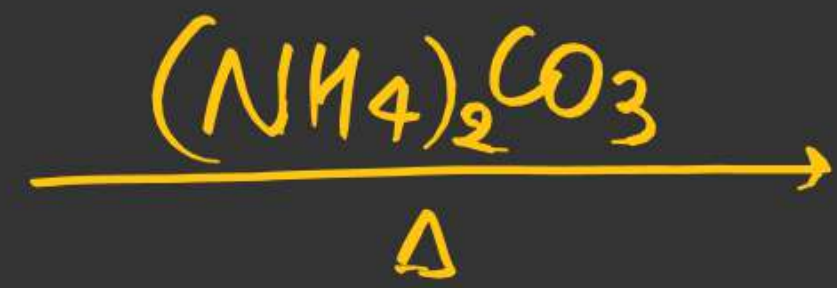
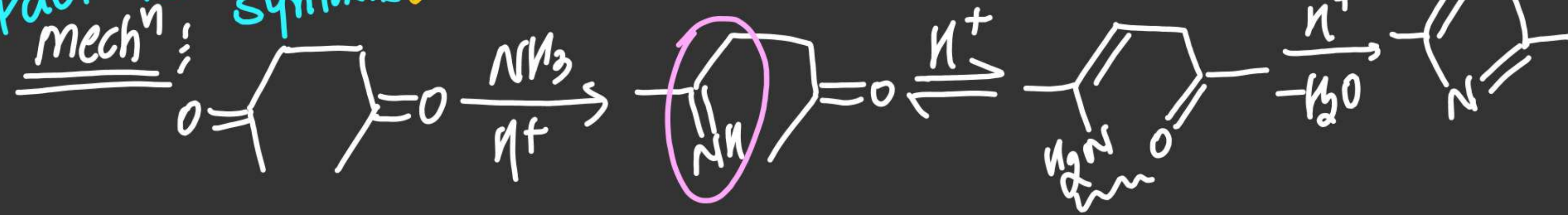


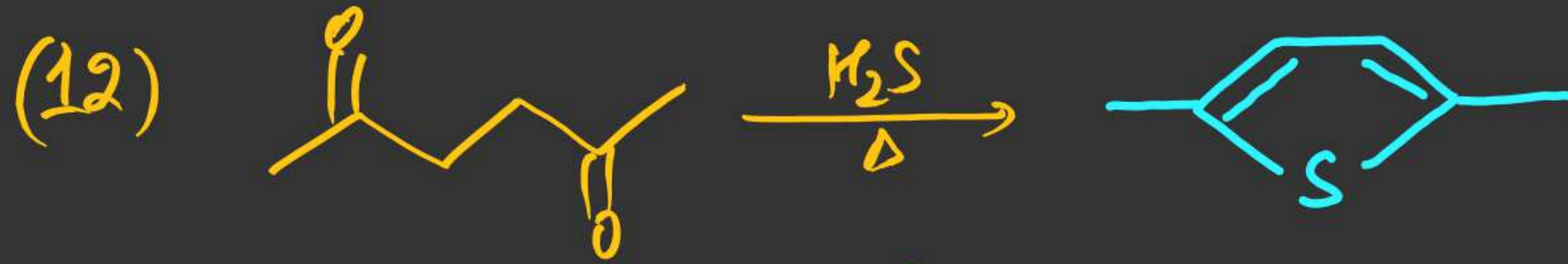


IIIT Advance

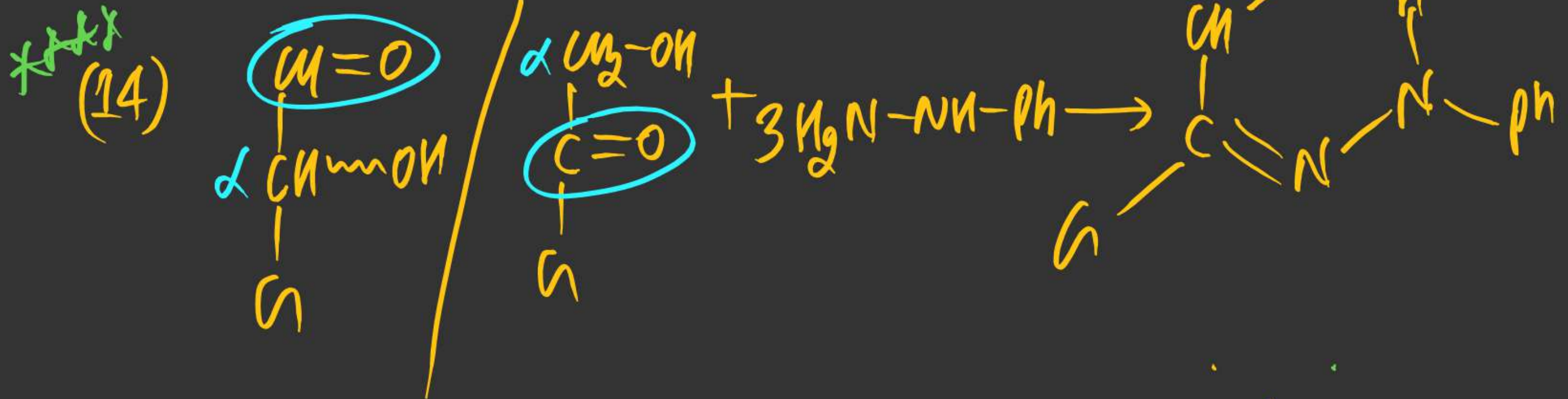
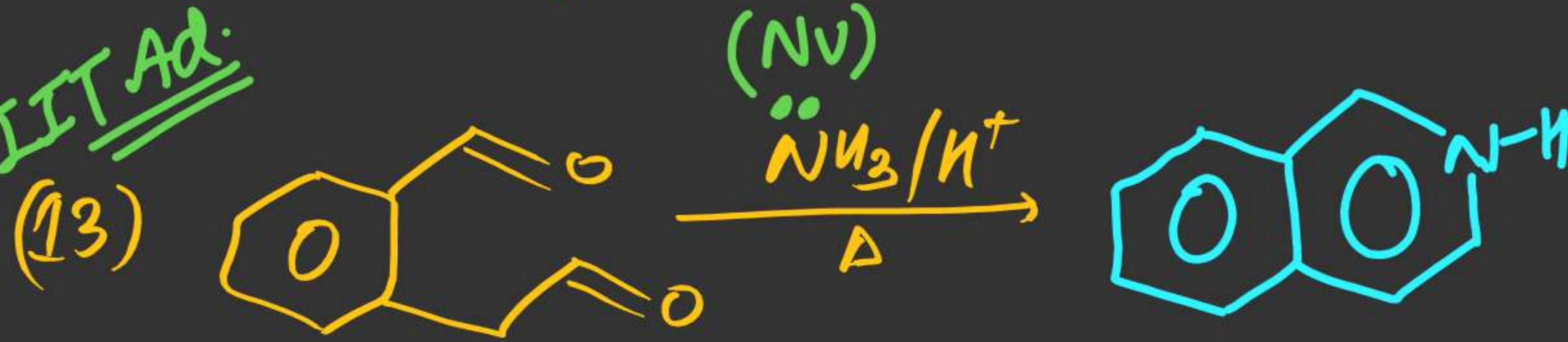


Paul Knorr
Mechⁿ
Synthesis

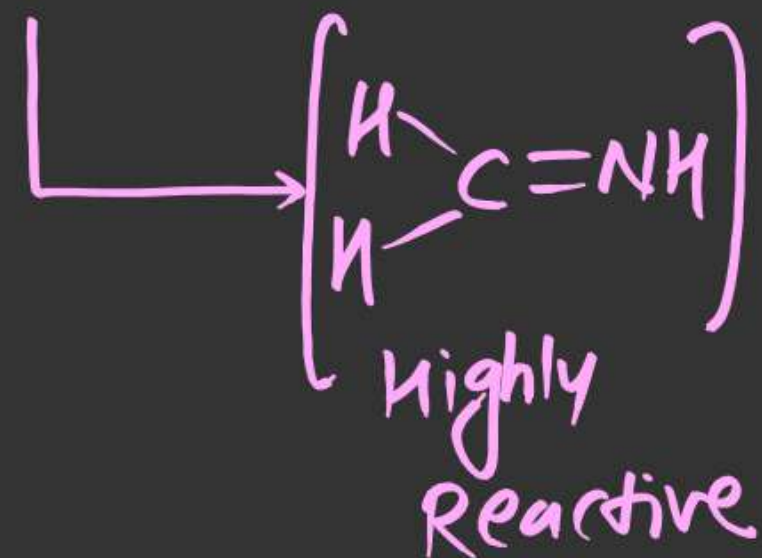
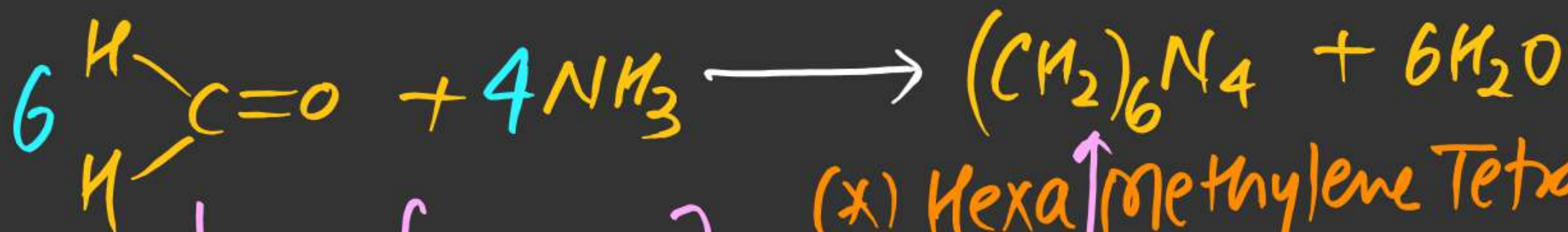




IIT Ad.

