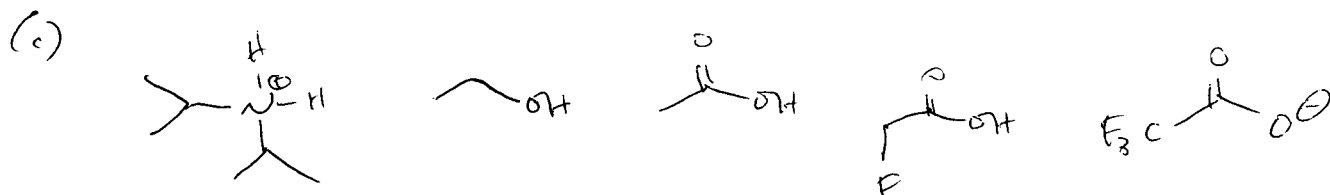
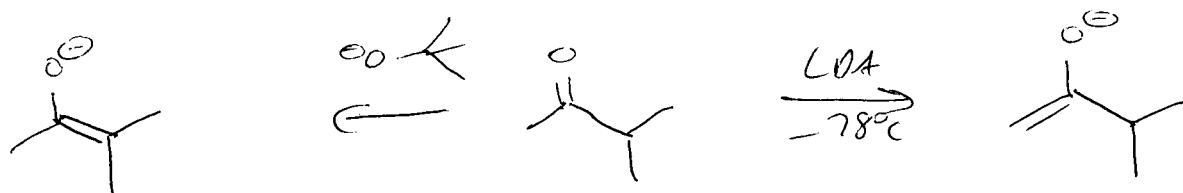


# Practice Exam 3 - Answers

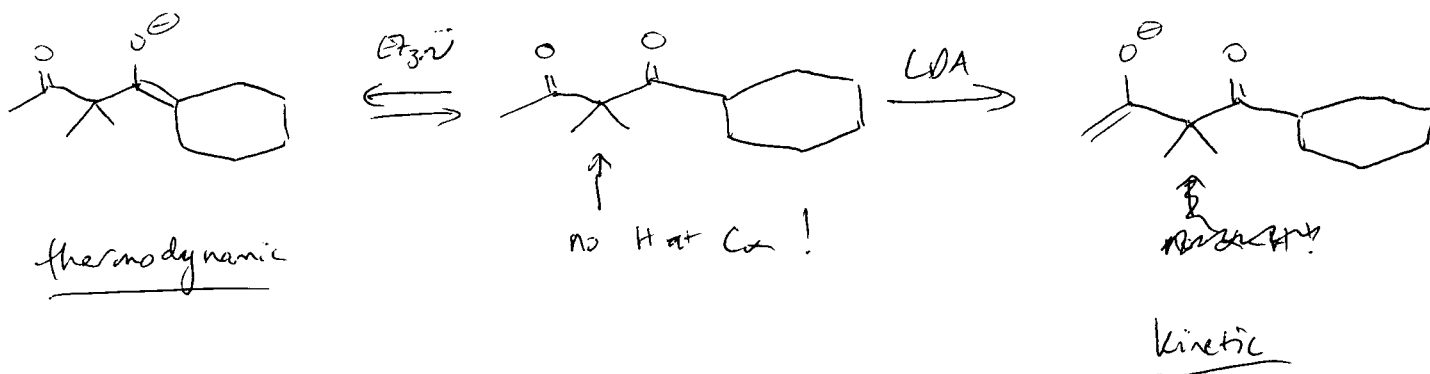
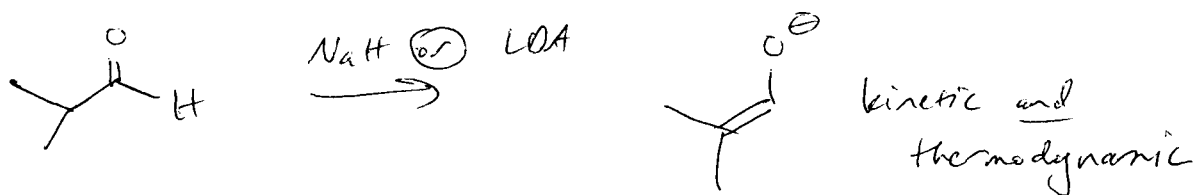


2.

