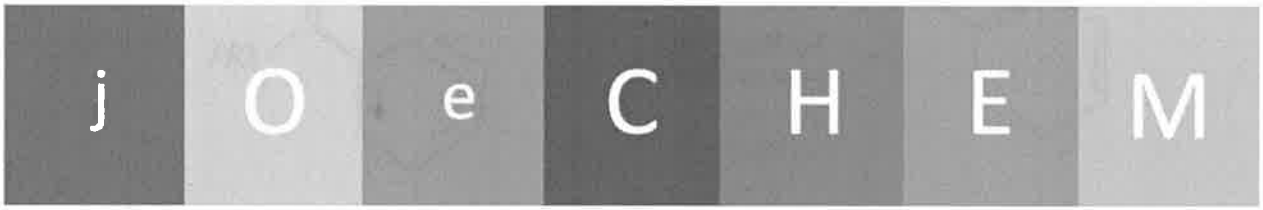
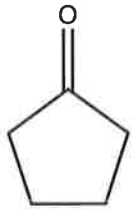
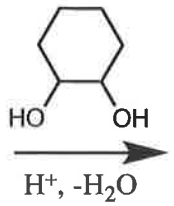
Organic Chemistry II

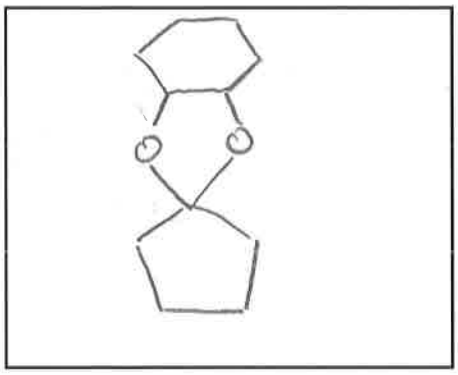
Exam 2

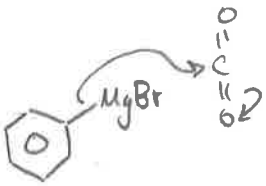


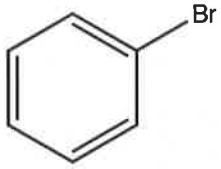
1.) The reactions below are shown missing their **final product**. For each problem below, correctly predict the final product. If you believe no product is formed/no reaction occurs, write "**NR**".



