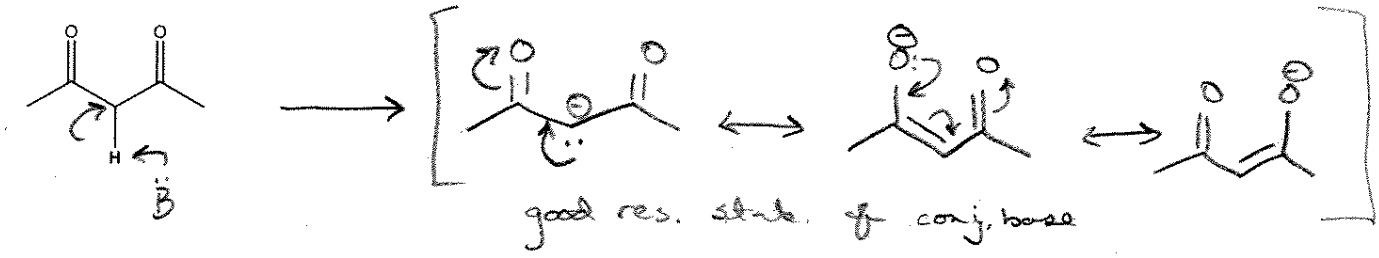
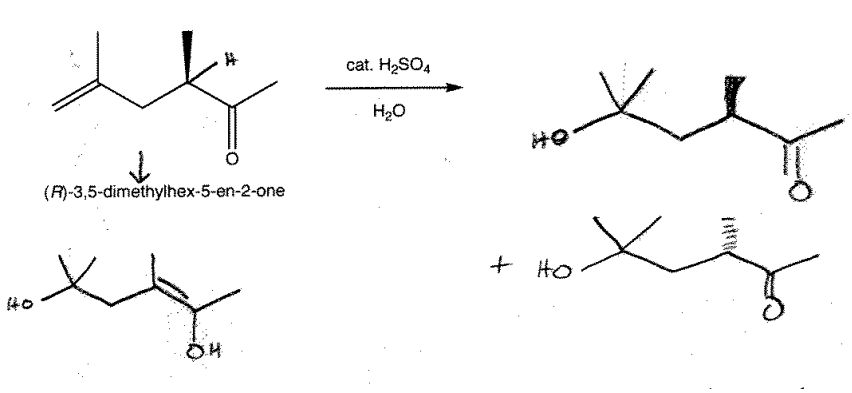
Enol & Enolate Chemistry 1 KEY

1. Briefly explain (with structures) why the indicated hydrogen has a very low pK_a of approximately 9. Most α hydrogens have a $pK_a \sim 19$.

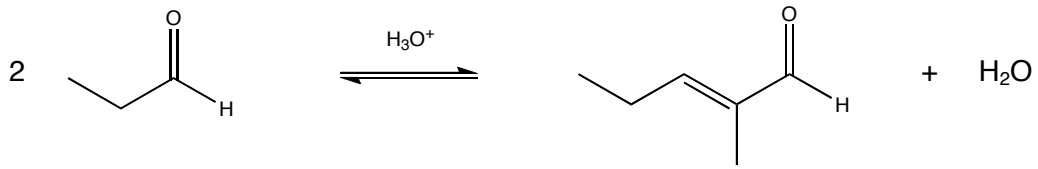


2. The reaction below leads to a racemic mixture of 5-hydroxy-3,5-dimethylhexan-2-one stereoisomers. Give the structures of this enantiomeric pair. Briefly explain the loss of stereochemistry (a structure will help).



In addition to the addition of H_2O to the DB, the enol can form that includes the stereocenter; upon tautomerization, both configurations are possible.

