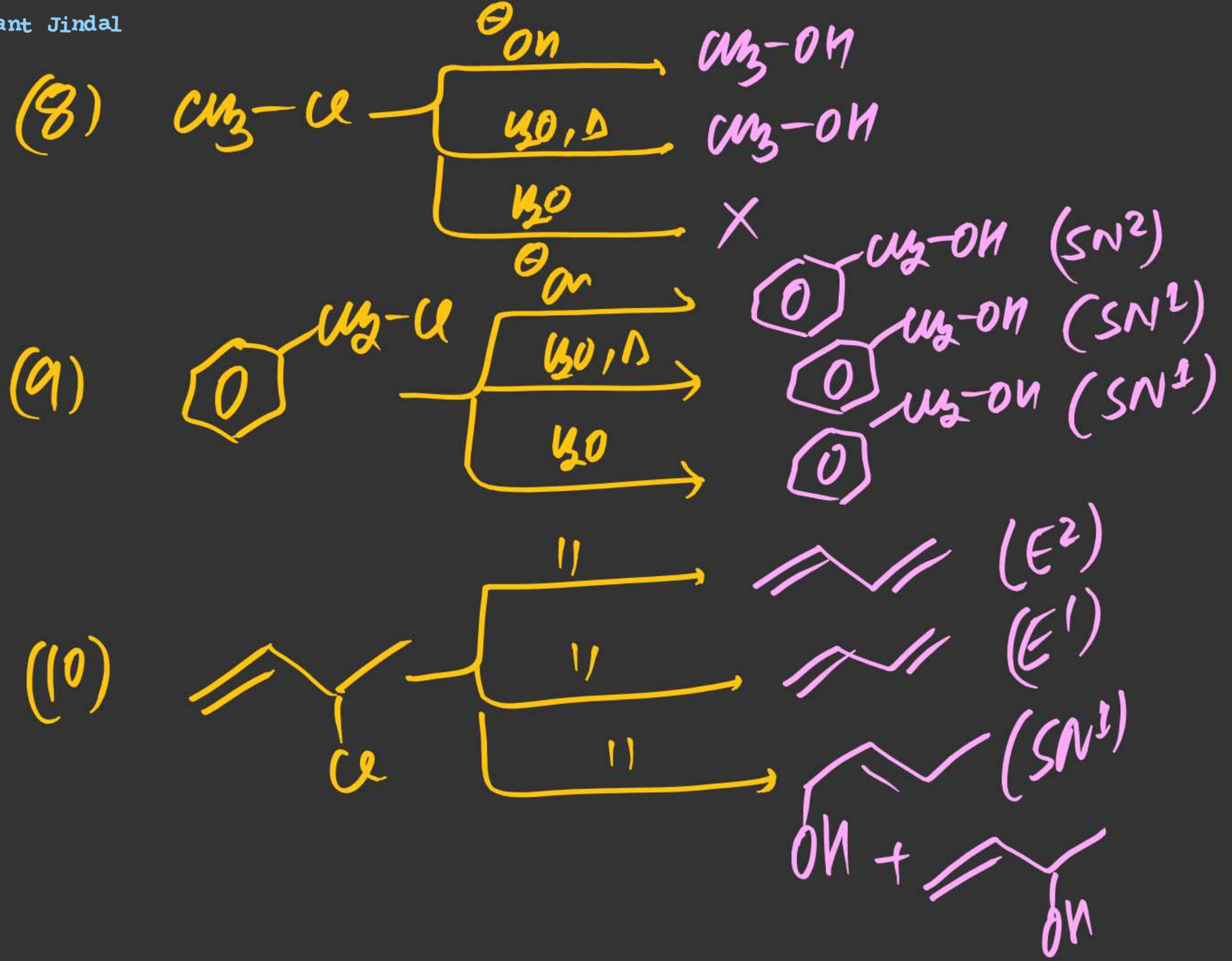
Imp (3)  $N\bar{a}OCH_3$ (SNU/SB) / $NaSCH_3$ (SNU/WB) →  (ma) +  (mi)

 (ma)

Imp (4)  || (SNU/SB) / || (SNU/WB) →  (ma) +  (mi)

 (ma) (SN²)





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Carbonyl Compound

(*) Nucleophilic addⁿ on $>C=O$ of

H_2N-Z
HNZ_2
ROH
H_2O
HCN
$NaHSO_3$

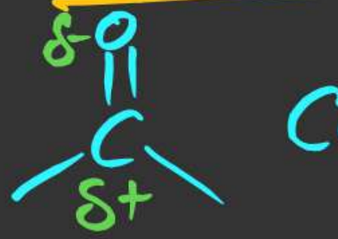
(*) Reduction Reaction [RMgX, $LiAlH_4$, $NaBH_4$, DIBAL, B_2H_6, Clemenson Red. Wolf-K./Red P/HI/H_2, Cat/N_2H_4, H_2O_2/Na-Eton...

