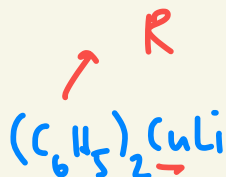
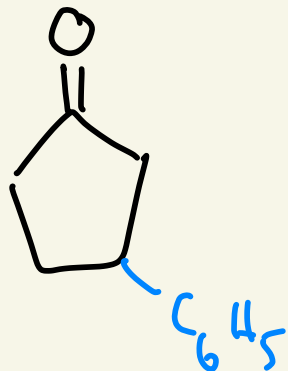
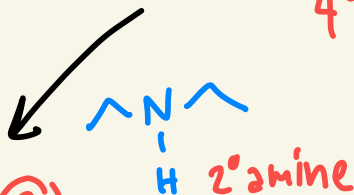
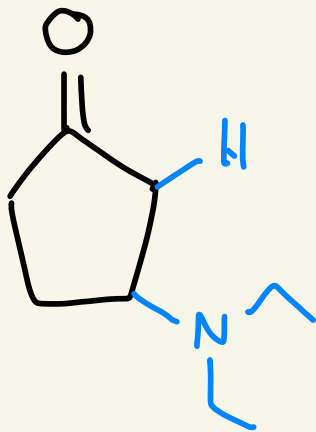
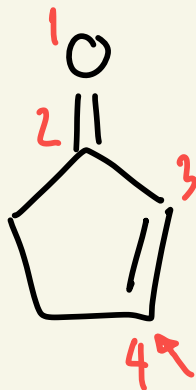


1,4-addition

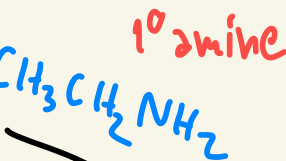
Class 2



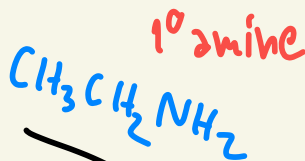
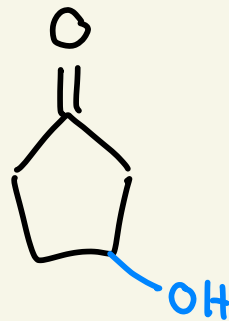
(1)



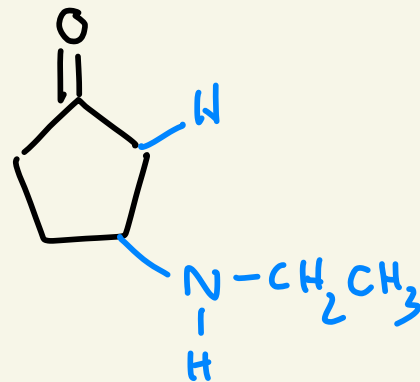
(3)



(2)



(4)