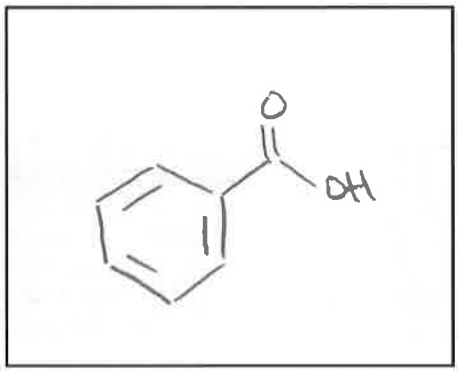




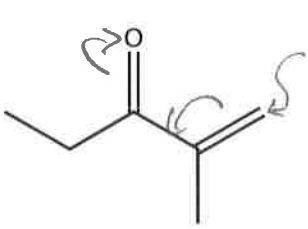




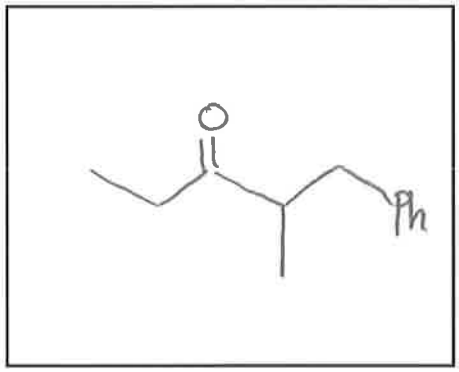
1.) Mg, THF
2.) CO_2
3.) H_3O^+



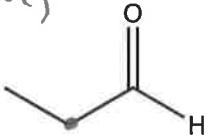
Cuprates attack once



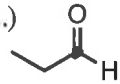
$(Ph)_2CuLi$

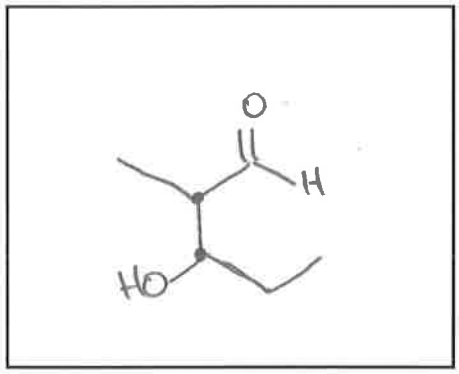


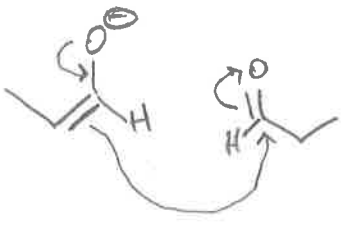
(Homo-aldol rxn)



1.) LDA
2.)