(*) Oxidation Reaction [$K_2Cr_2O_7$, PCC, PDC, O_3, Cold $KMnO_4$, Tollen's Fehling - - - - -]

(*) Named Reactions [Haloform, Aldol, Carnizaro, Perkin - - - - -]

Nishant Jindal

Nucleophilic addⁿ on $\rangle C=O$!

$\Rightarrow$ 

Compound behaves like a weak Electrophile

Neutral

$\Rightarrow$ $\rangle C=O$ Electrophilicity can be increased By Protonating "O" in Acidic Condition

$(\delta' \gg \delta)$

$\Rightarrow$ Sometimes Basic Condition is Required to increase effect Conc. of Nu.

$H-C\equiv N \rightleftharpoons H^{\oplus} + (CN^{\ominus})$ (NU)
(WA)

$H-C\equiv N + NaOH \rightarrow \underset{\text{(High Conc)}}{Na^{+}CN^{-}} + H_2O$
NU

(#) Reaction of Primy Amine H_2N-Z & $>C=O$ Compound

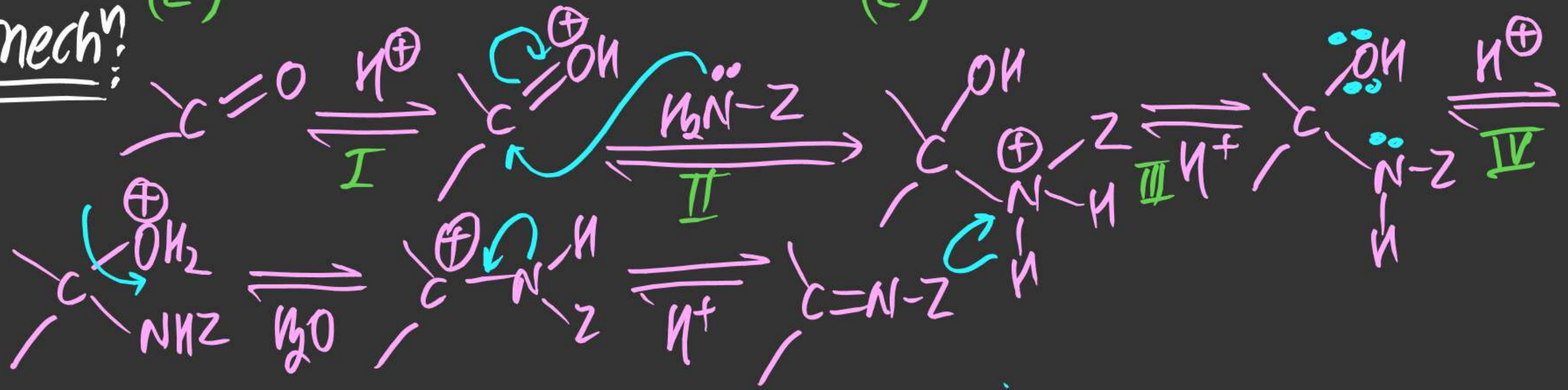
⟹ on Rxⁿ b/w $>C=O$ & H_2N-Z product Containg $>C=N-$ is obtained

⟹ Reaction is Carried out in Acidic Condⁿ (pH < 7)

(1) $>C=O + H_2N-Z \xrightarrow{pH(4.5-6.0)} >C=N-Z + H_2O$

(E) (E)

Mechⁿ:



Note (i) Carbocation Intermidiate

(ii) Reversible Rxn

(iii) At pH = 4.5 ⇒ $[H^+]$ Conc. would be higher & effective Conc. of Nu would be less

$H_2\ddot{N}-Z \rightleftharpoons H_3\overset{\oplus}{N}-Z$ (H^+)

(Nu)