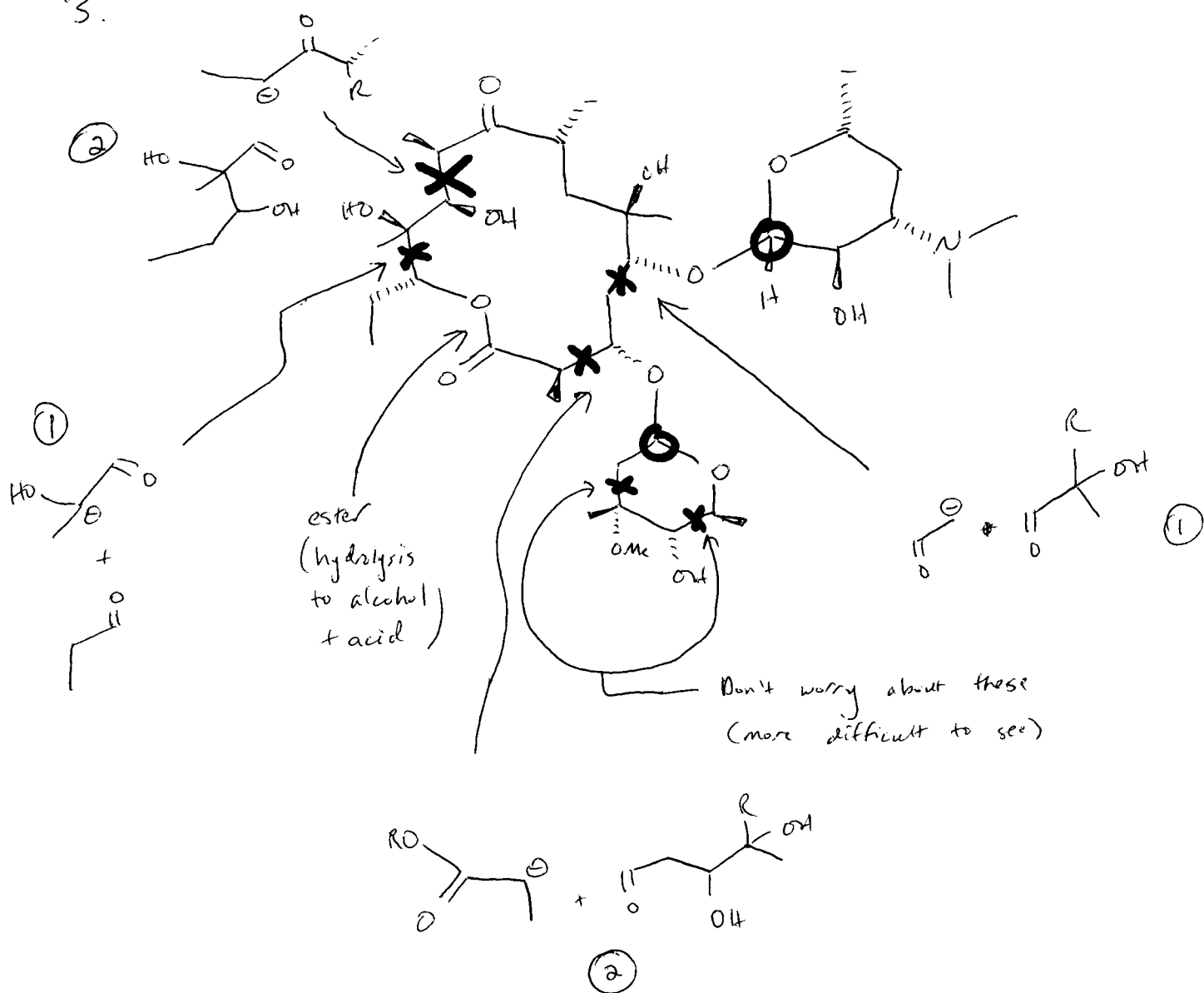


thermodynamic  
most substituted  
enolate = most stable  
(equilibrium conditions!)

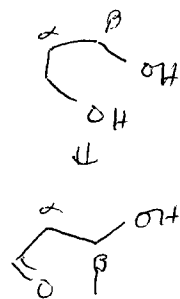
Kinetic  
least sterically hindered  
is removed fastest



3.