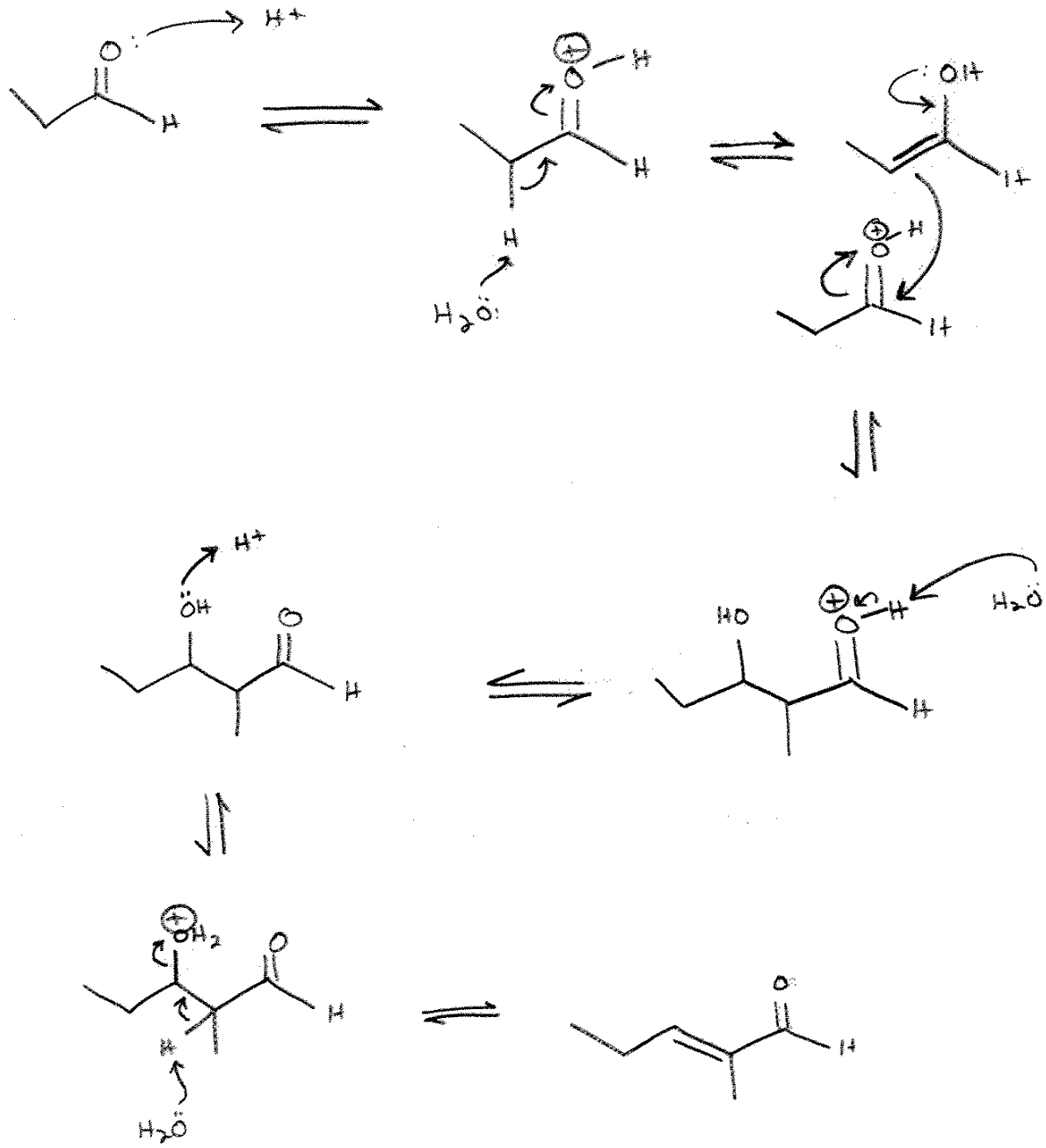
3. Give a complete arrow-pushing mechanism for the following reaction. All of the steps are fully reversible. Briefly explain why the reaction equilibrium lies far to the right.



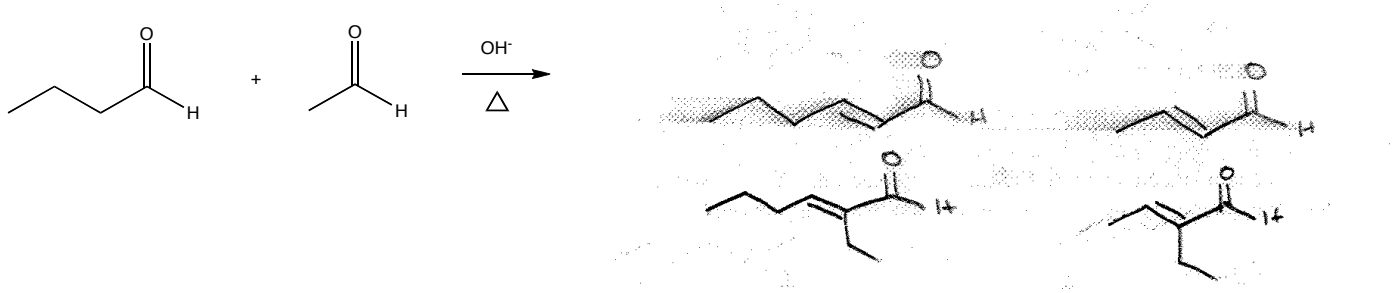
Please complete on a separate sheet.

Mechanism on the following pages.