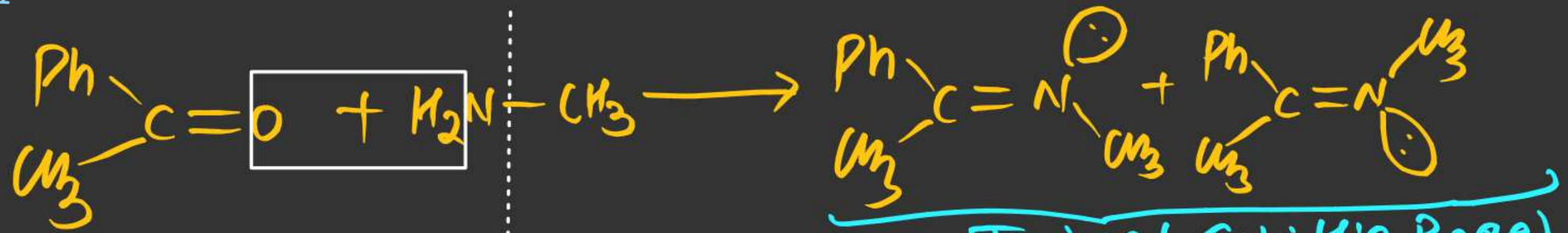
& hence step-II becomes r.d.s.

(iv) At pH = 6.0 ⇒ $[H^+]$ Conc. would be lesser & Step (IV) wd be r.d.s

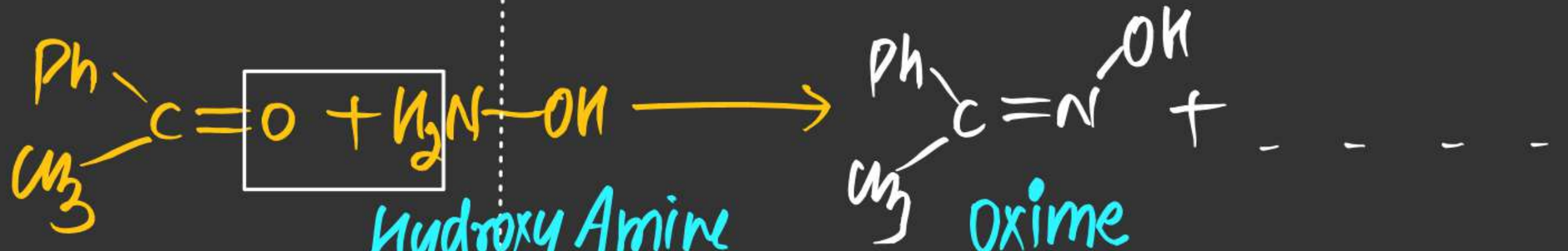
M.Imp

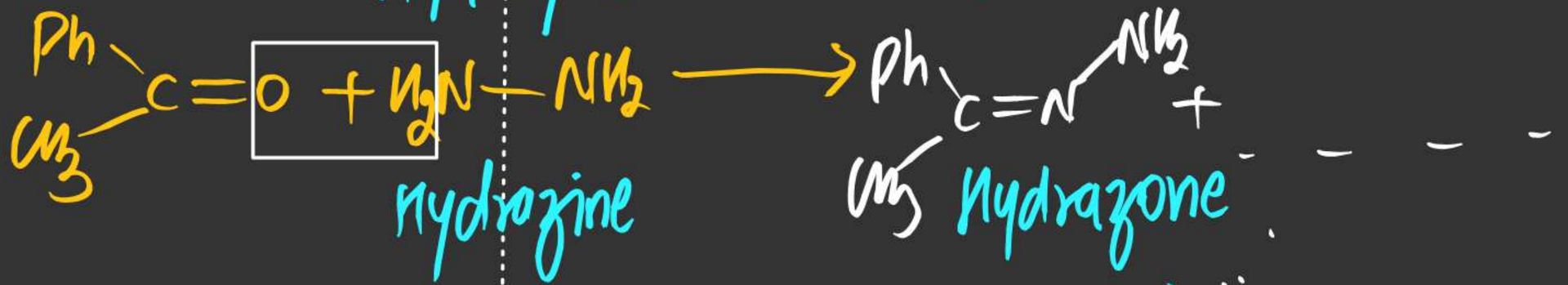
(v) Use of 2,4 DNP / Braddy's Reagent in POC is to find presence of $>C=O$ group due to formation of Coloured Hydrazone product.