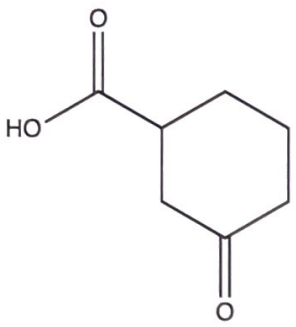




Acid-Base

VS

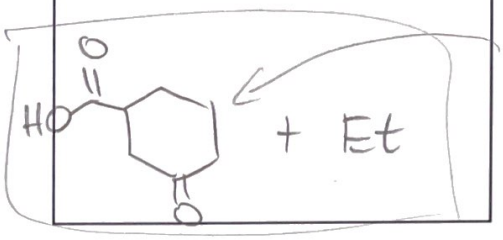
~~attack ketone~~



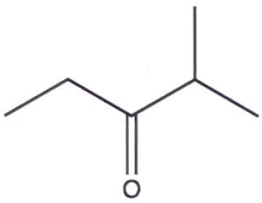
1.) EtMgBr

2.) H_3O^+

NR OR



Reprotonated in step 2

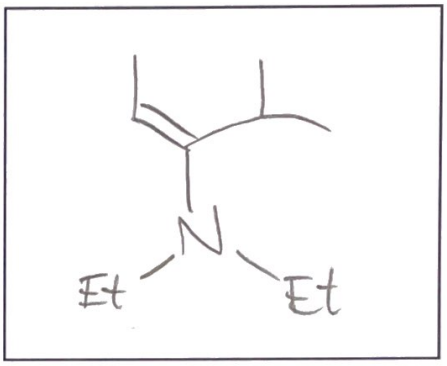


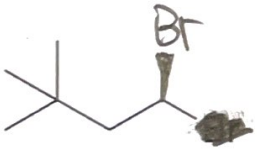
Et, Et

N

H

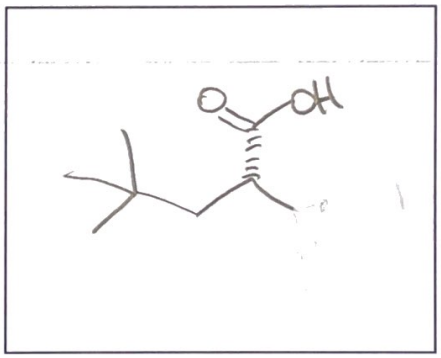
H^+, $-H_2O$

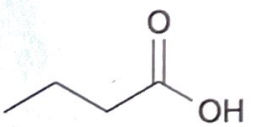




1.) KCN

2.) H_3O^+



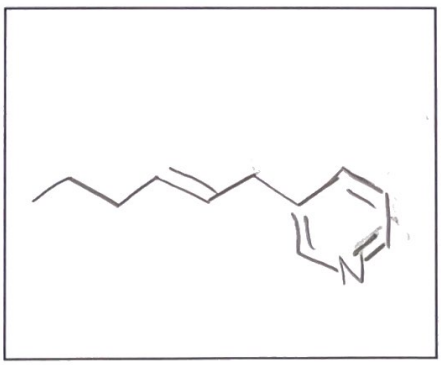


1.) $LiAlH_4$

2.) H_3O^+