Michael reaction

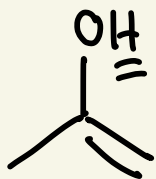
$\text{Nu}^- = \text{enolate}$

CO_3^{2-} carbonate

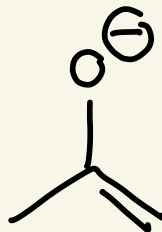
NO_3^-

SO_4^{2-}

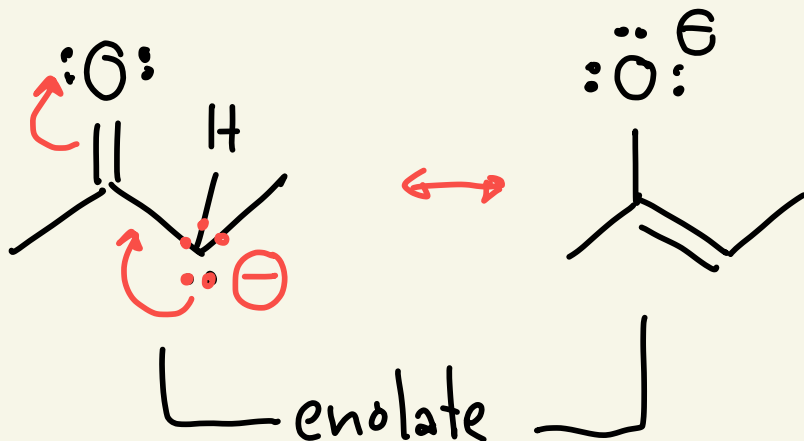
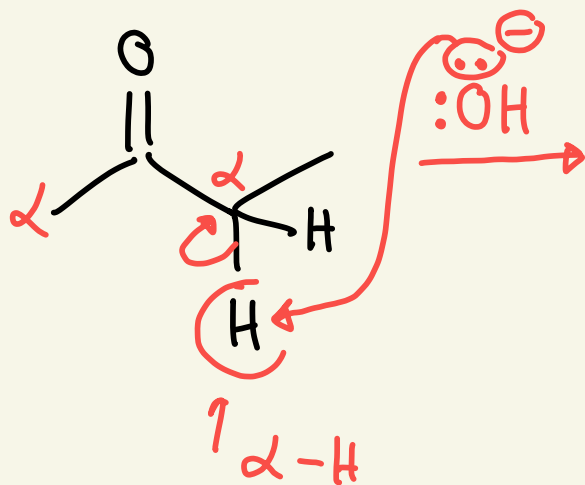
PG_3^{4-}