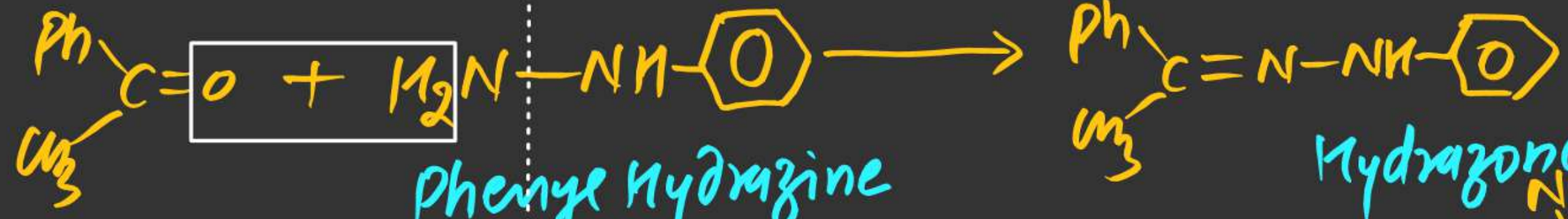
Nishant Jindal

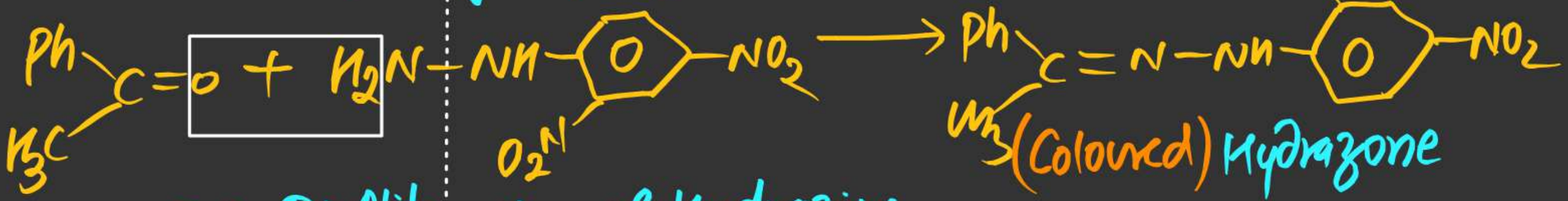
(2) 

(3) 

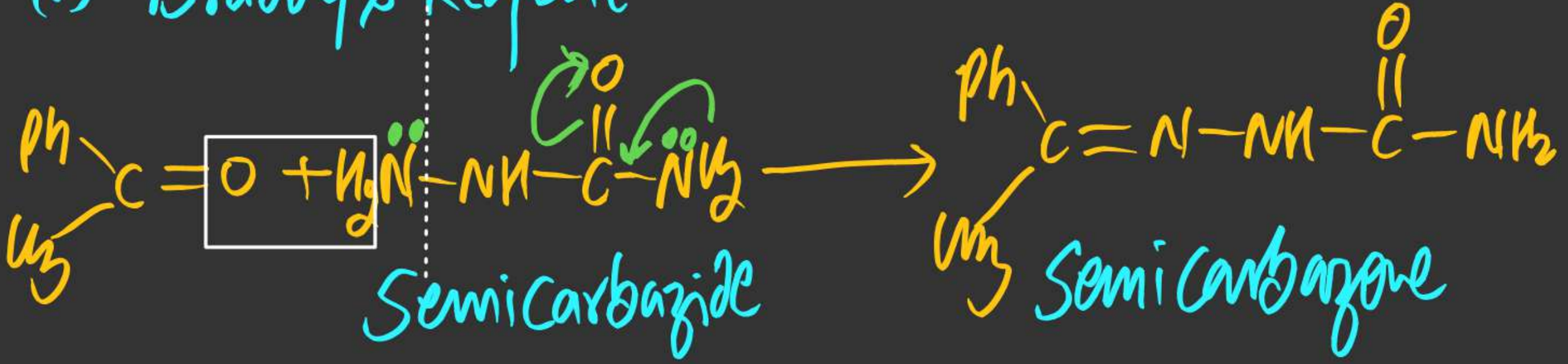
(4) 

(5) 

(6) 

(7) 

(*) 2,4-Di Nitro phenyle Hydrazine
(*) 2,4 DNP
(∞) Braddy's Reagent

Imp
(8) 