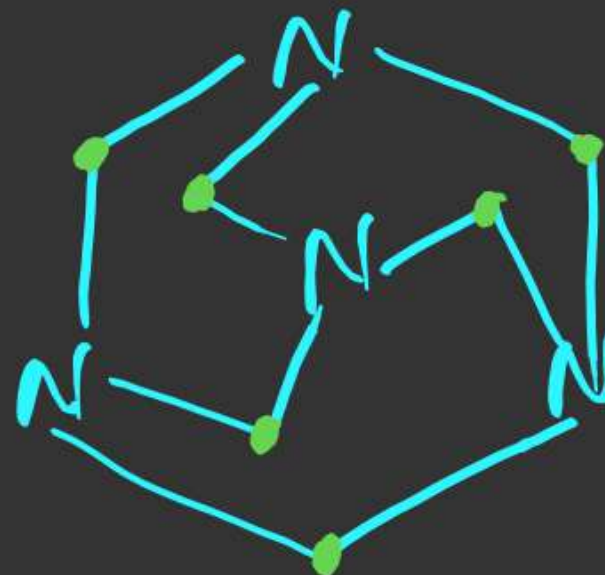


~~M.F~~
~~(15)~~



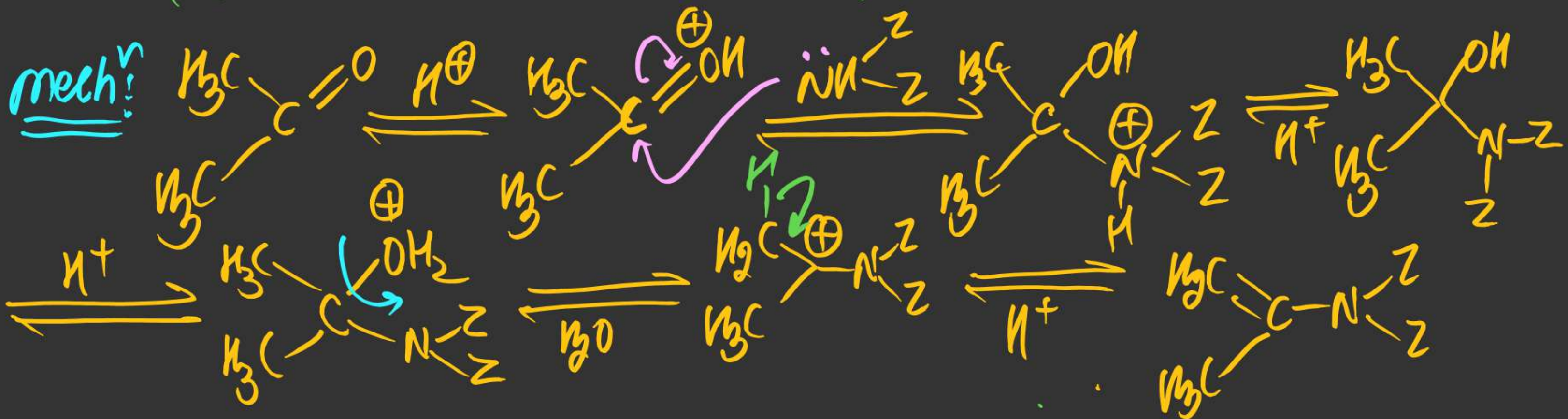
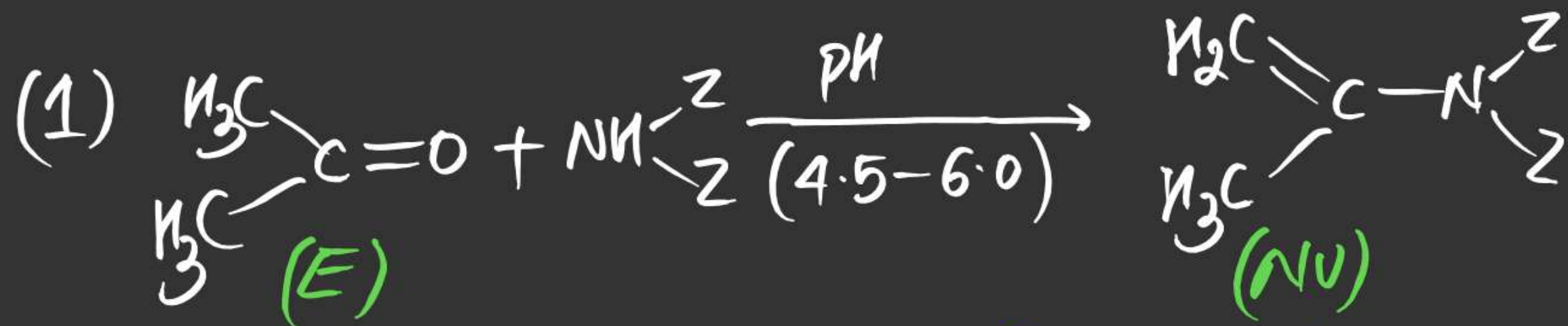
(*) Hexamethylene Tetra Amine
or
(*) Urotropine

(*)

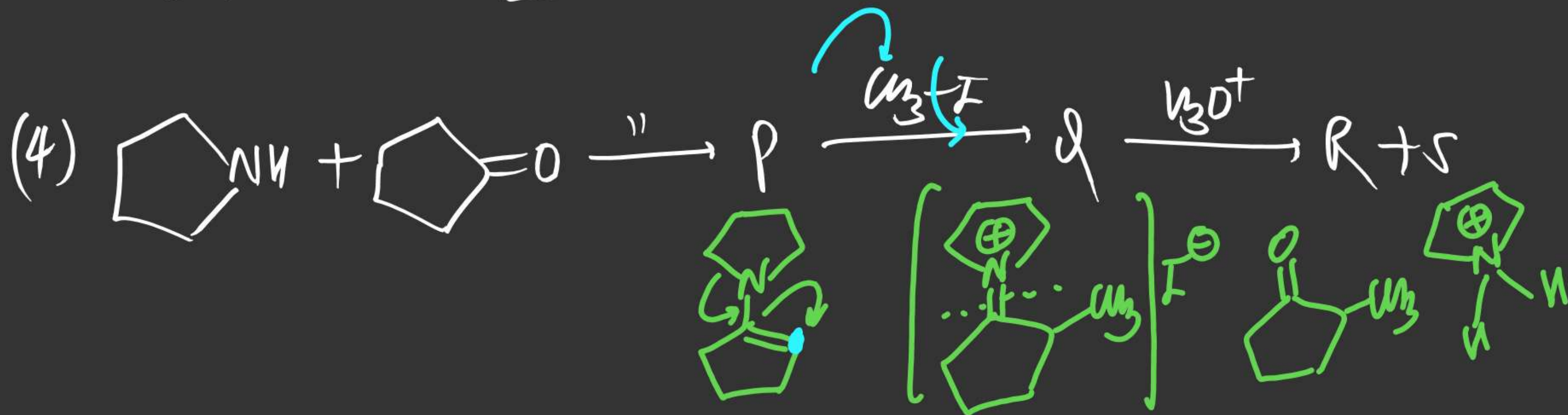
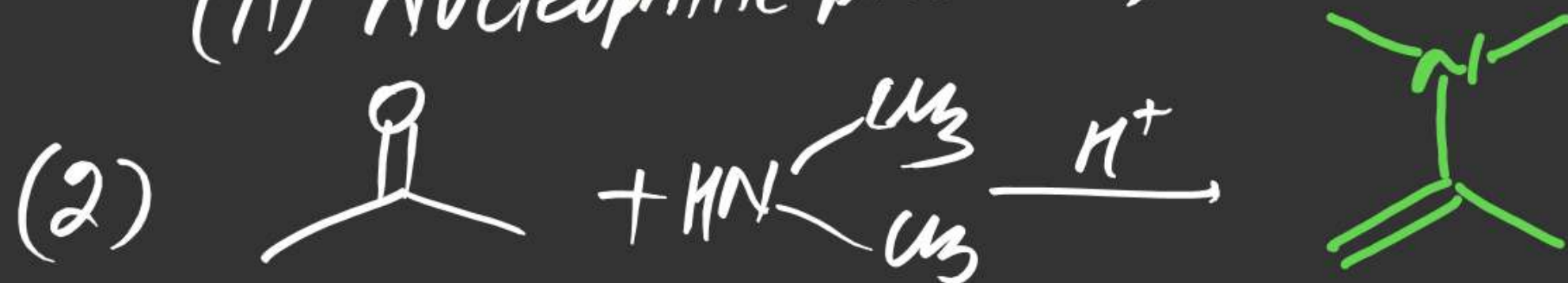


(#) Rxn of Sec. Amine $\text{HN} \begin{smallmatrix} \diagup \text{Z} \\ \diagdown \text{Z} \end{smallmatrix}$ with $\text{C}=\text{O}$!