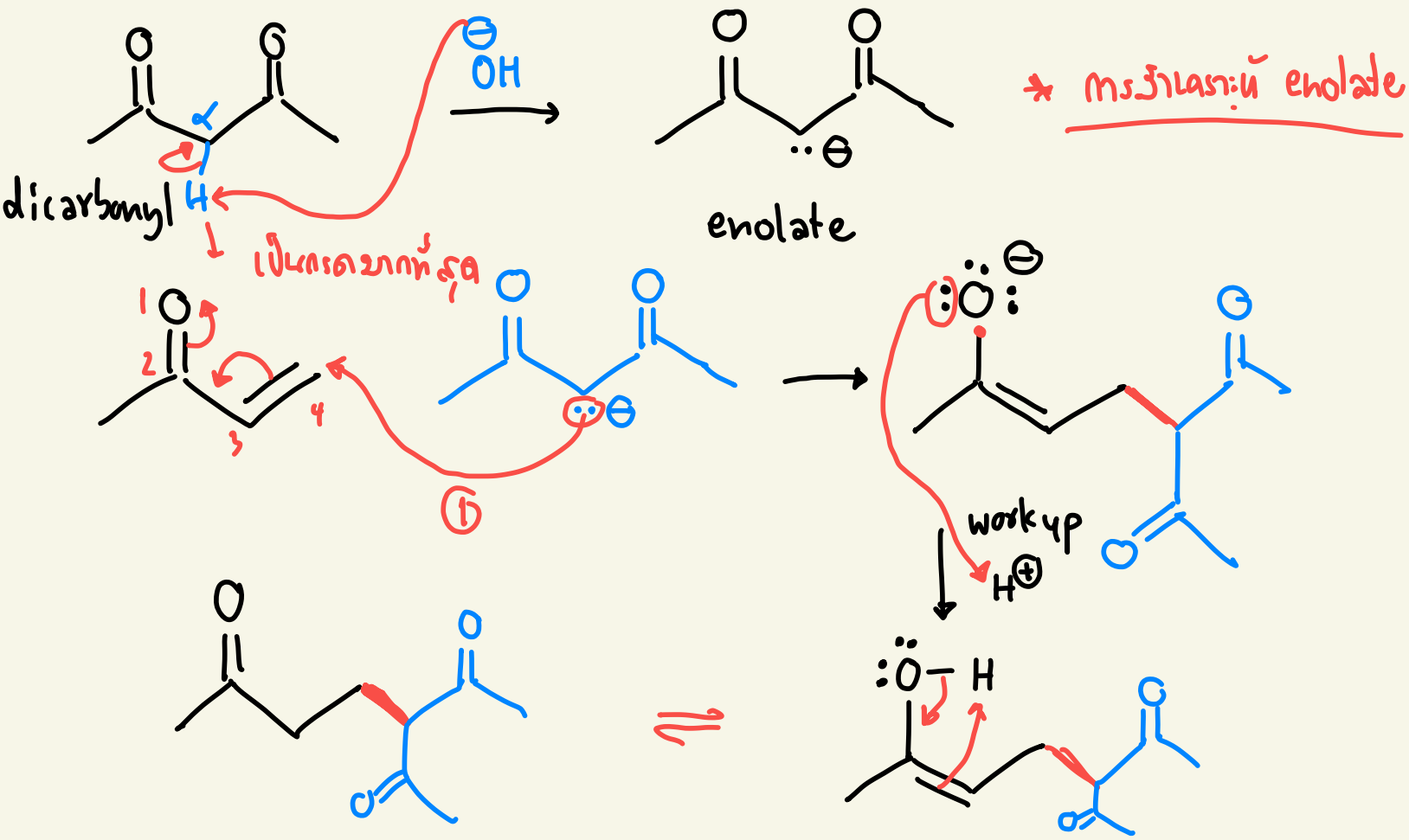
enol = ene + ol



→ enolate (vs: enol)



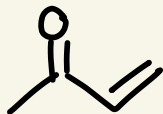
Michael reaction



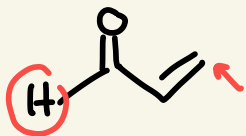
Michael receptor (α,β)

Nu

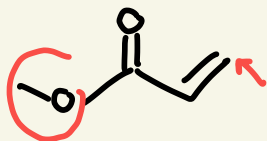
Conjugate



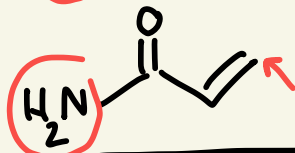
ketone



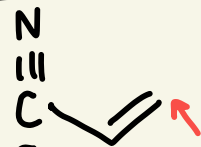
aldehyde



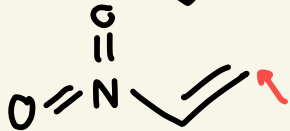