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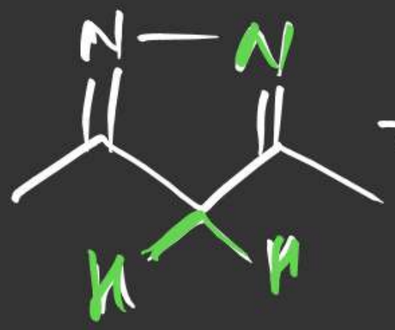
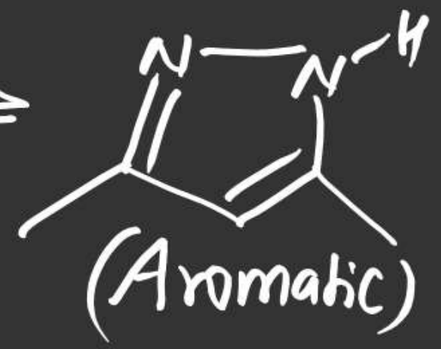
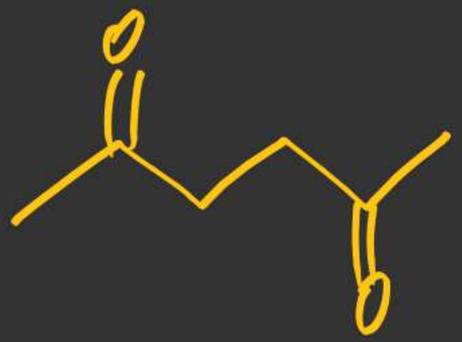
(9)  $+ NH_2-NH_2 \xrightarrow{''}$  $\rightleftharpoons$ 
(Aromatic)

(10)  $+ NH_2-OH \xrightarrow{''}$

(11)  $\xrightarrow[\Delta]{(NH_4)_2CO_3}$

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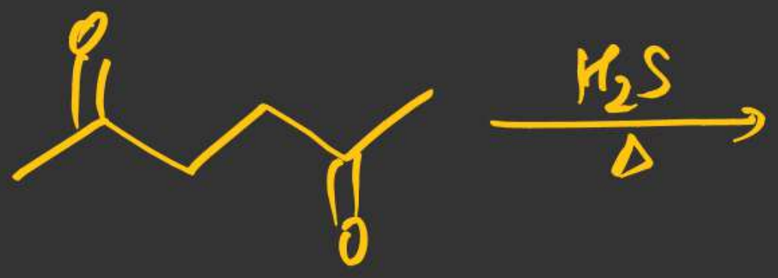
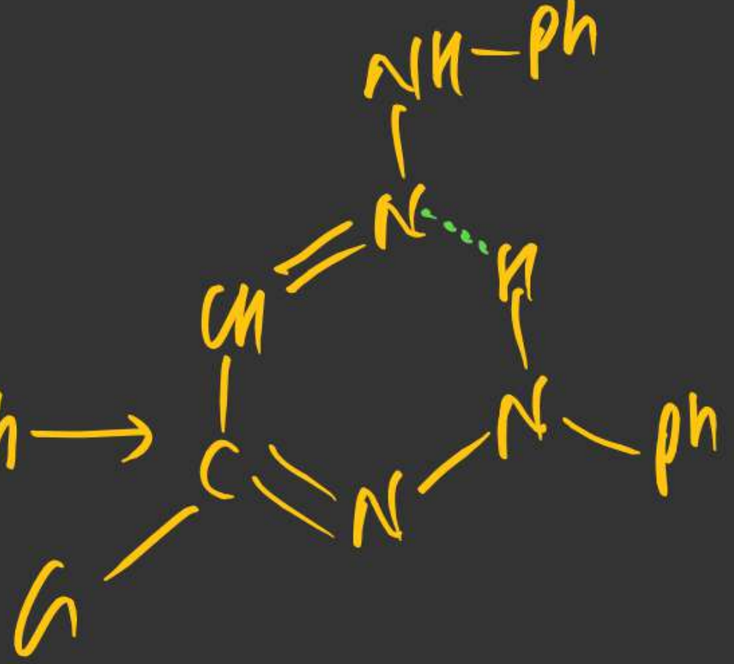
(12)  $\xrightarrow[\Delta]{H_2S}$

(13)  $\xrightarrow[\Delta]{NH_3/H^+}$

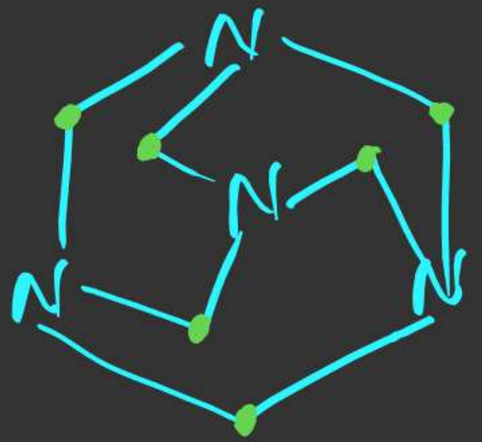
(14) α CH=O / α CH_2-OH + $3H_2N-NH-Ph \longrightarrow$ 

M.I.T.