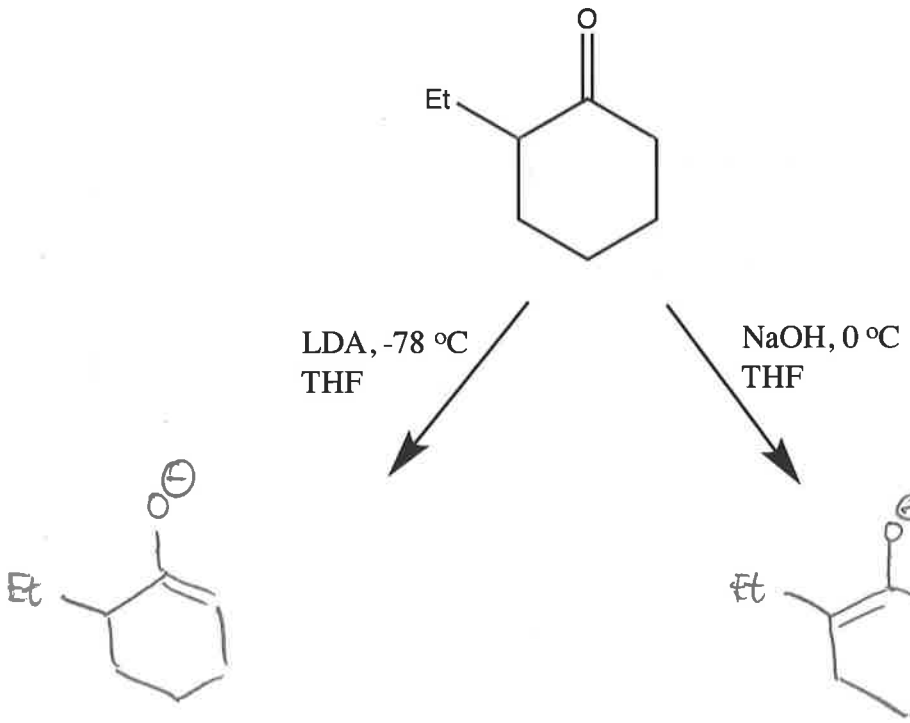
3.) PCC

4.) Ph_3P



E double bond

2.) In a lab setting, the 2-ethylcyclohexanone species below is subjected to two different types of environments/conditions to produce enolates. Correctly predict the 2 enolates produced in the reactions below, and label each one as either a **Thermodynamic** or **Kinetic** enolate.



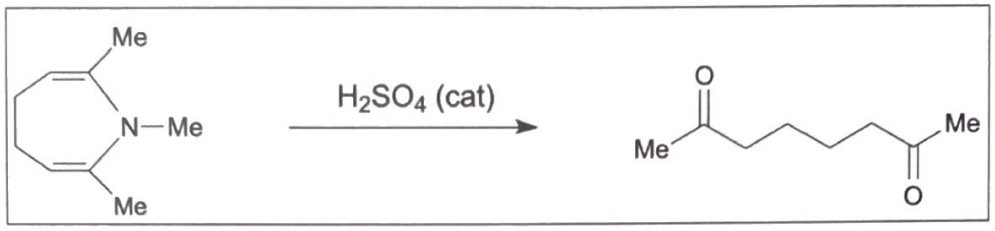
Kinetic

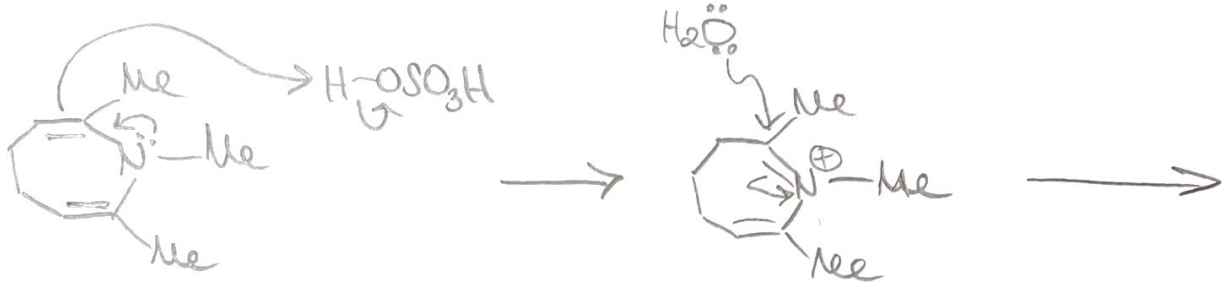
Big, bulky base grabs more accessible alpha proton (less steric hindrance).