ester



amide



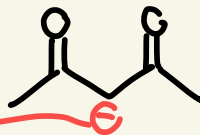
nitrile γ -unsat



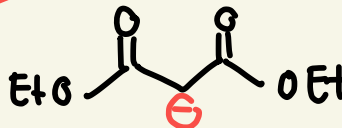
nitro γ -unsat

Michael donor (Nu)

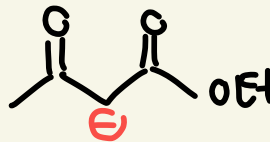
β -diketone



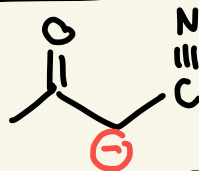
β -diester



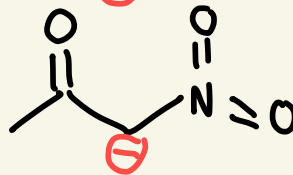
β -ketoester



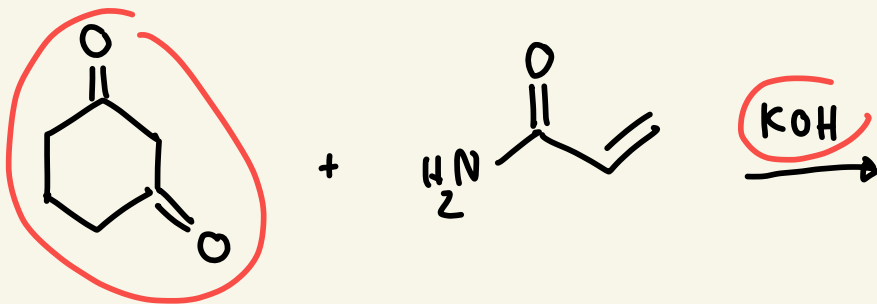
β -ketonitrile



β -ketonitro γ -unsat



Example.