(15) $6\,HCHO + 4NH_3 \longrightarrow (CH_2)_6N_4 + 6H_2O$

$HCHO \rightarrow [H_2C{=}NH]$ (Highly Reactive)

(*) Hexa Methylene Tetra Amine
or
(*) Urotropine
(*)



Nishant Jindal

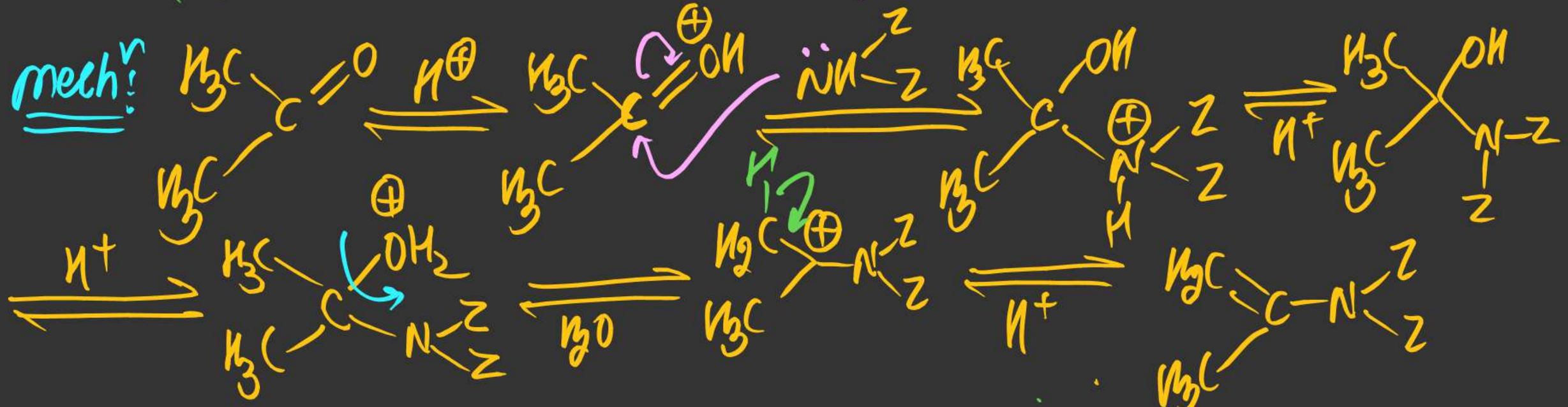
(#) Rxn of Sec. Amine $HN<^{Z}_{Z}$ with $>C=O$:

$\Rightarrow$ Rxn b/w $>C=O$ & Sec. Amine **Enamine** is obtained as a Product.

(1) $H_3C-\underset{H_3C}{\overset{}{C}}(=O) + NH<^{Z}_{Z} \xrightarrow[(4.5-6.0)]{pH}$ $H_2C=C(CH_3)-N<^{Z}_{Z}$

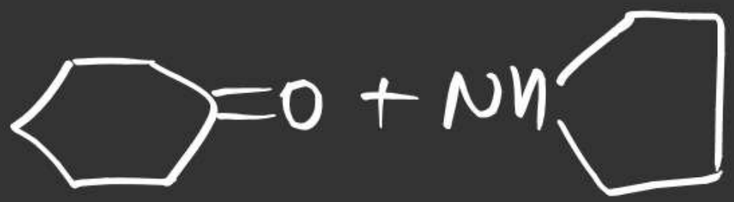
(E) (NU)

mech!



Note (i) Carbocation int
(ii) Nucleophilic product is obtained

(2)  $\xrightarrow{H^+}$

(3)  $\xrightarrow{\quad}$

(4)  $\xrightarrow{\quad}$ P $\xrightarrow{CH_3-I}$ Q $\xrightarrow{H_3O^+}$ R + S