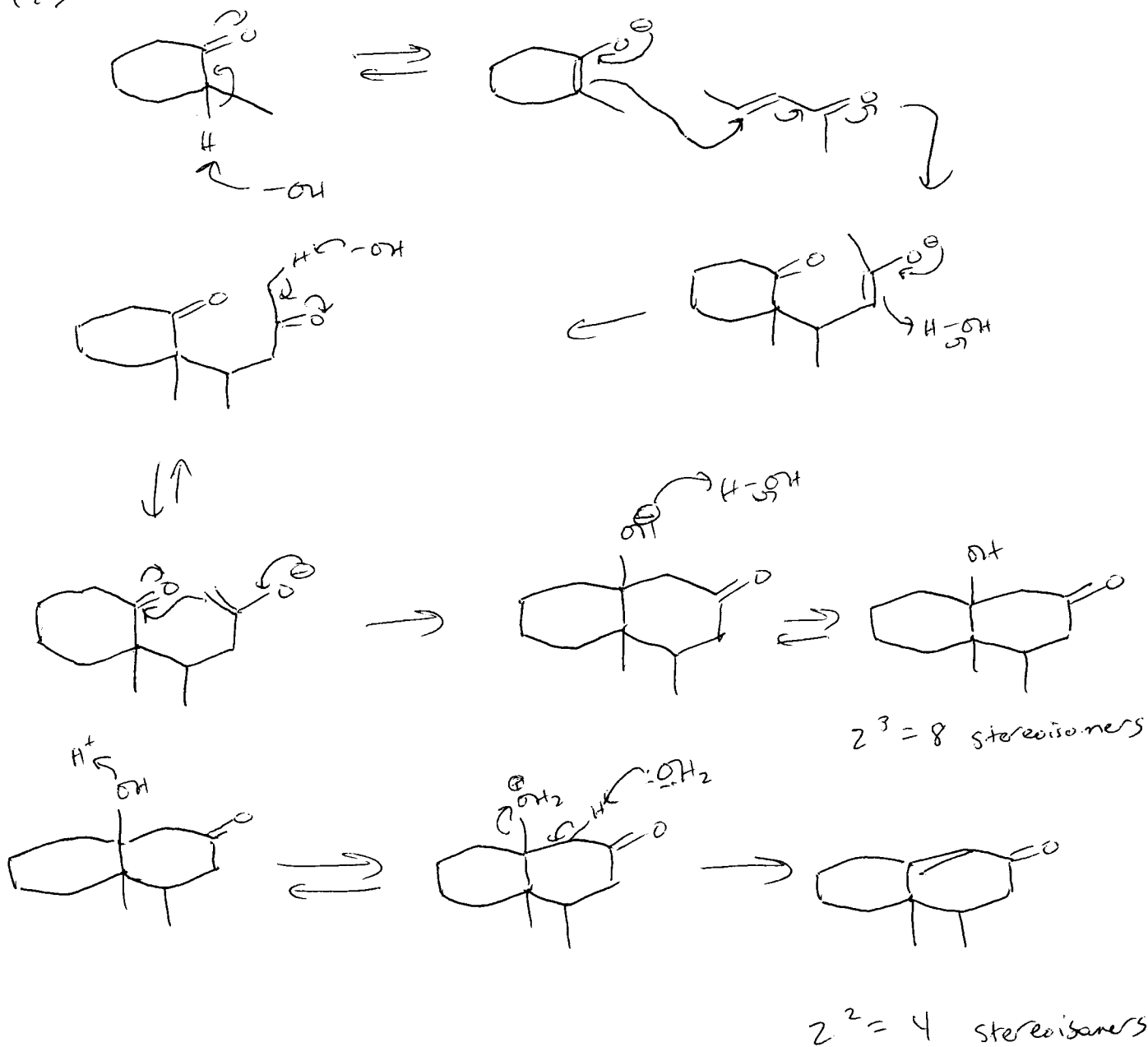


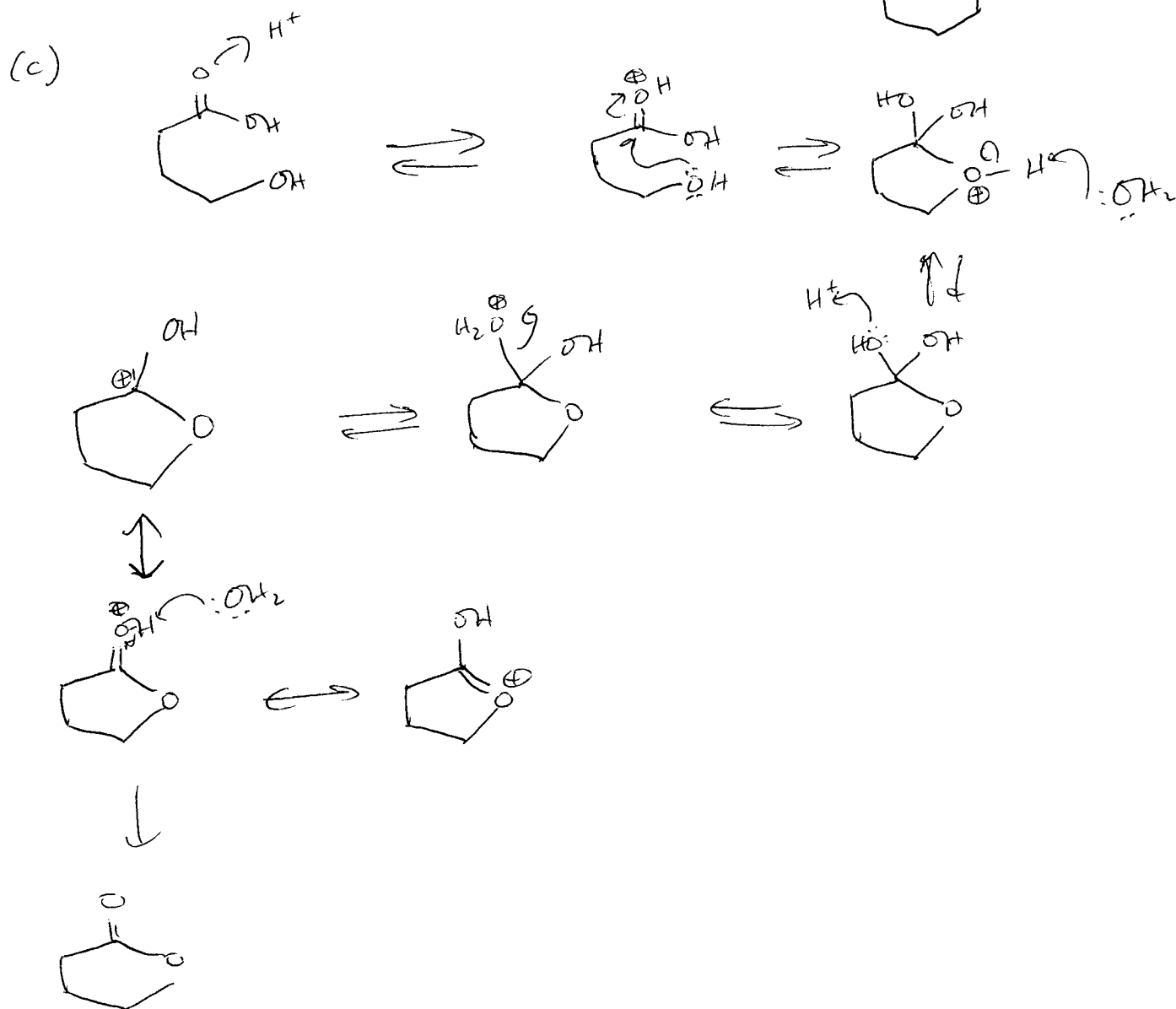
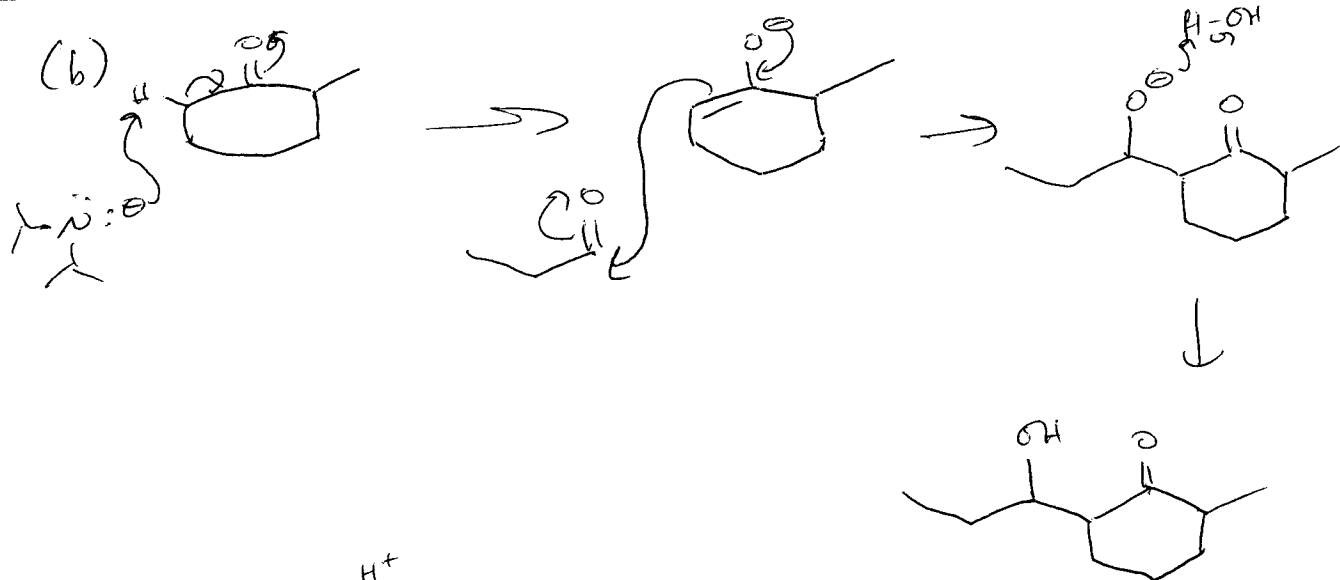
Note: This is more difficult than a CHEM 322 exam question (though doable for a CHEM 322 student!). But... you should be able to see aldo/ construction signs ( $\alpha, \beta$ -unsat.  $C=O$  ;  $\beta$ -OH  $C=O$  ;



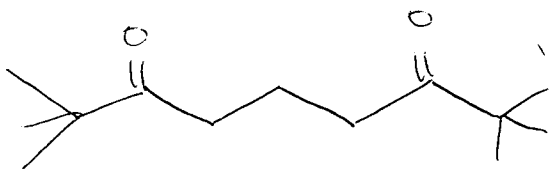
4. (a) Resonance  
 (b) Equilibrium  
 (c) Equilibrium  
 (d) Equilibrium and enantiomers
- 