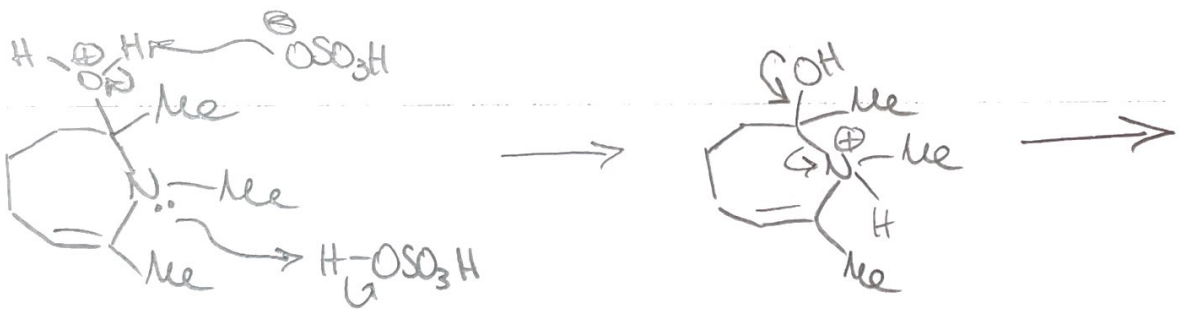
Thermodynamic

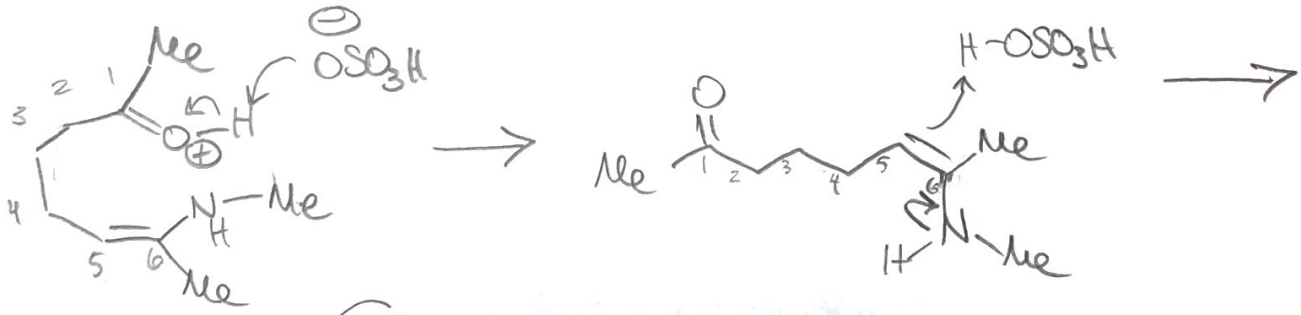
Smaller base grabs alpha proton to form more substituted double bond.

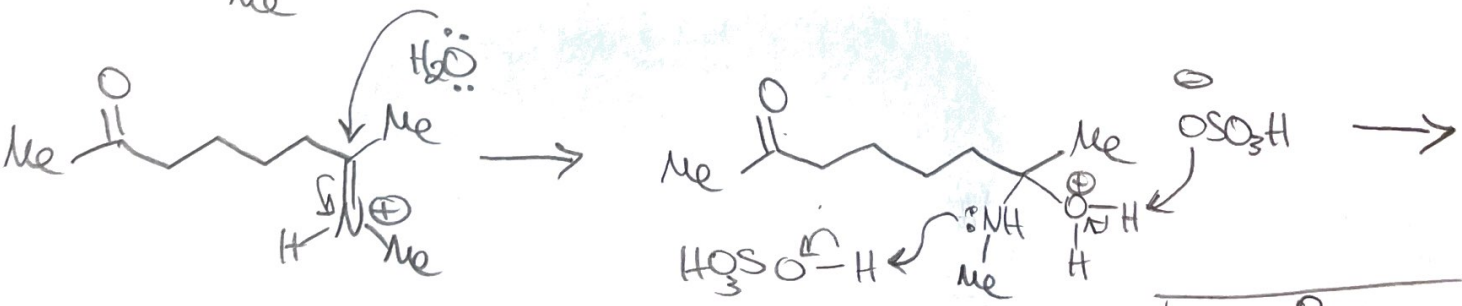
3.) Given the following reaction below, draw the full arrow pushing mechanism.