① 3,4-dione enolate

② enolate 4' and 5.4

③ work up with H^+

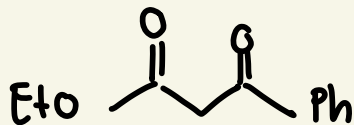
④ tautomerization

Practice

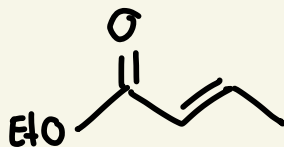
①



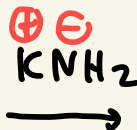
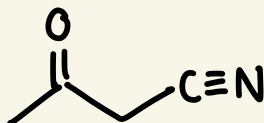
+



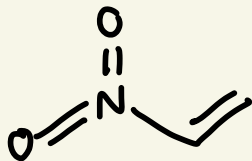
②



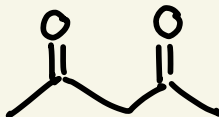
+

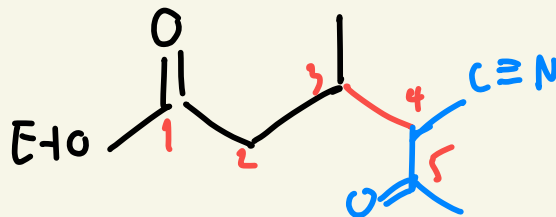
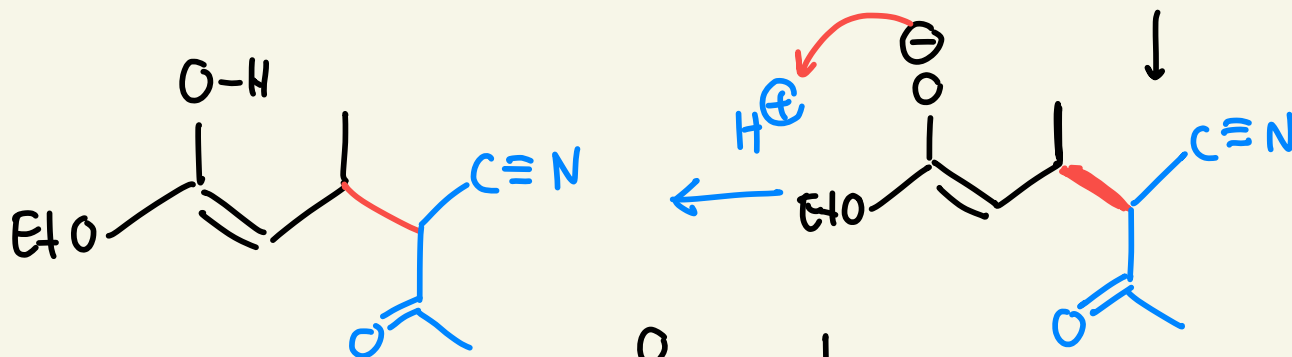
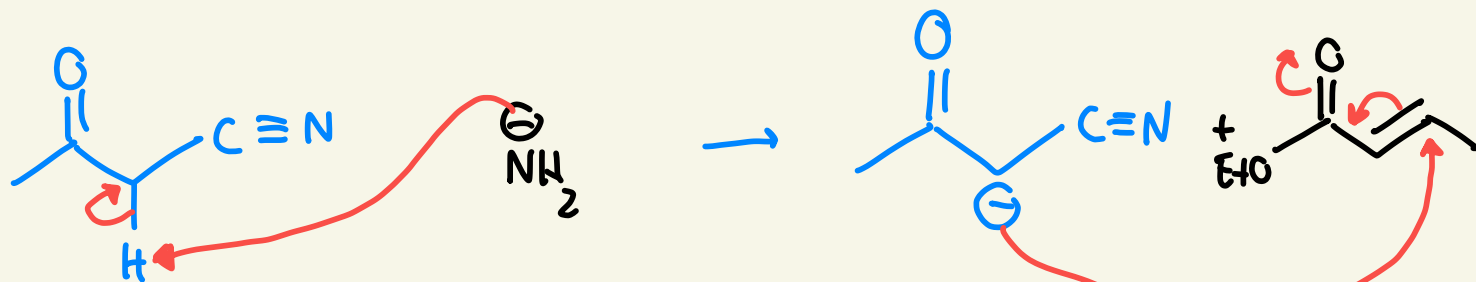
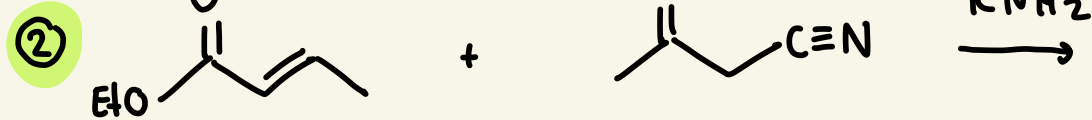