5. (a)

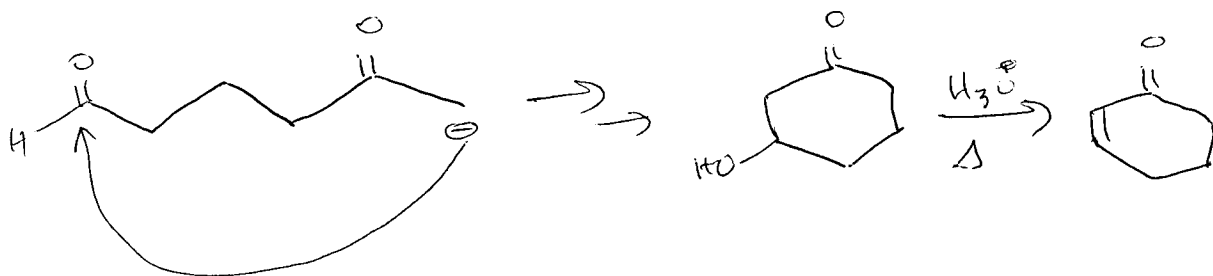




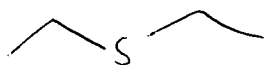
6. (a)



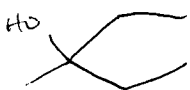
(b)



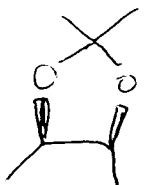
(c)



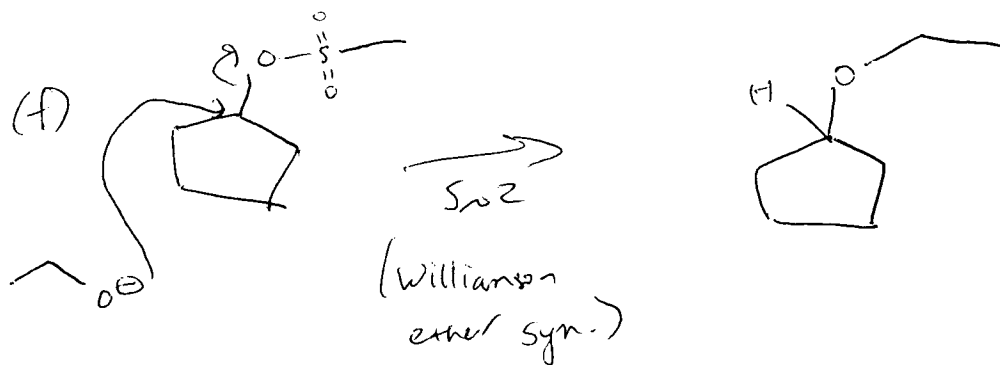
(d)



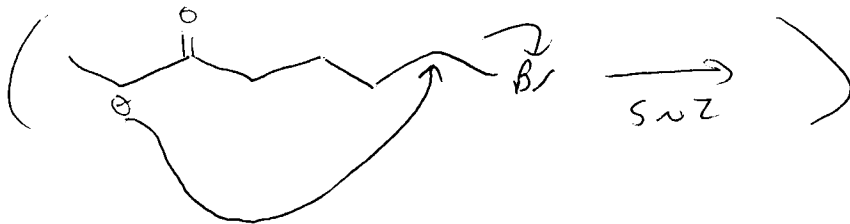
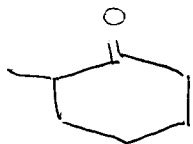
(e)



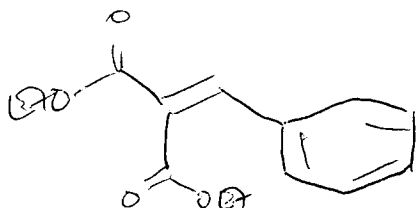
(f)



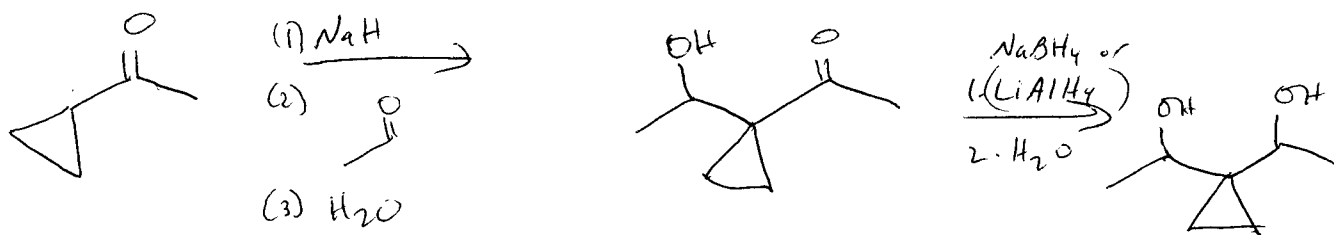
(g)



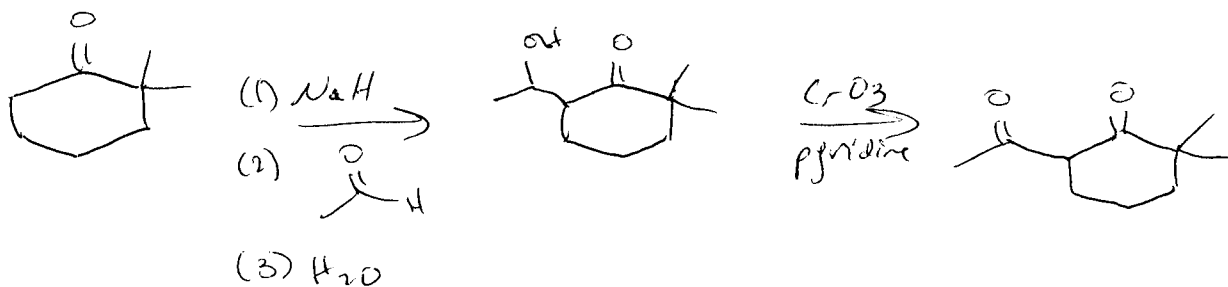
(h)