#3 (mechanism)

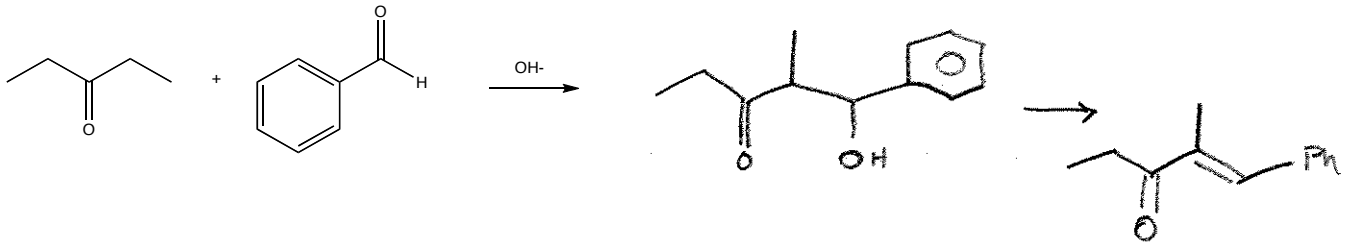


4. Give the structures of all of the possible aldol *condensation* products of the following reaction:

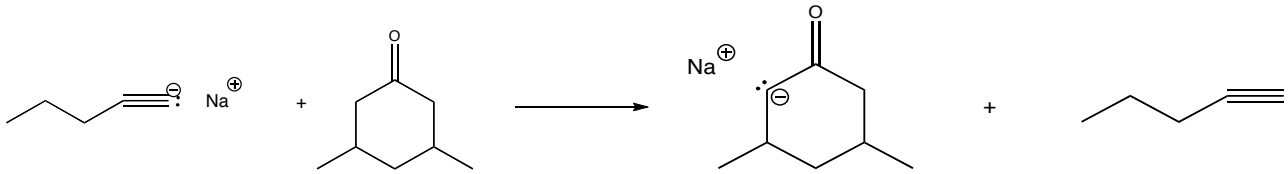


5. Predict the product(s) for the following reactions:

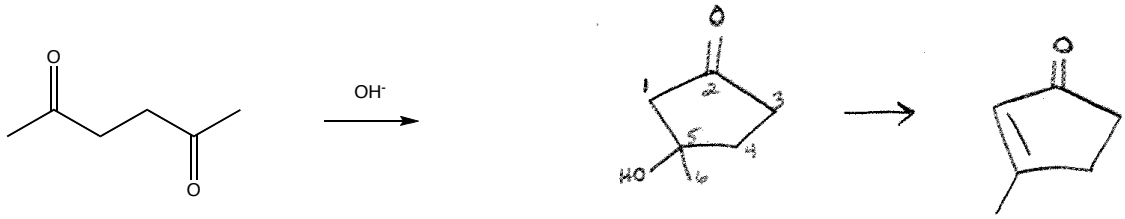
A)



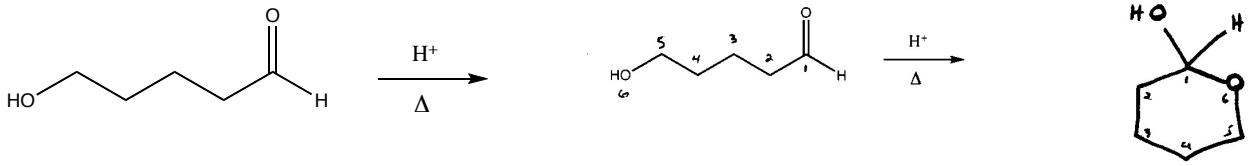
B)

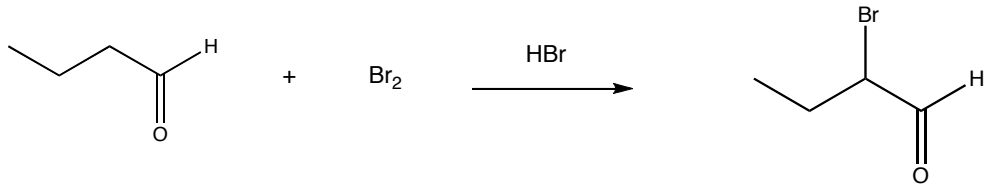


C)

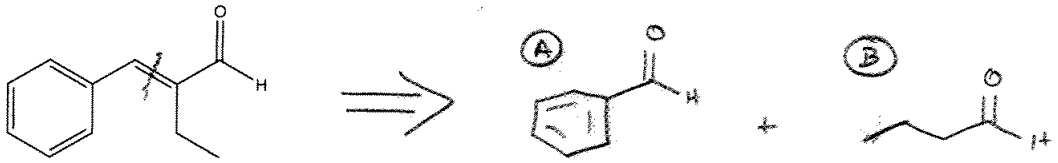


D)



E) 

6. Suggest starting materials and a reaction scheme (be as specific as possible) for the formation of the following product in good yield with only a small percent of possible side products. You may use aldehydes as your only source of carbon atoms, but you may use any other reagents, solvents, or conditions necessary.



Put aldehyde (A) into a strongly basic (OH^-) solution & slowly add aldehyde (B).