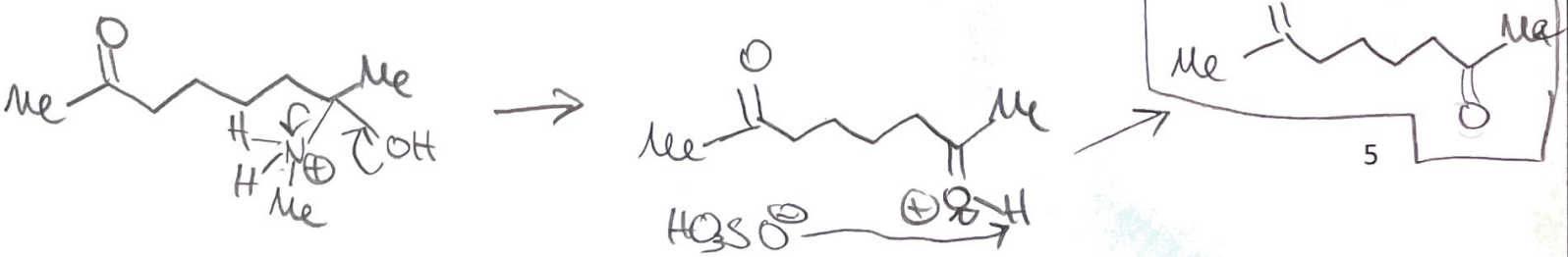




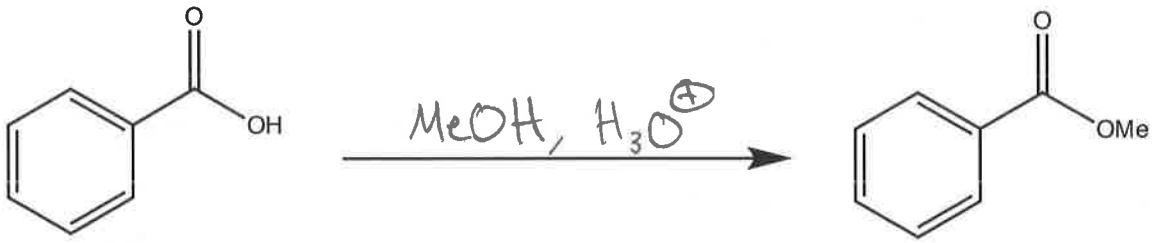


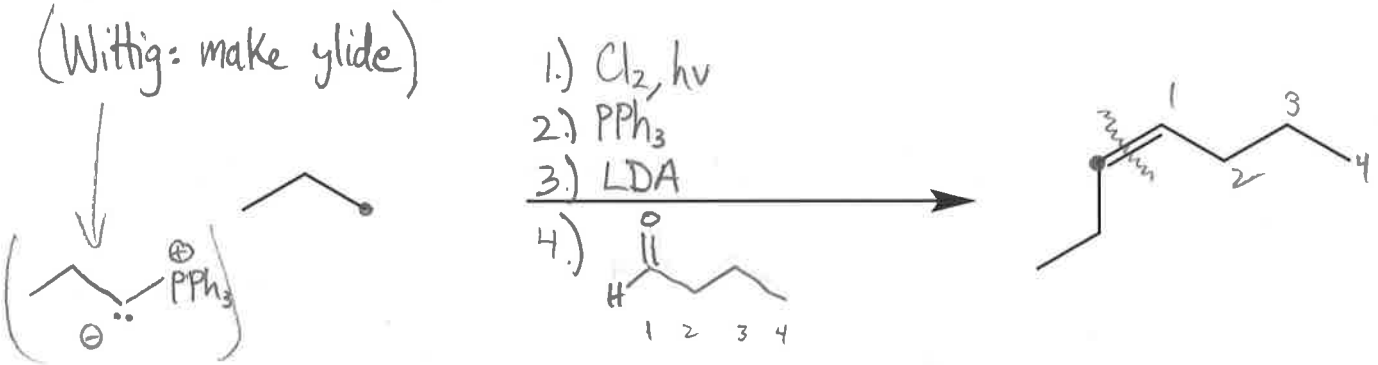


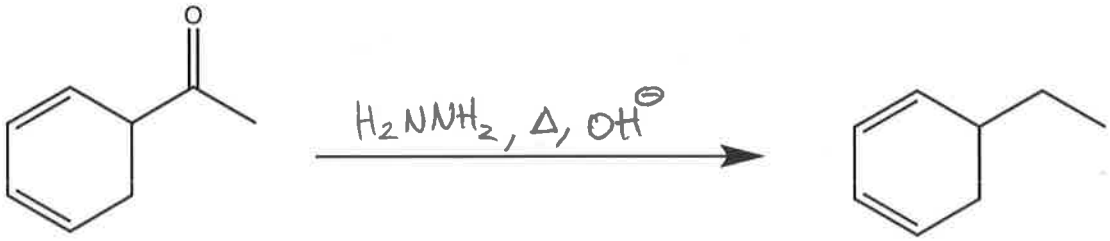


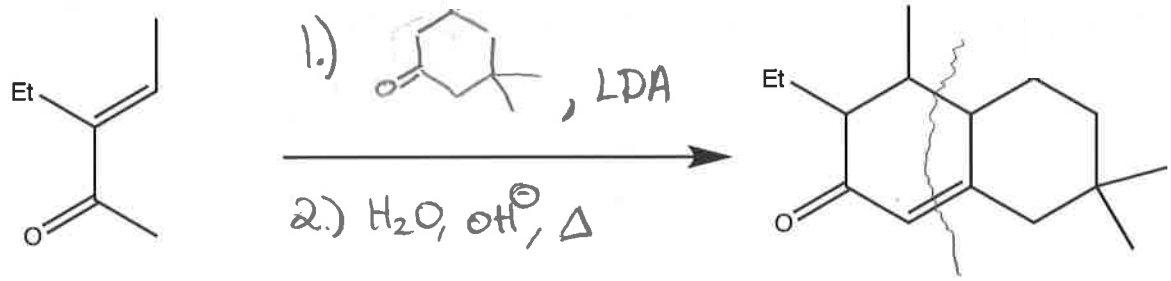


4.) Below various reactants and products are shown. In each reaction, provide the necessary reagents to make the given transformations occur.
Note: The reactions can possibly require multi-step reagents.