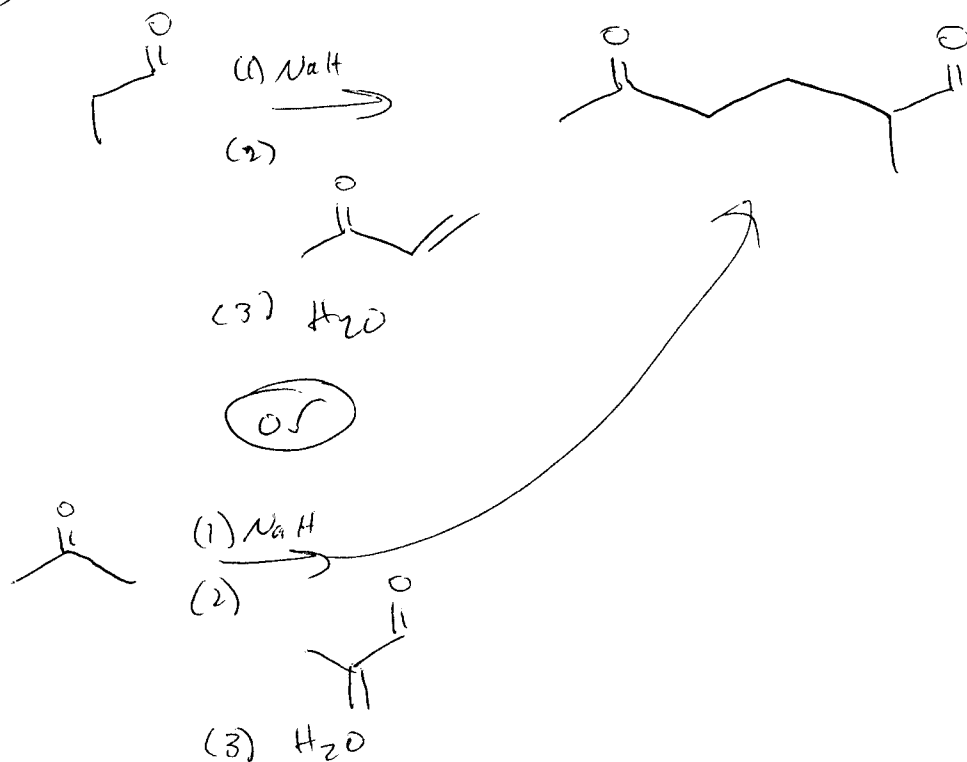
7.(a)



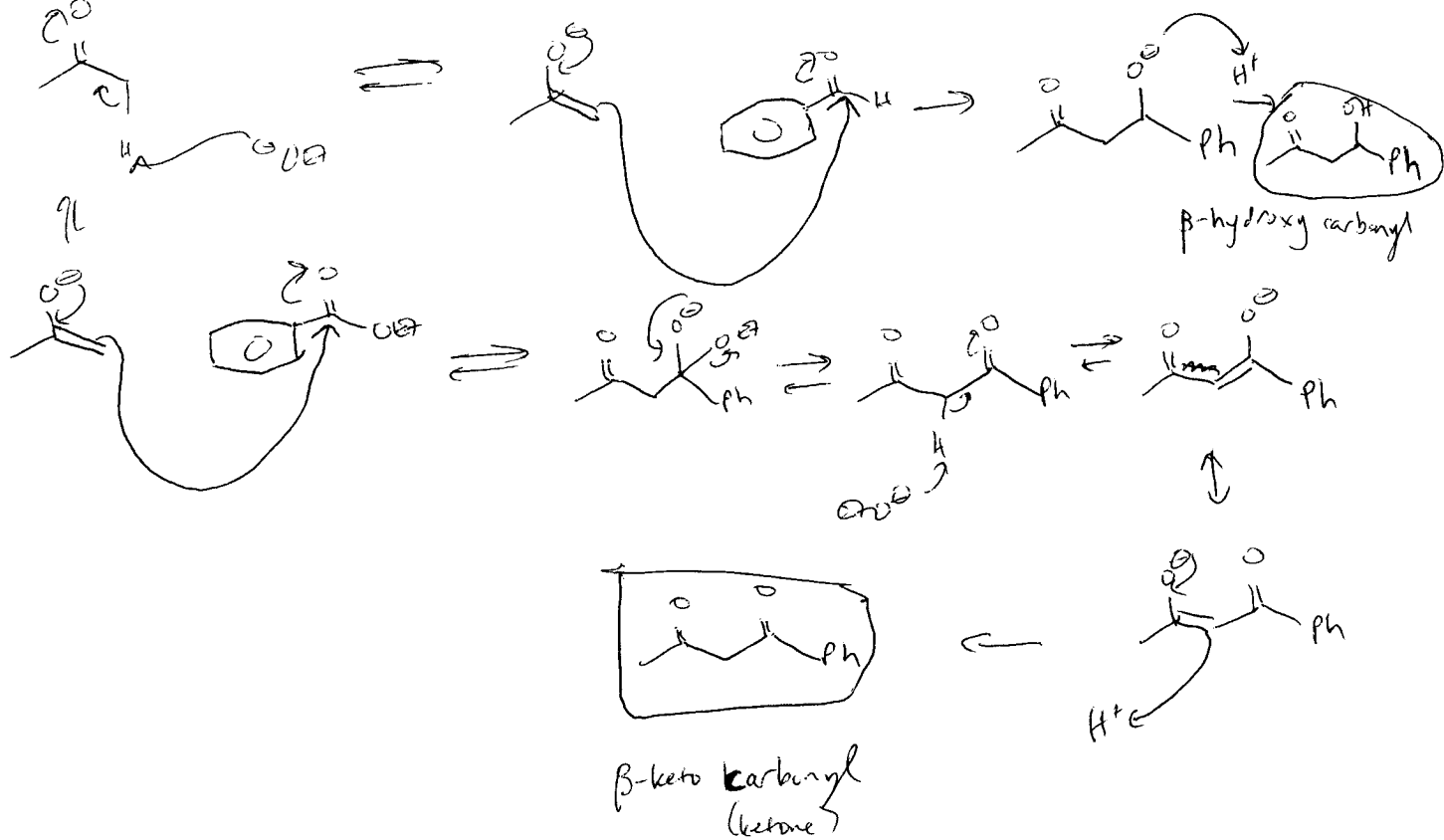
(b)