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

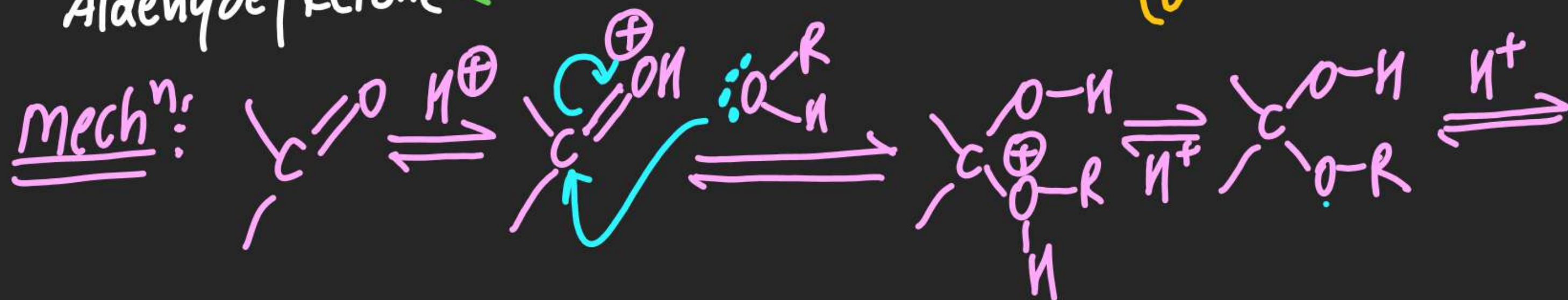
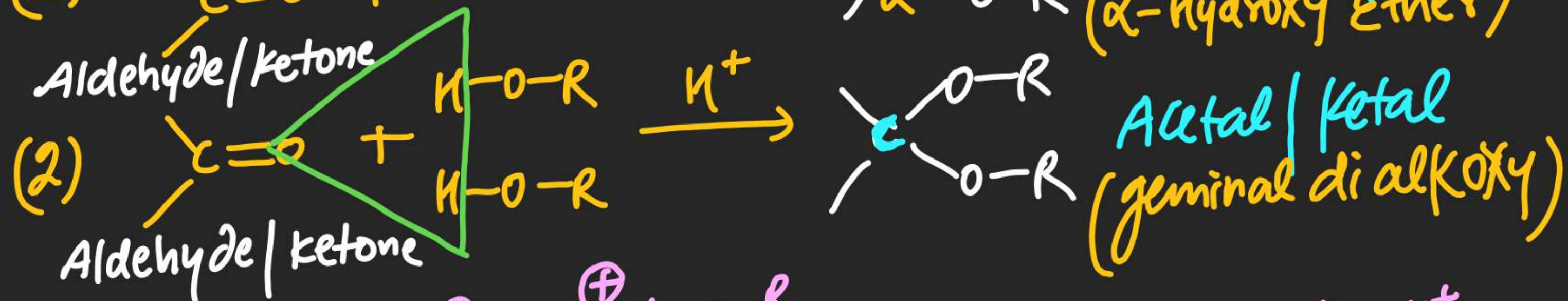
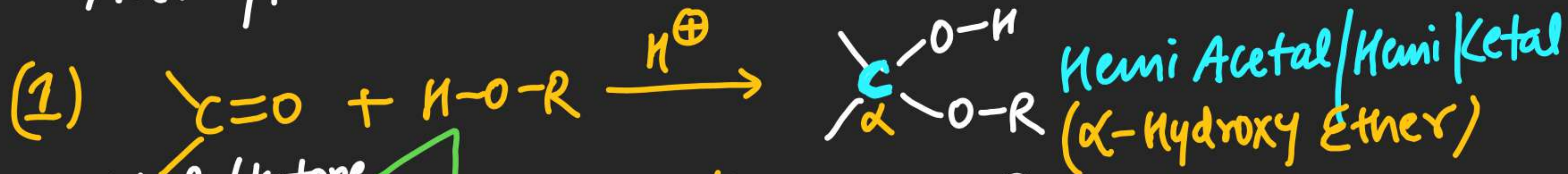


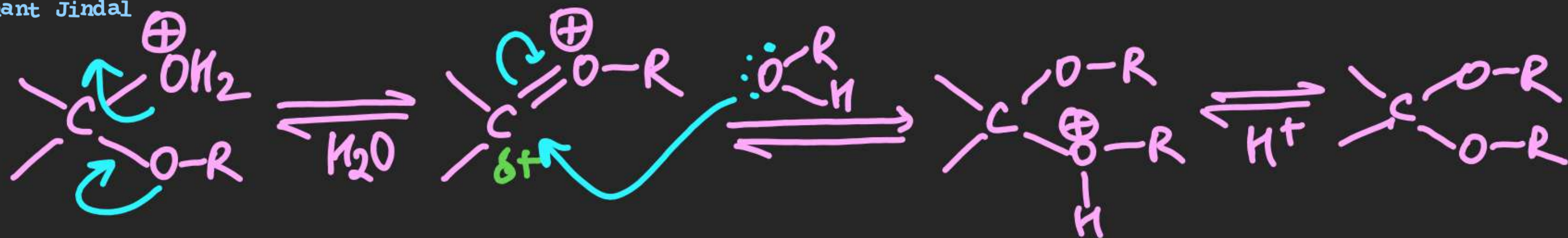
Note (i) Carbocation int
 (ii) Nucleophilic product is obtained



(#) Rxn of R-OH:

⇒ On Reaction of $\text{C}=\text{O}$ & Alcohol Hemi Acetal/Hemi ketal or Acetal/ketal is obtained as a product.





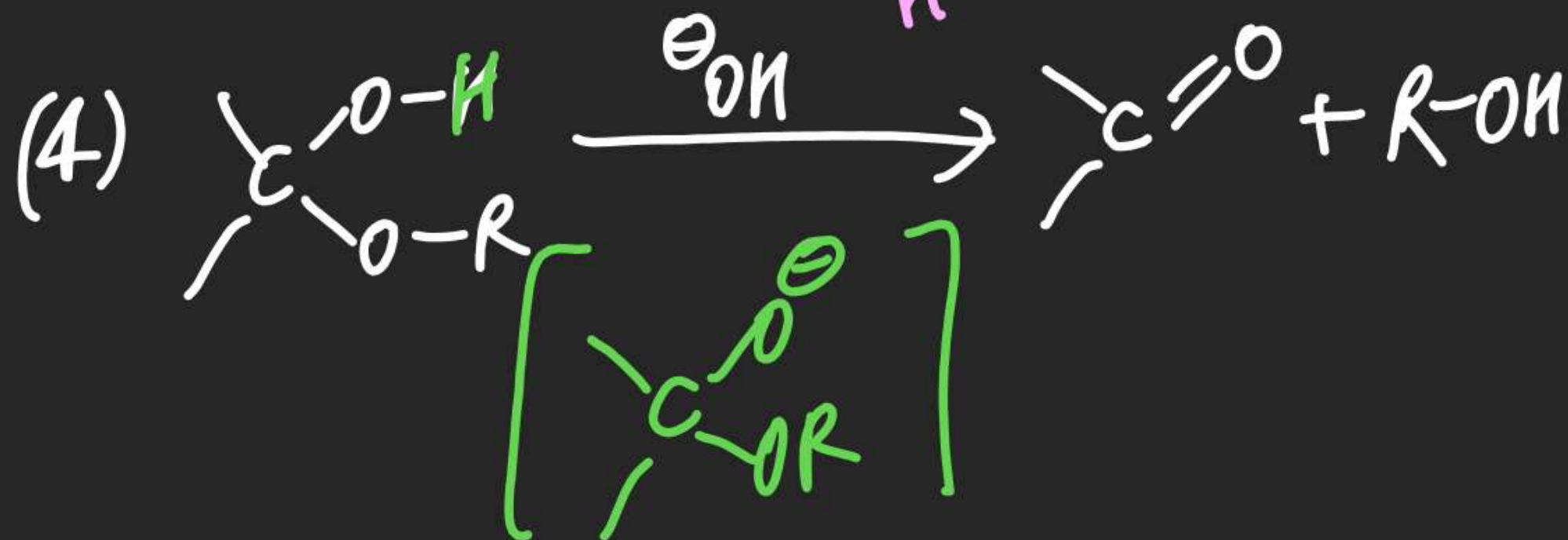
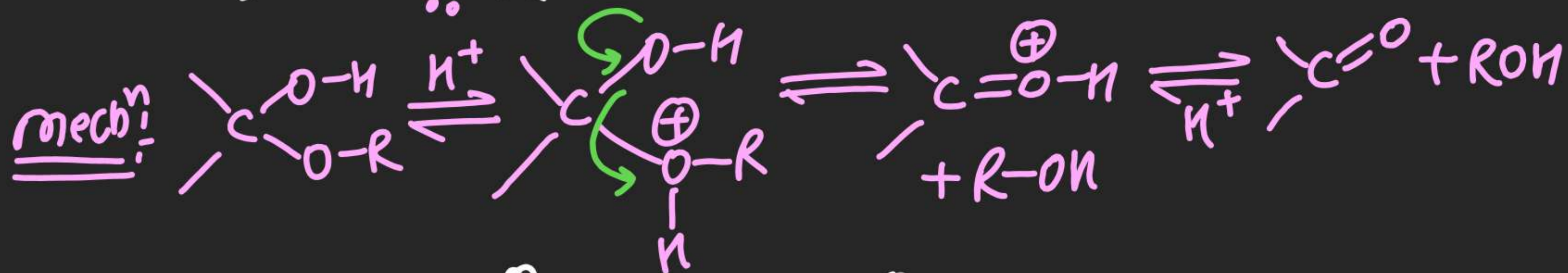
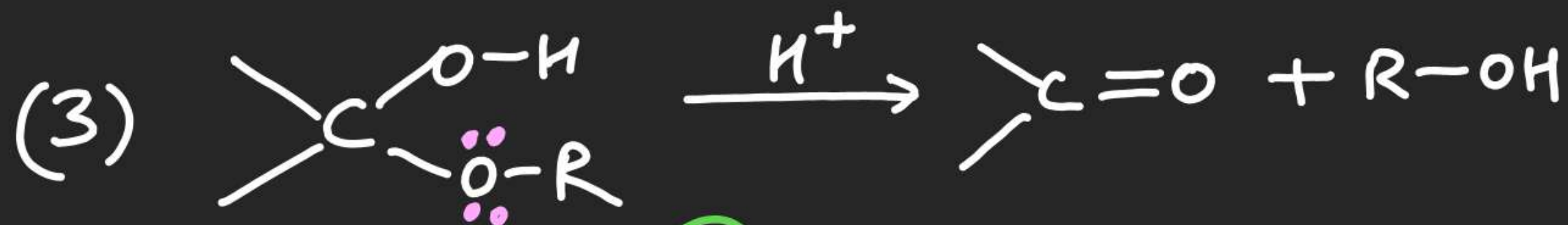
Note (i) Carbocation Intermediate