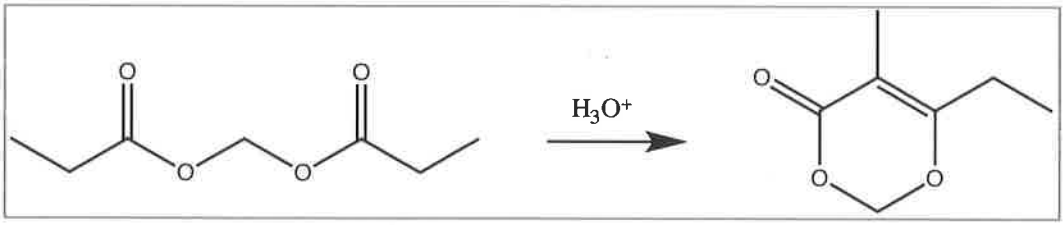


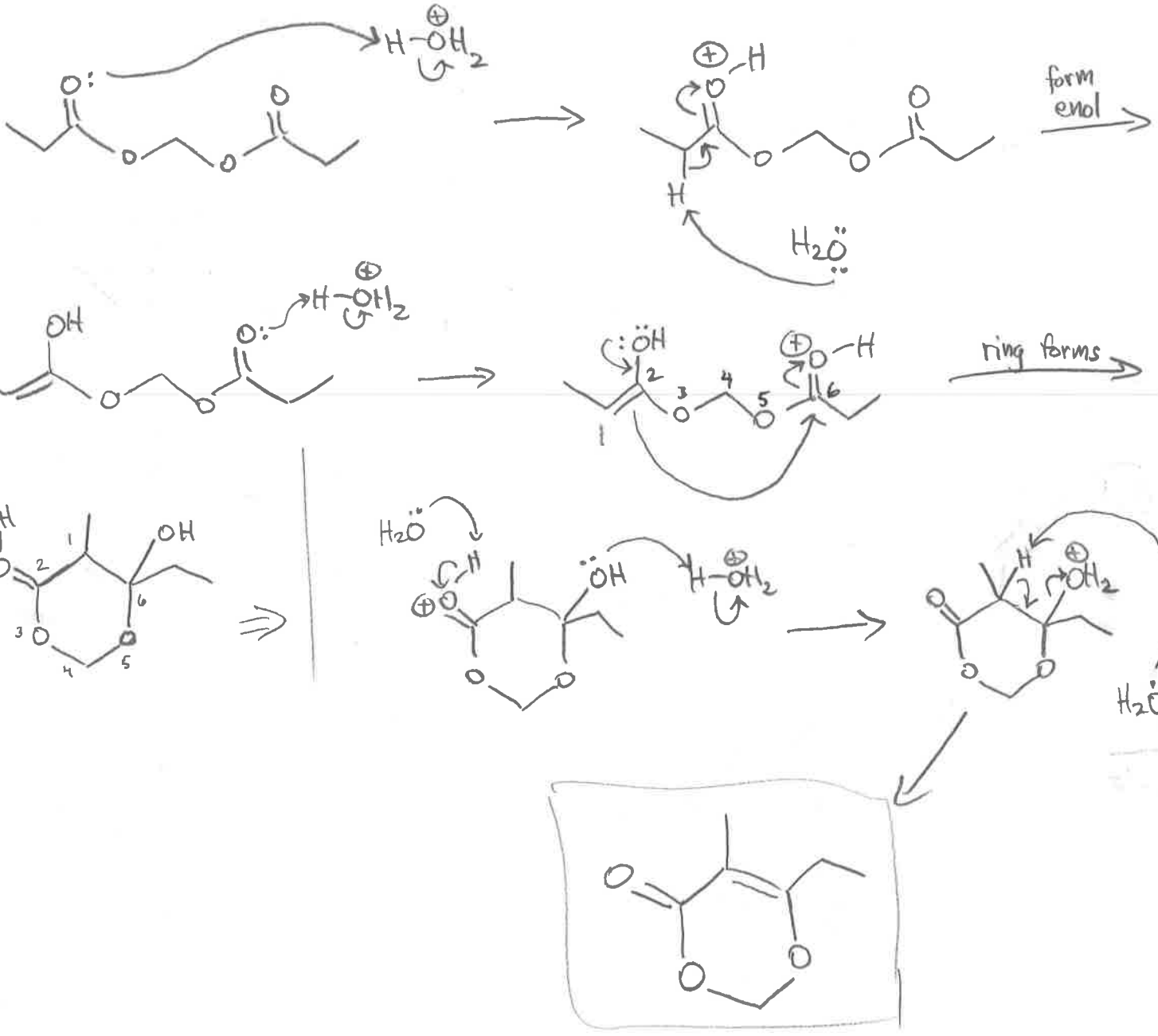




Aldol condensation w/ enol

5.) Given the reaction below, draw the full arrow pushing mechanism. (intramolecularly)

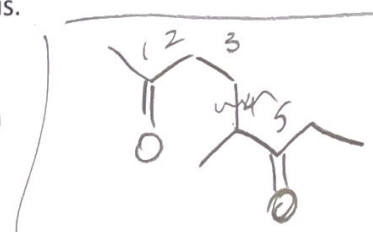




1,5-dicarbonyl ⇒ Michael Addition

6.) Given the target molecule pictured below on the **right hand side** of the page, provide an efficient synthesis using only methanol and 2-butanol as your carbon sources. You may use whatever inorganic reagents to achieve the synthesis.

(9)



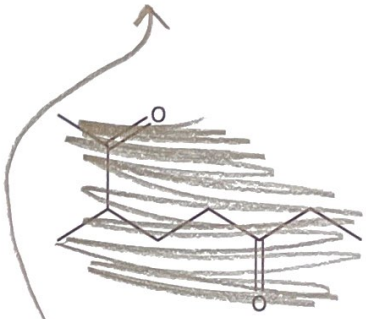
(4) ⇒ (2) OH

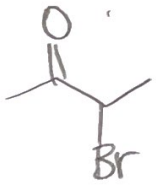
(1) ⇒ (1) CH_3OH

PBr_3

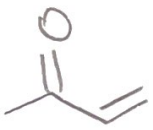
LDA
-78°C
THF

$Br_2, h\nu, \Delta$





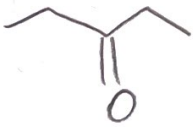
LDA



+

CH_3Br +

[SN2]



LDA

(optional: -78°C, THF)