③

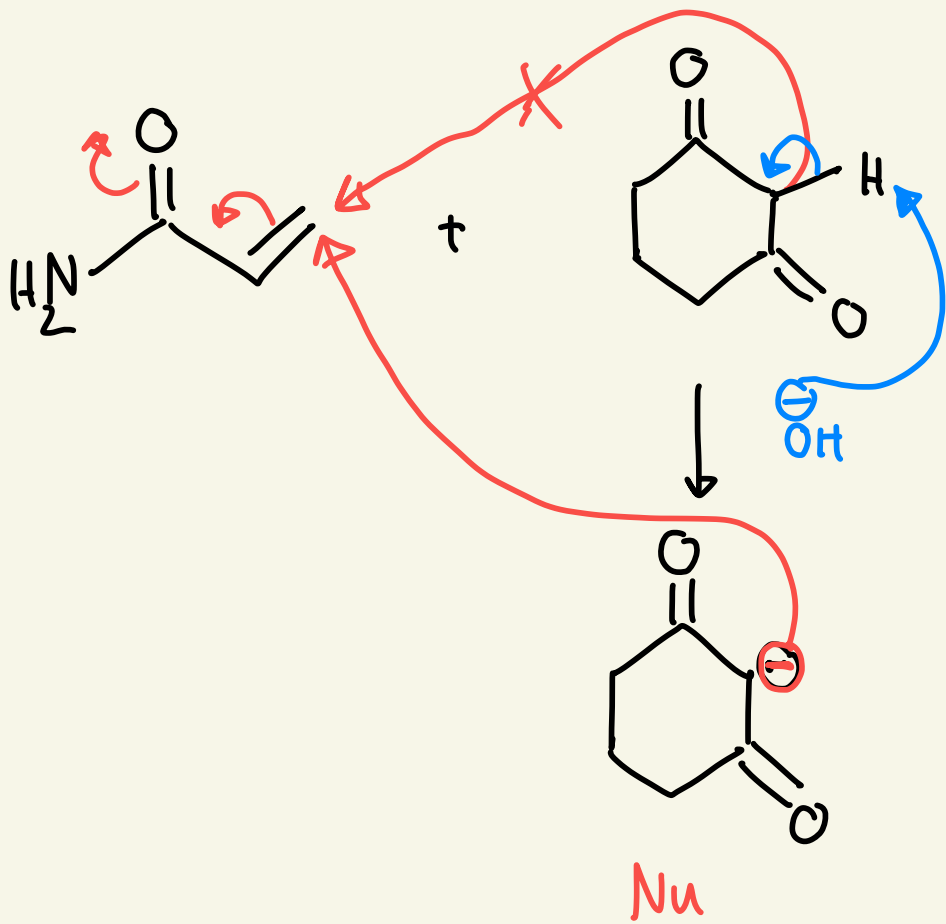


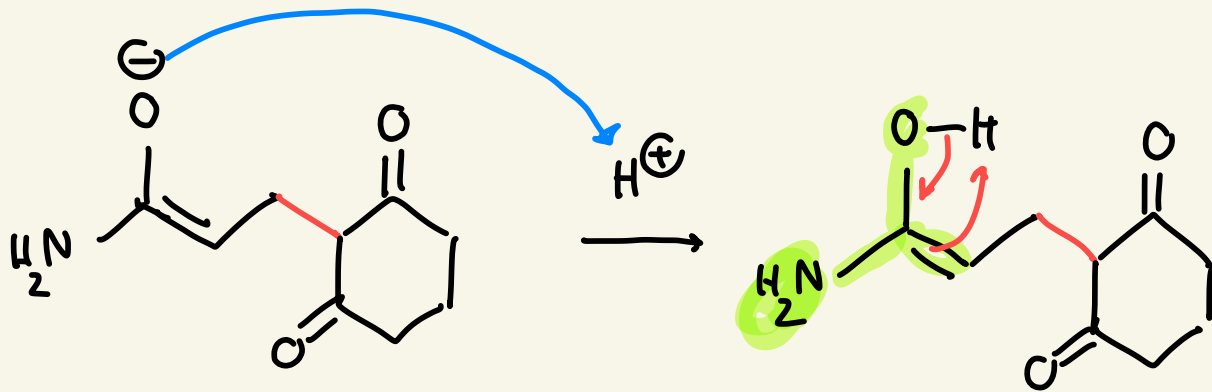
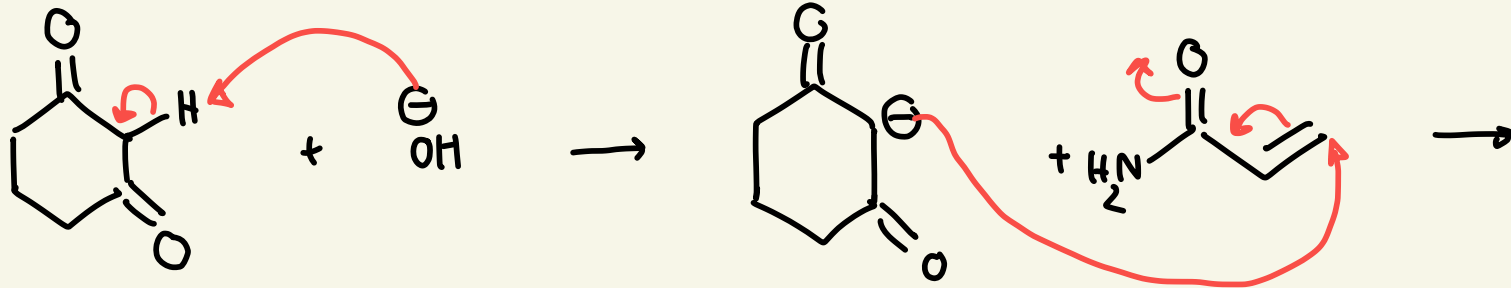
+