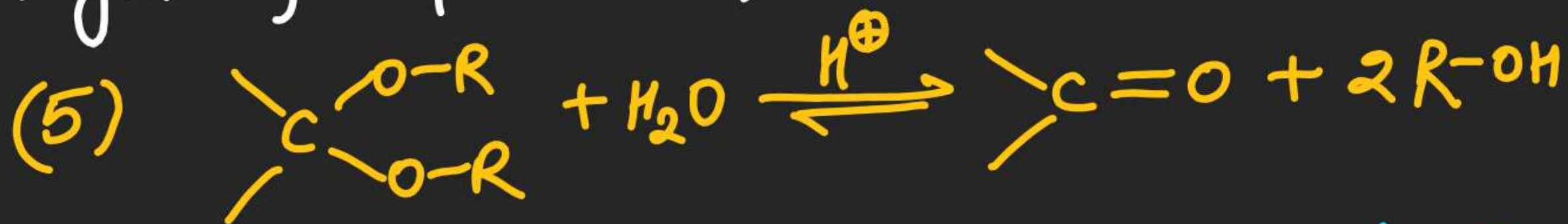
(iii) Reversible Reaction

(iv) Hemi Acetal or Hemi ketal Both are highly unstable in Acidic

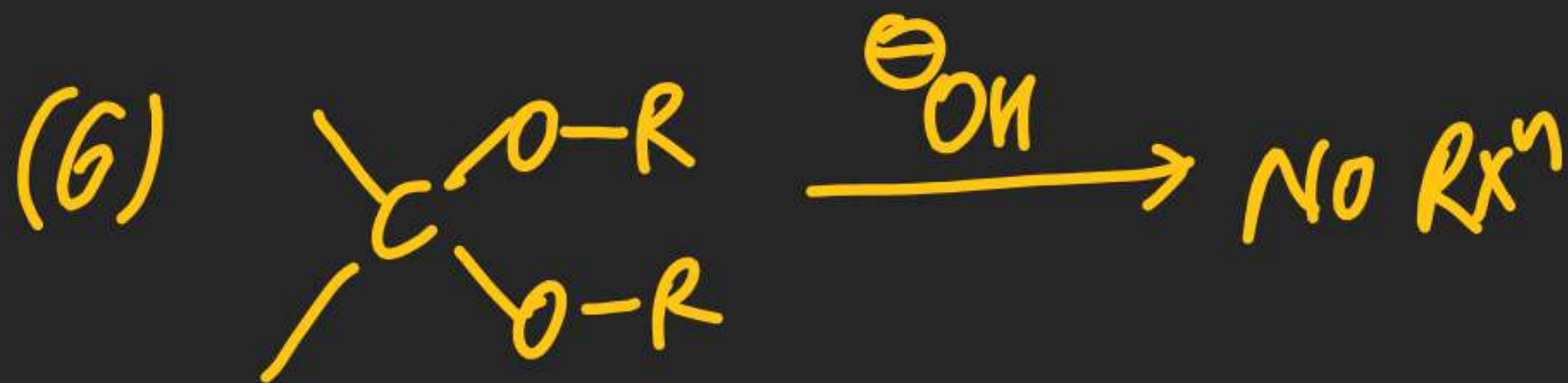
as well as in Basic Condition & gets decomposed into >C=O & Alcohol.



(v) Acetal & Ketal Both are highly unstable in Acidic Condition & gets hydrolysed into >C=O & Alcohol.

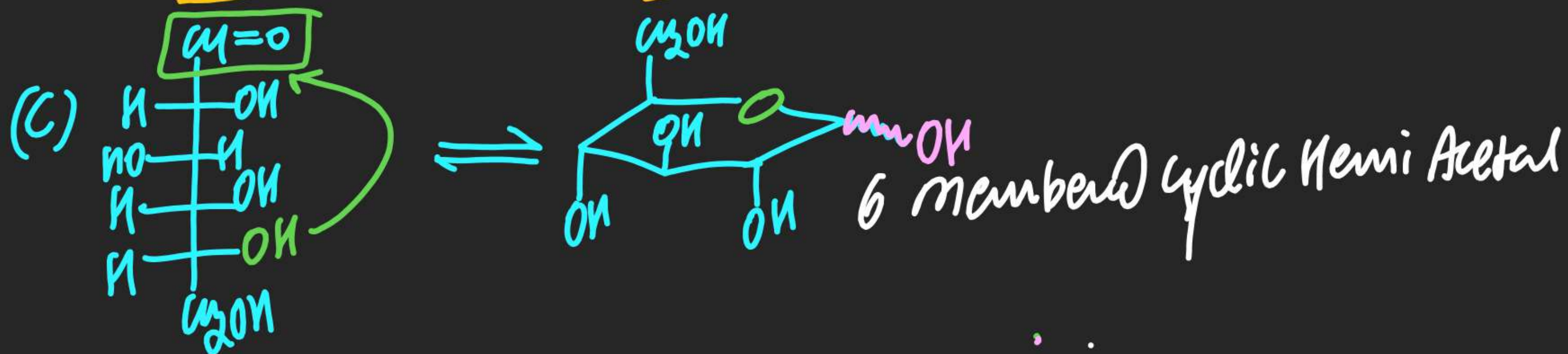


~~(vi)~~ Acetal & Ketal Both are highly stable in Basic Condition

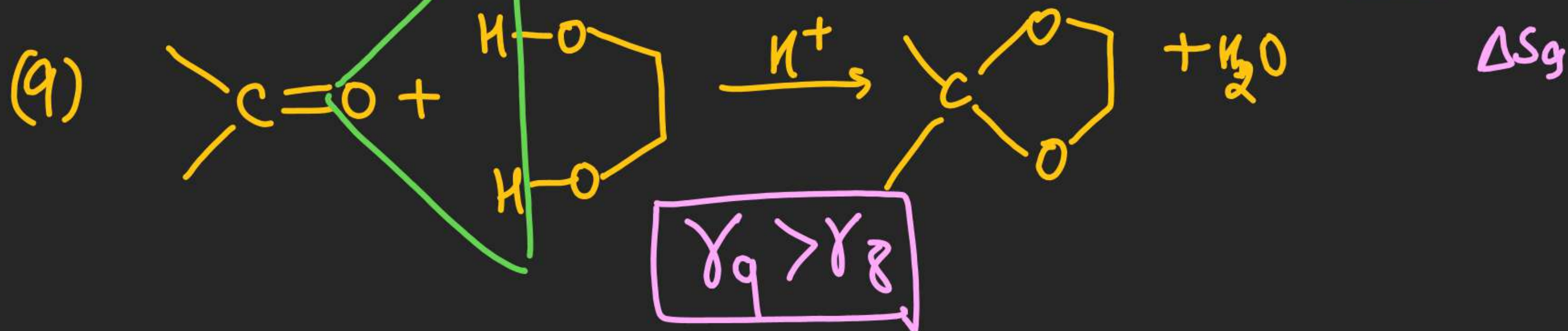
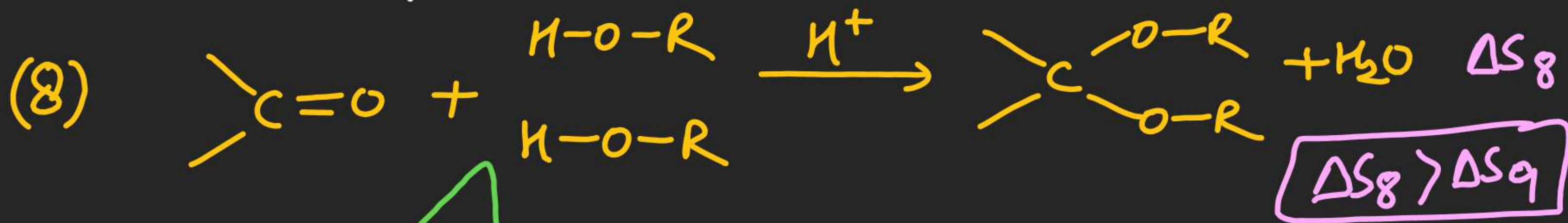