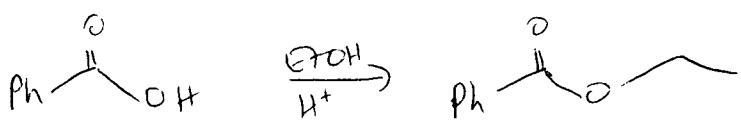
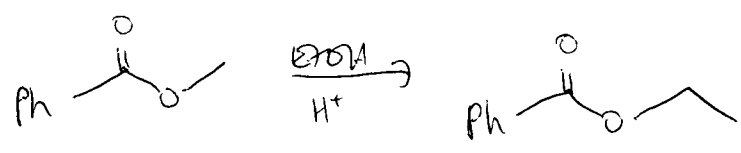
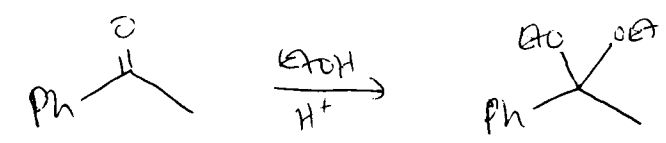
(c)



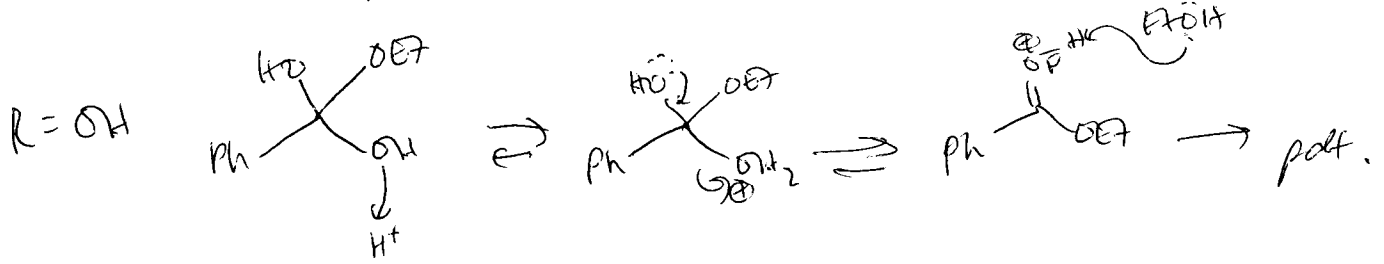
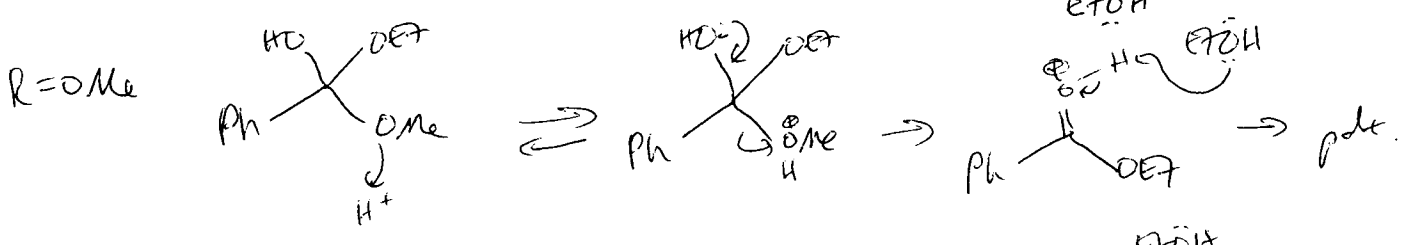
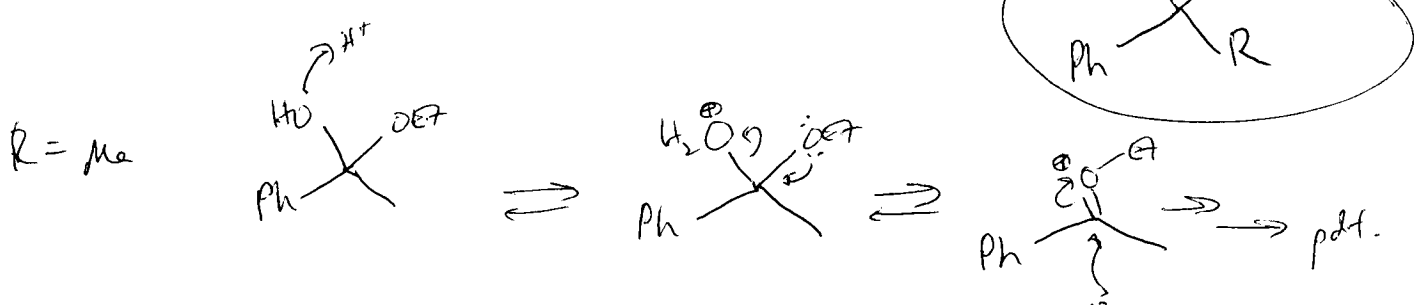
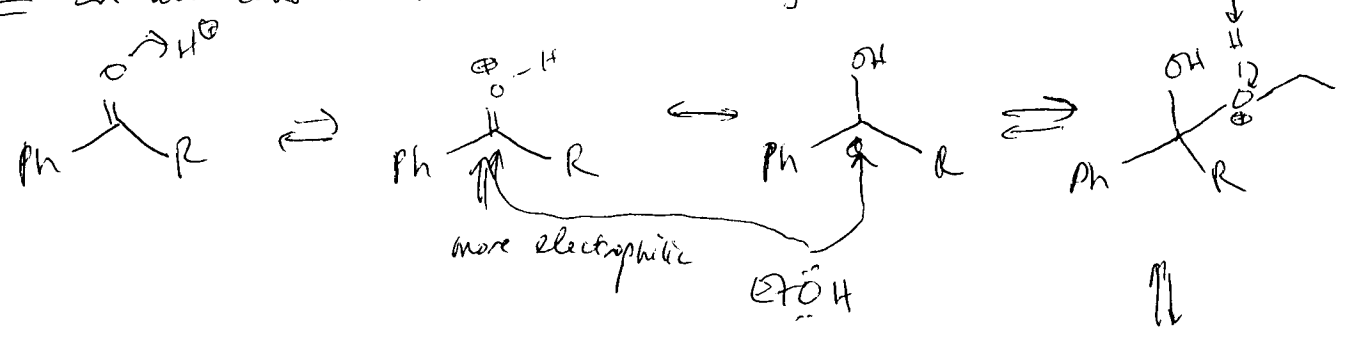
1



4.