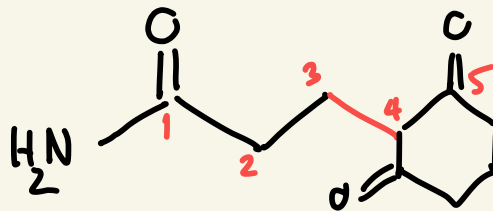


1,5-diketone





1L



1,5-dicarbonyl compound

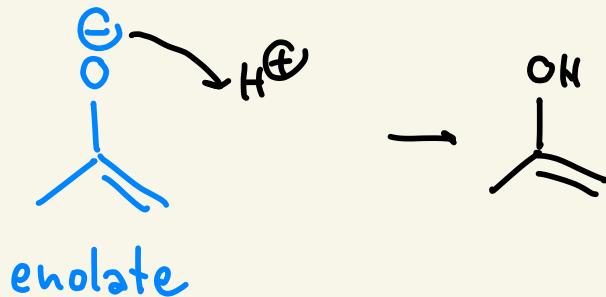
Stork reaction

Nu = enamine
↳ ene + amine

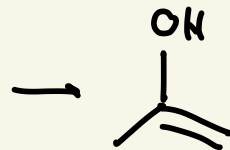


722157-7

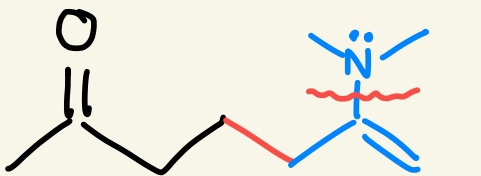
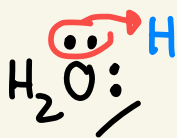
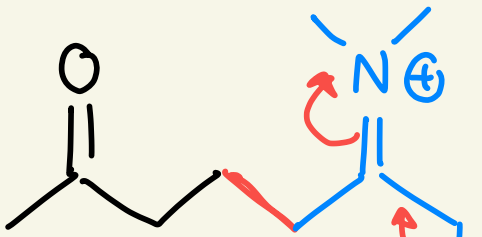
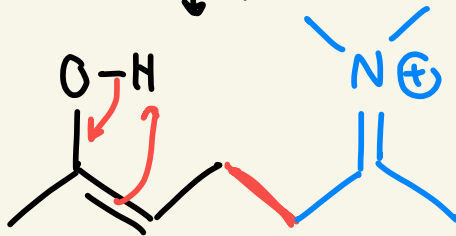
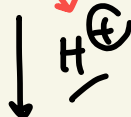
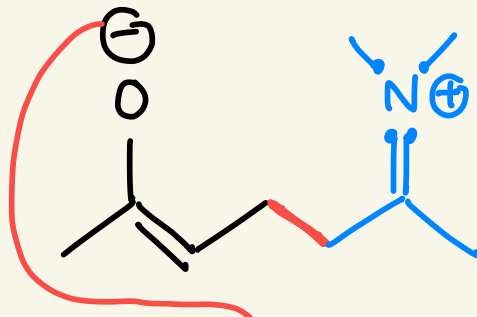
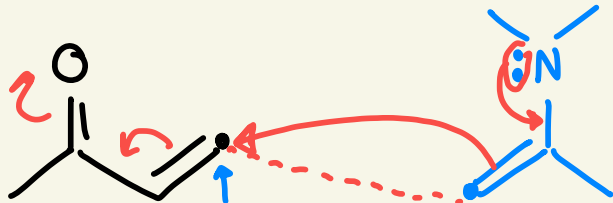
↓
722157-7



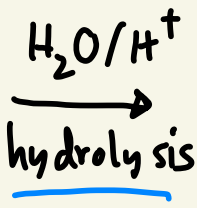
75-725



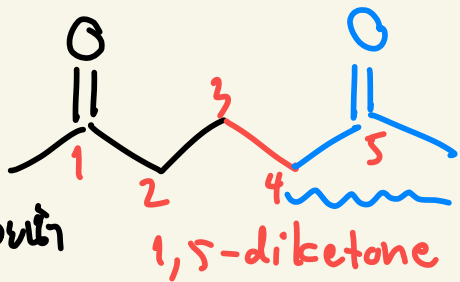
กลไก.



enamine



→ การตัดตัวน้ำ



1,5-diketone