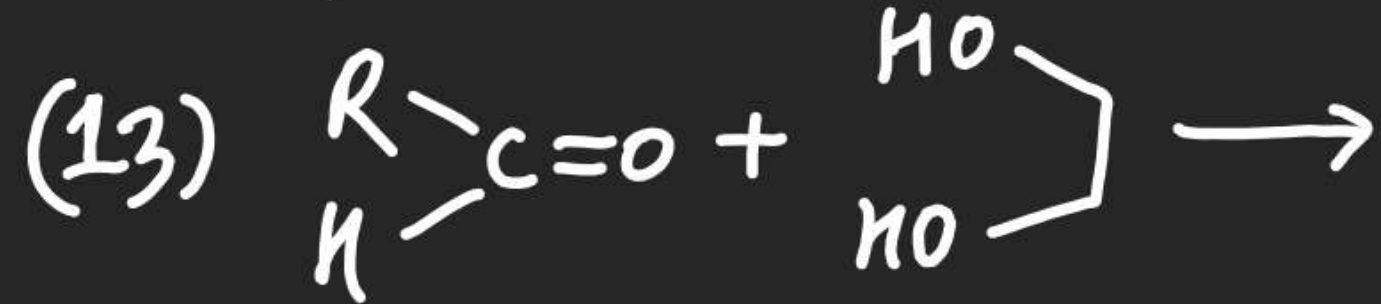
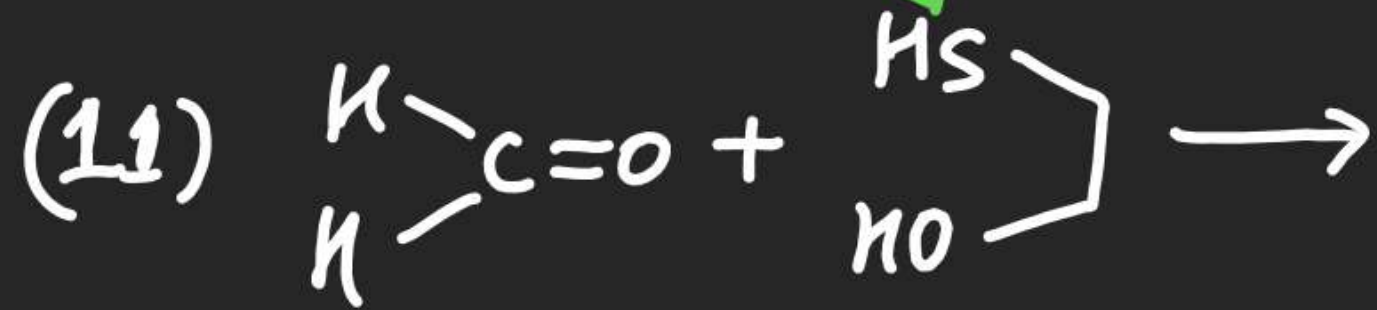
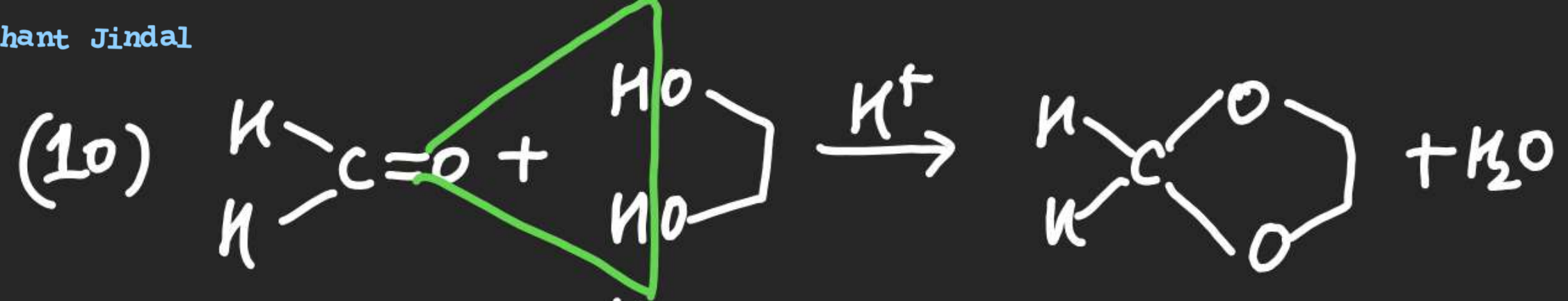
(vii) Formation of cyclic Hemiacetal or Hemiketal if mne

preferred over acyclic hemi Acetal / hemi ketal formation
if Ring size is 5 or 6 membered.

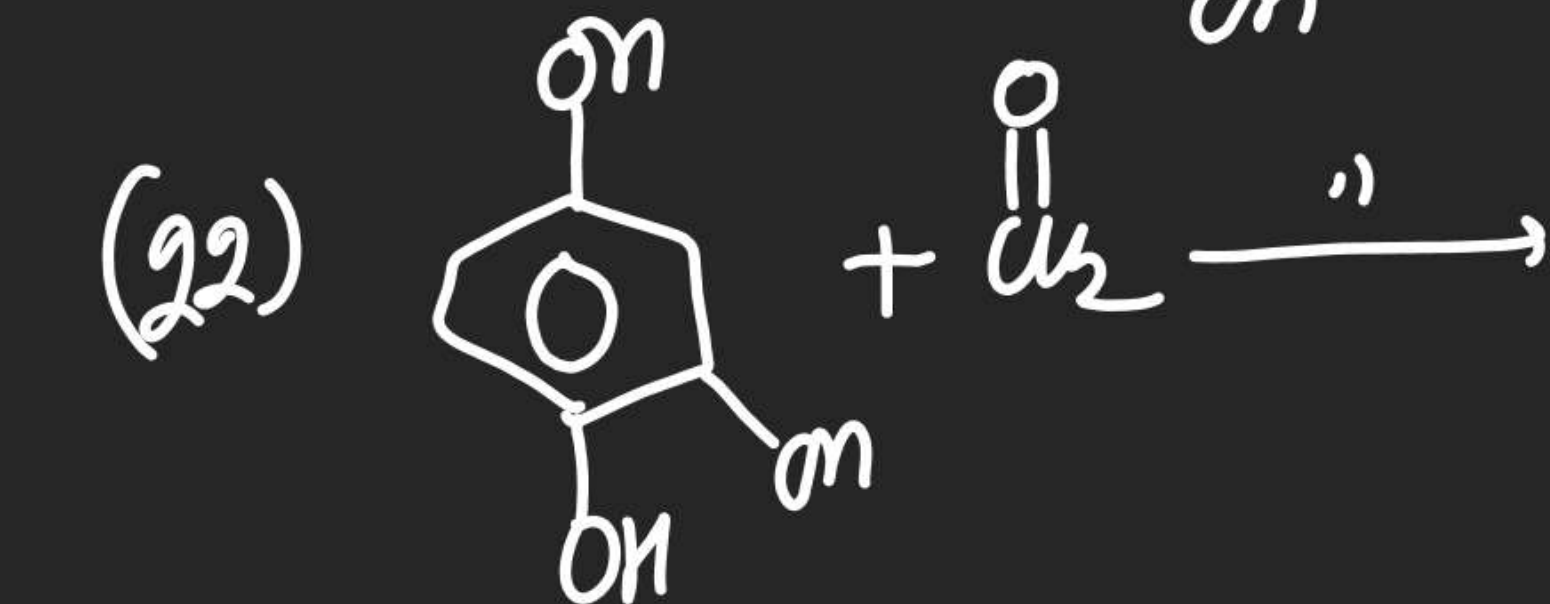
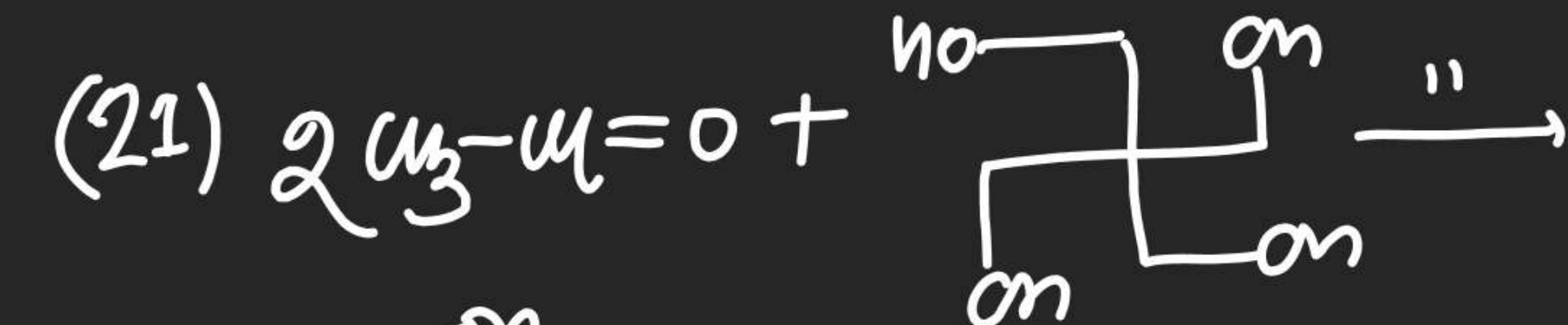
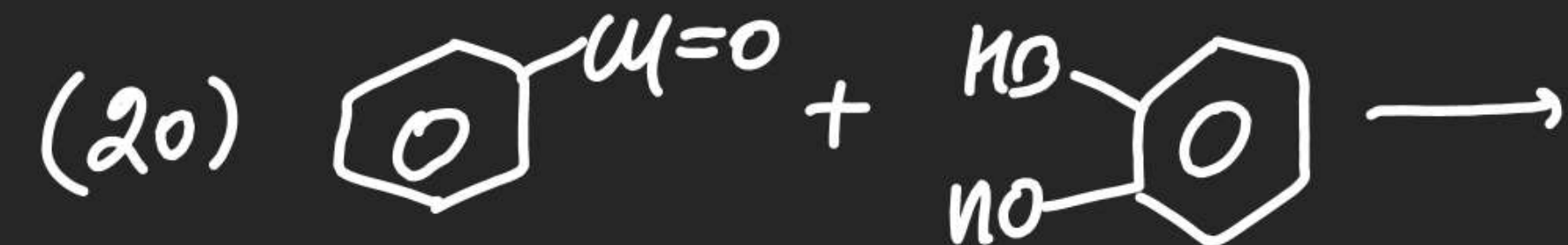