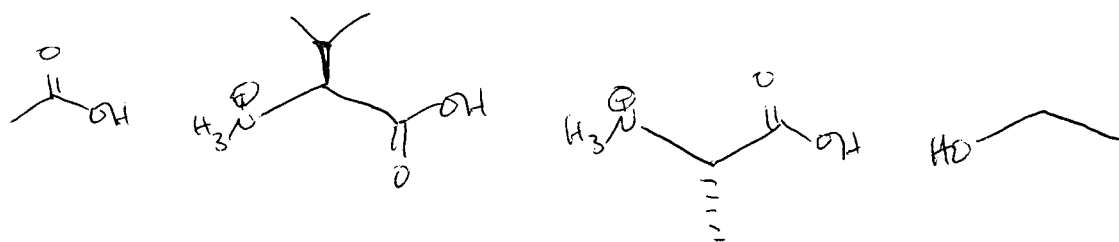
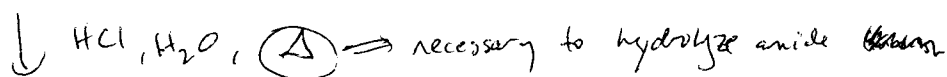
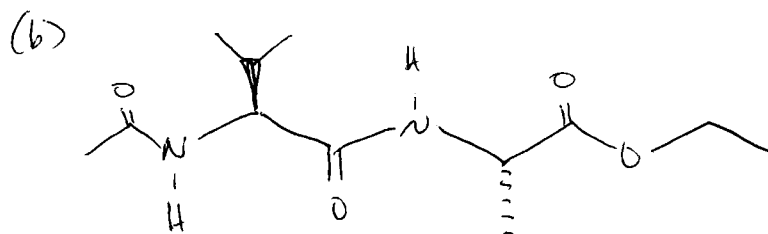
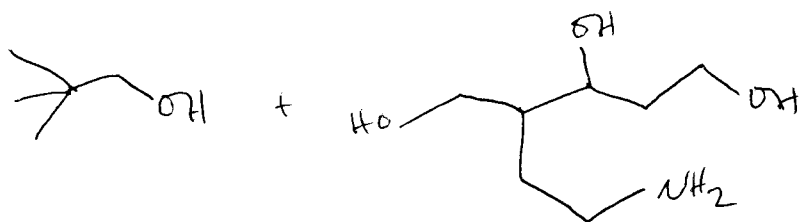
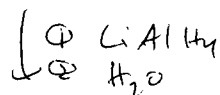
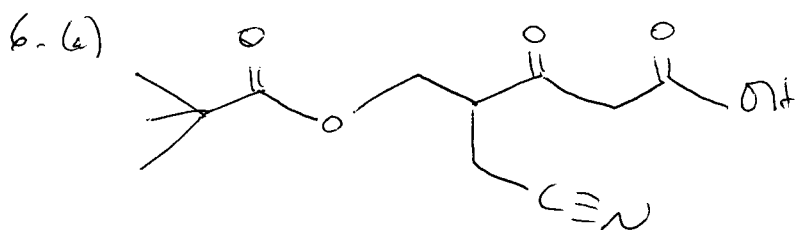
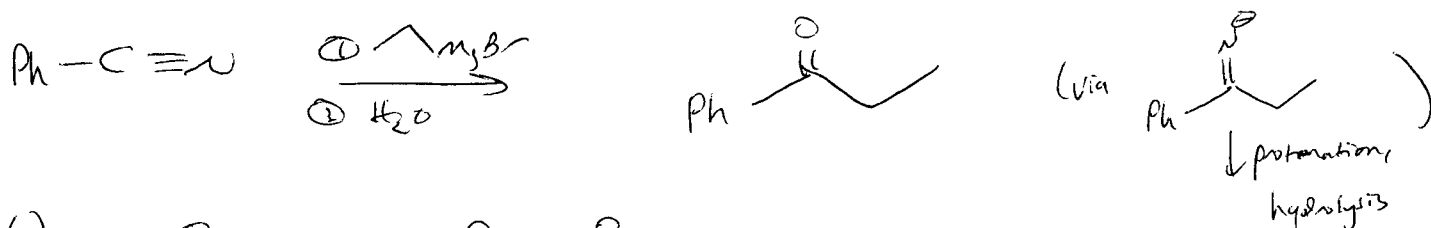
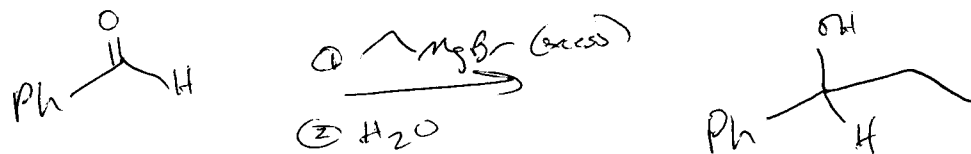
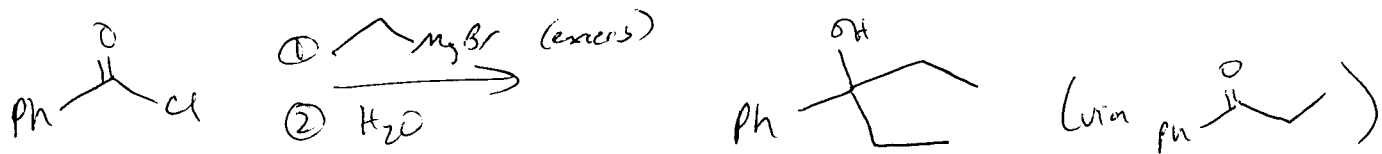


Note! In all cases the mechanism starts by



could protonate either OH

5.