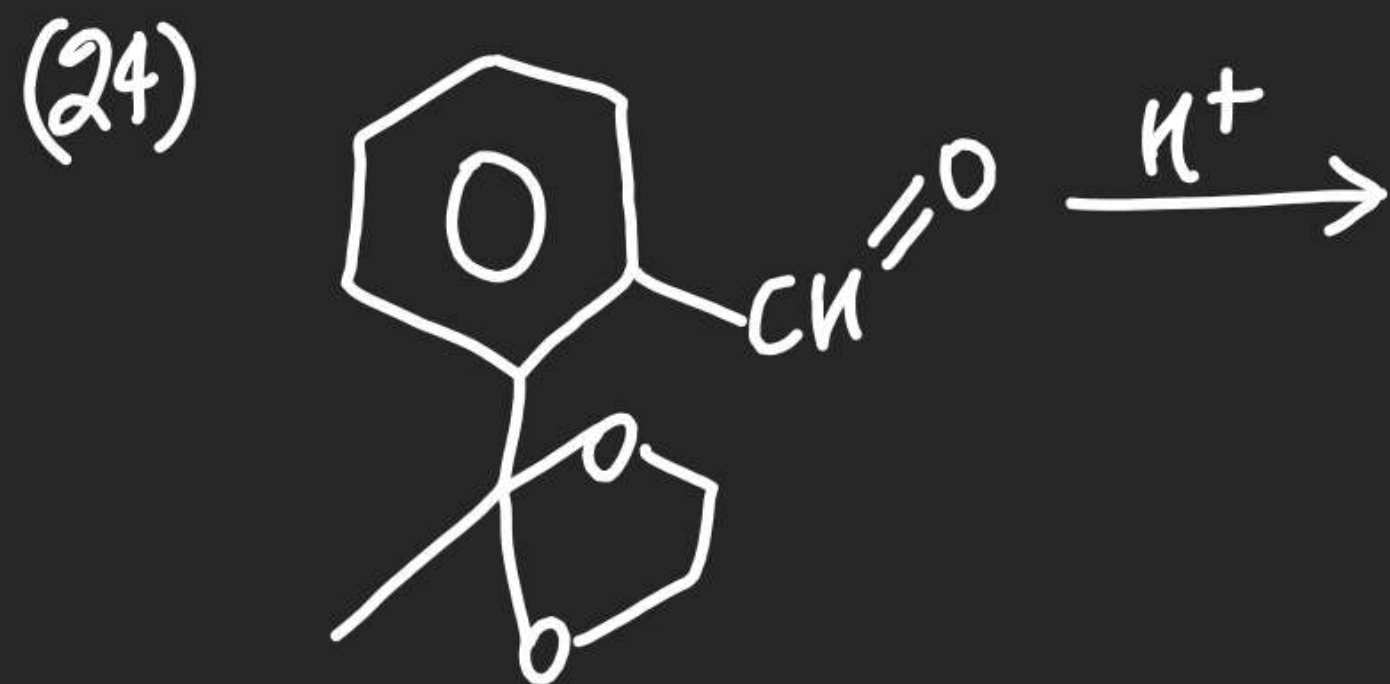
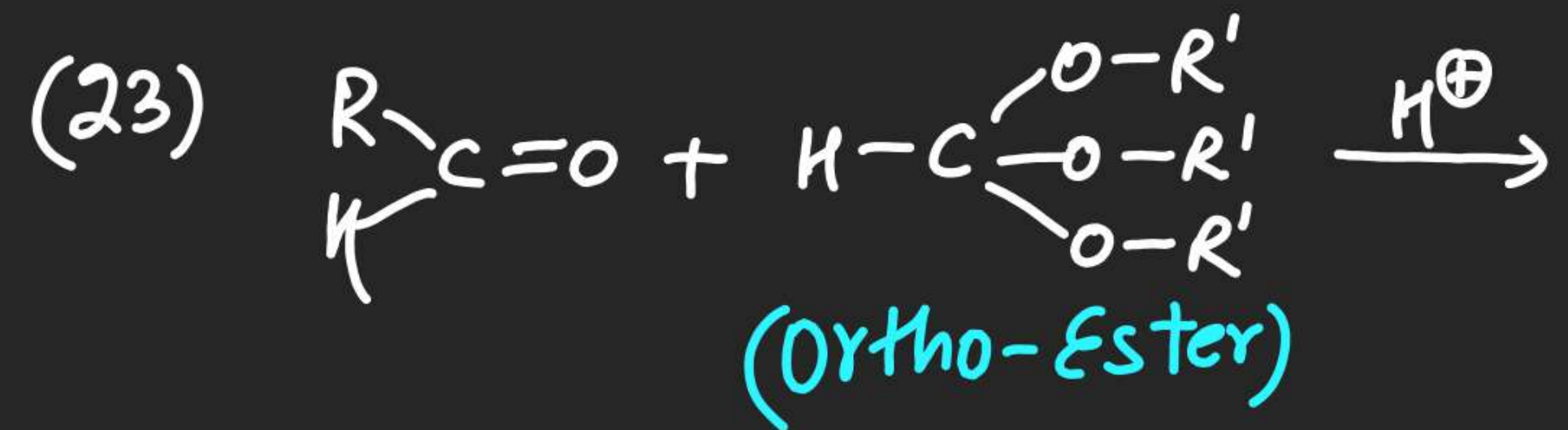
(viii) Formation of 5/6 membered Cyclic Acetal/Ketal are more favorable than Acyclic Acetal & Ketal due to less change in Entropy.











(#) Addition of H-OH // Hydration of $C=O$ // Geminal diol formation!.

\Rightarrow on Reaction of $C=O$ & H_2O , geminal diol is obtained as a product.

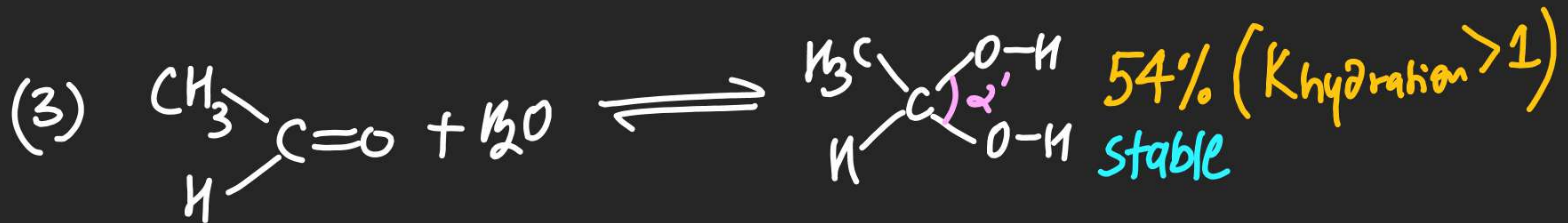
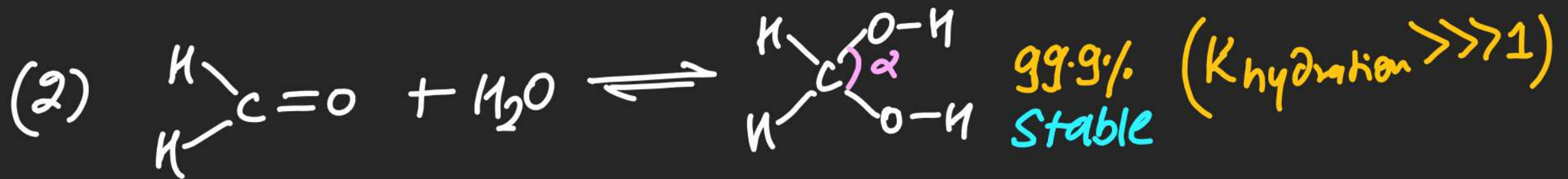


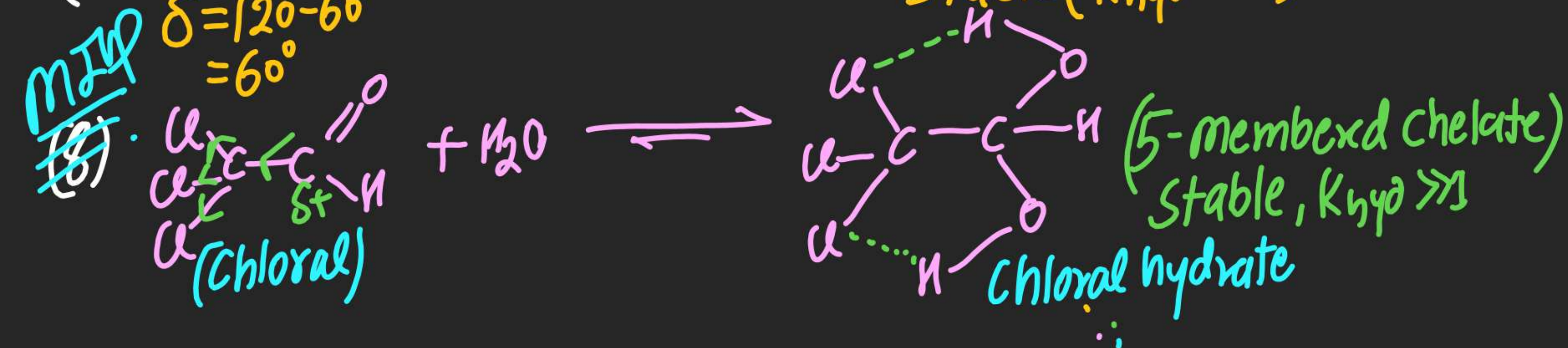
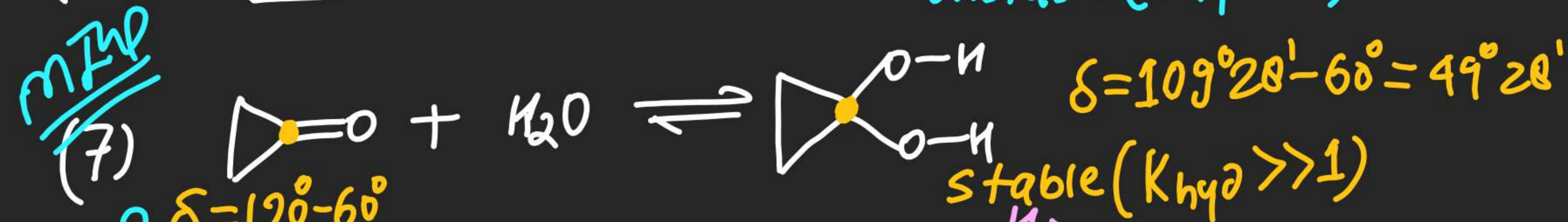
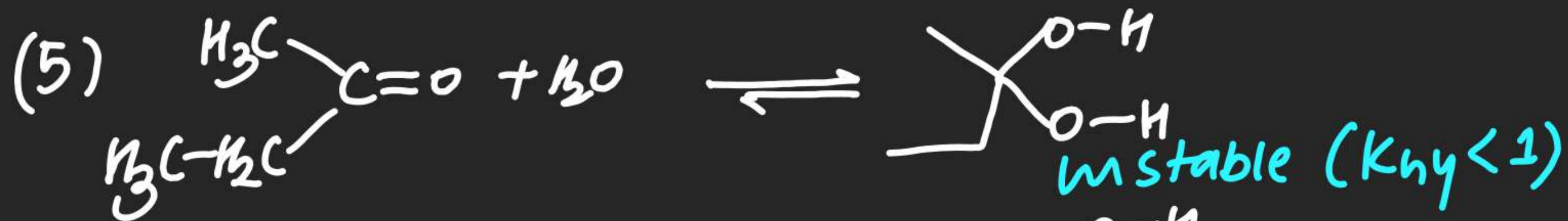
Note (i) $K_{\text{hydration}} = \frac{[\text{Geminal diol}]}{[\text{Carbonyl comp}][H_2O]}$

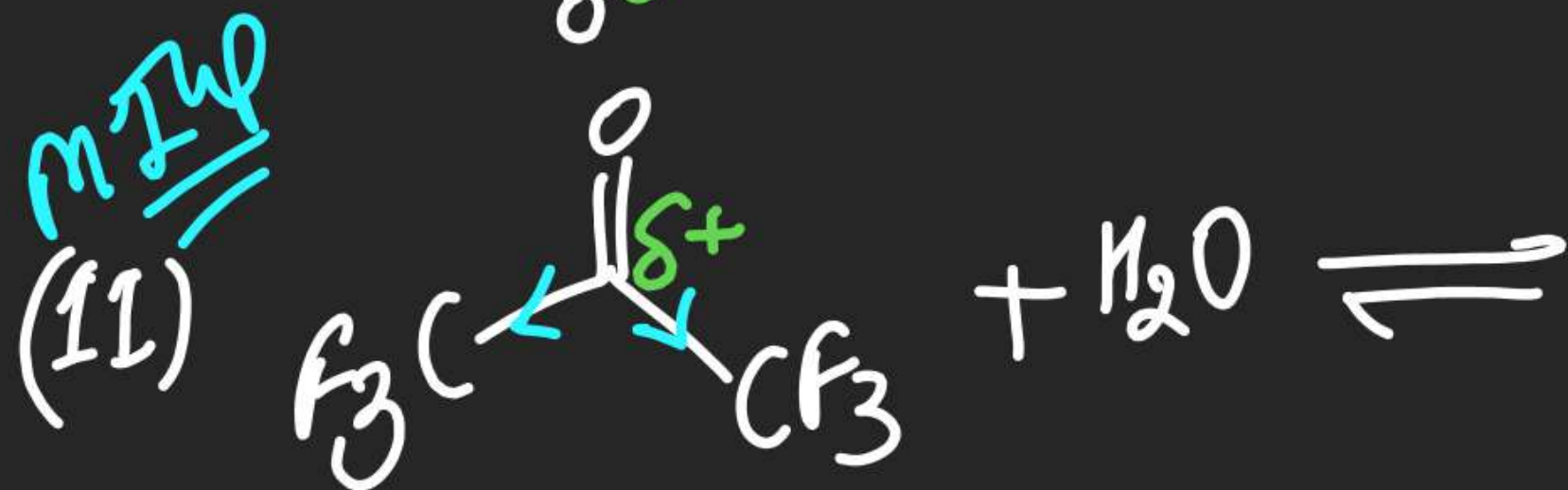
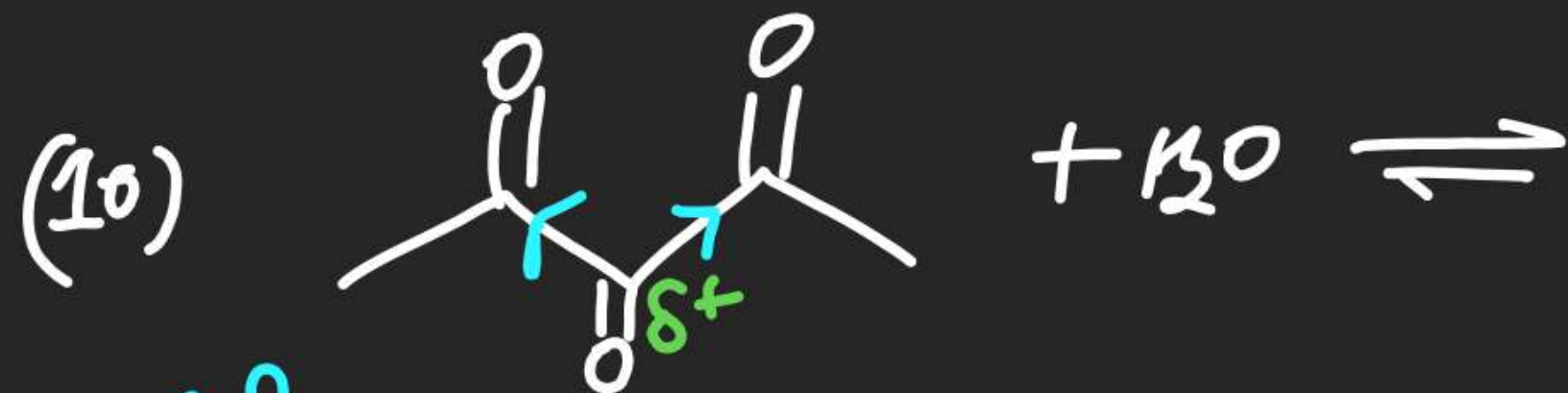
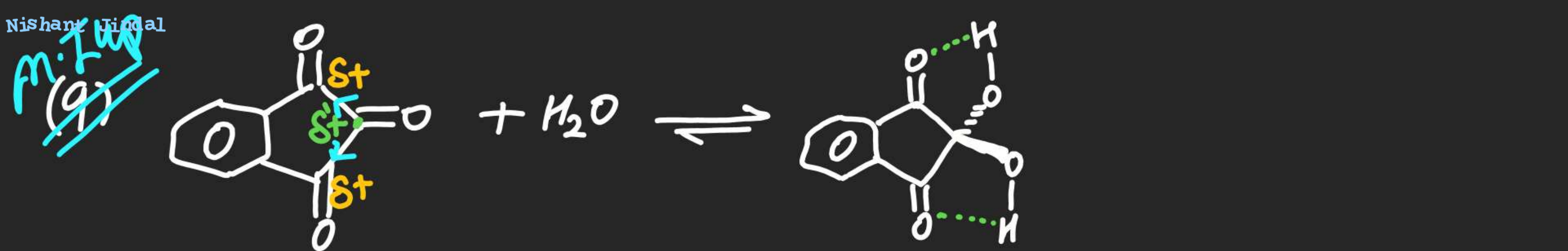
(ii) Geminal diol would be more stable iff
(a) Formation of 5/6 membered chelation.

(b) Relief in Angle strain

(c) higher Bond angle b/w two -OH group.

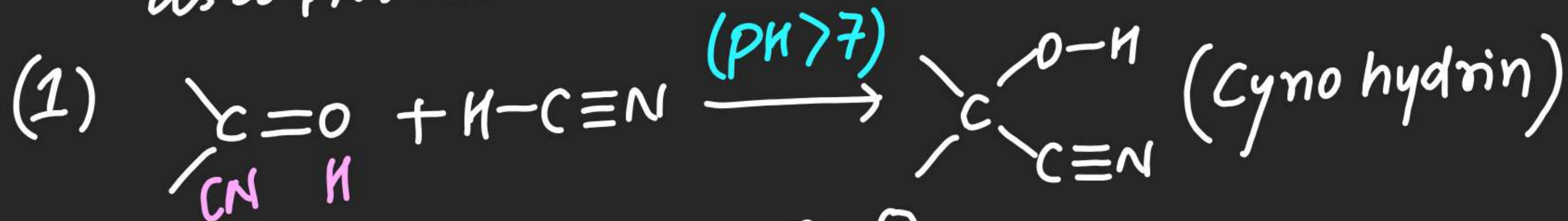




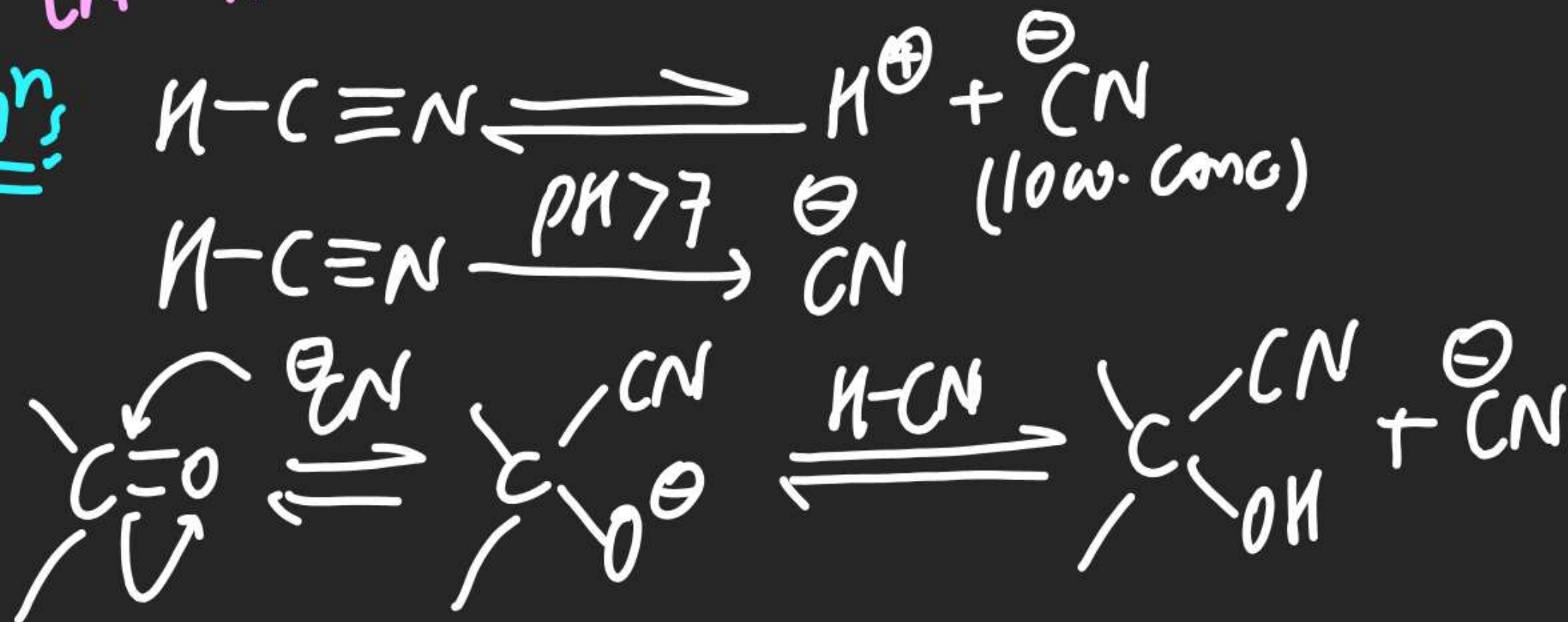


(#) Addition of HCN!

\Rightarrow $\text{C}=\text{O}$ Compound on Reaction with HCN gives Cyano hydrin as a product.

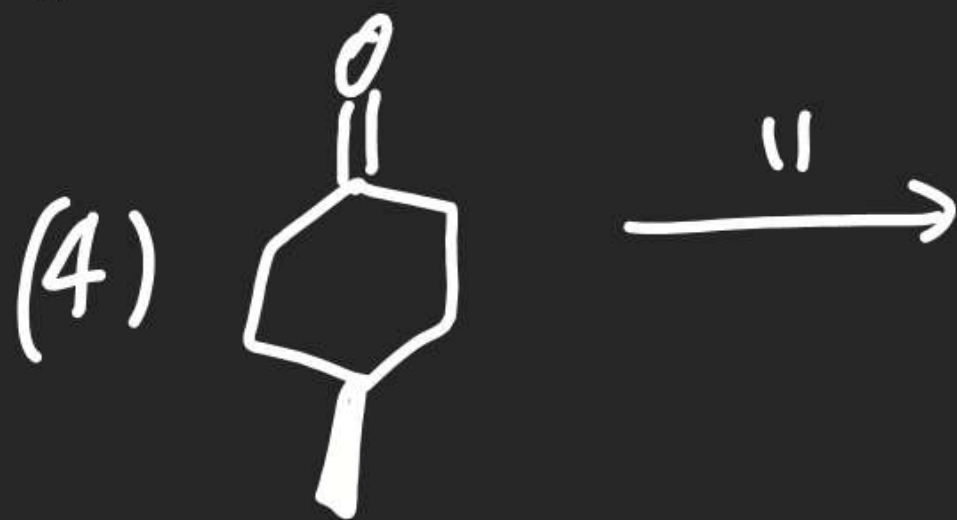


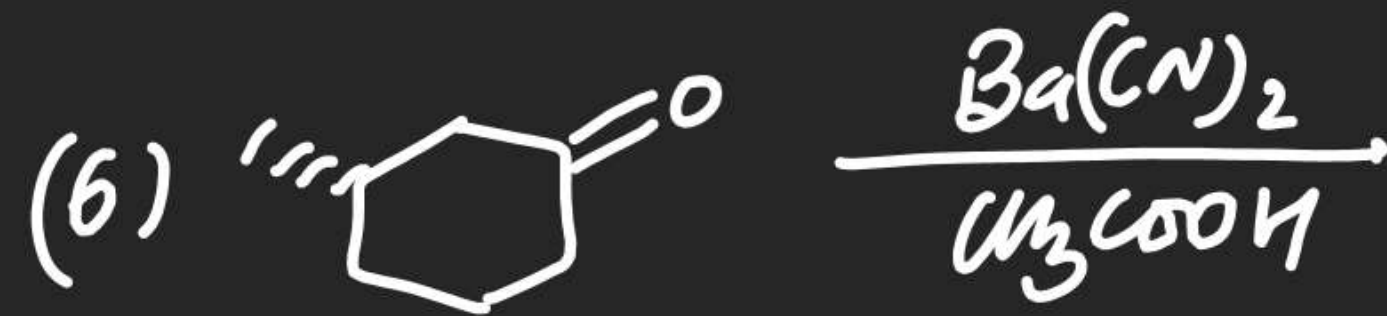
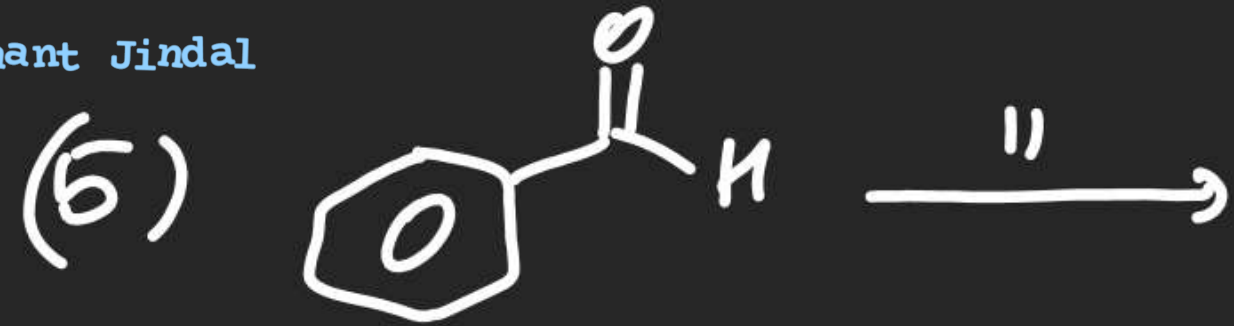
mechⁿ:



Note (i) Basic condⁿ (pH 7-7) is used

(ii) Sometimes salt of CN is also used.





(#) Addition of NaHSO_3 :-