7. See class notes for complete answer

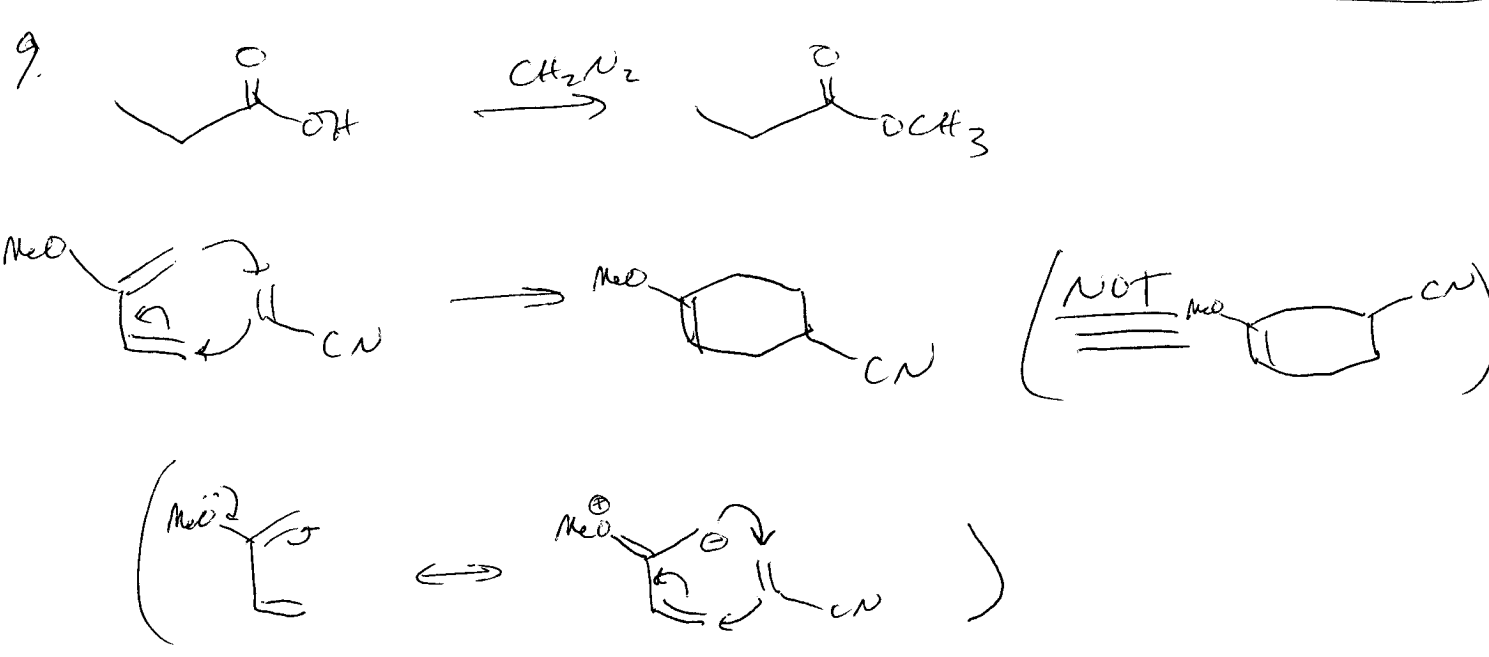
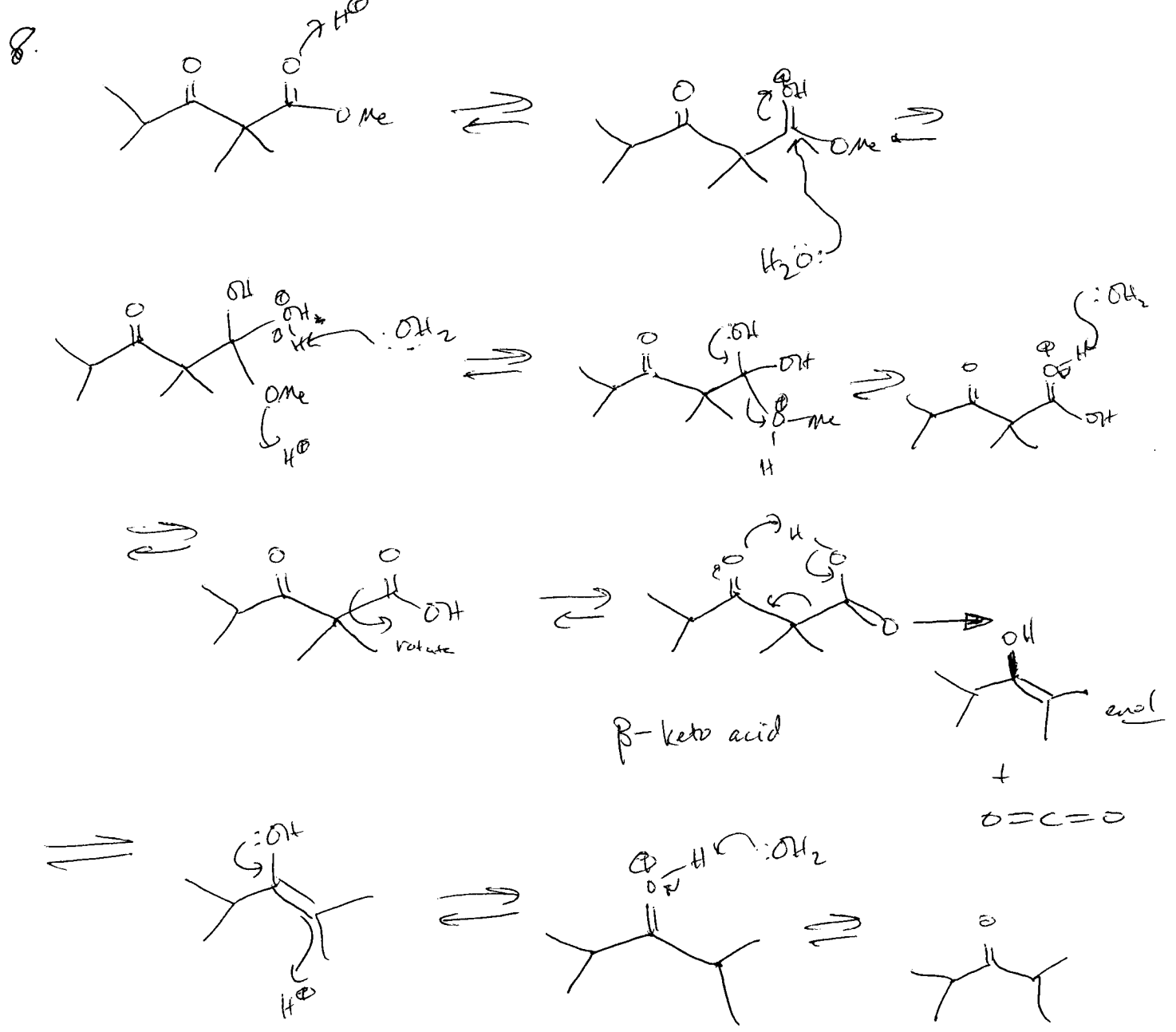
Short answers (not complete!)

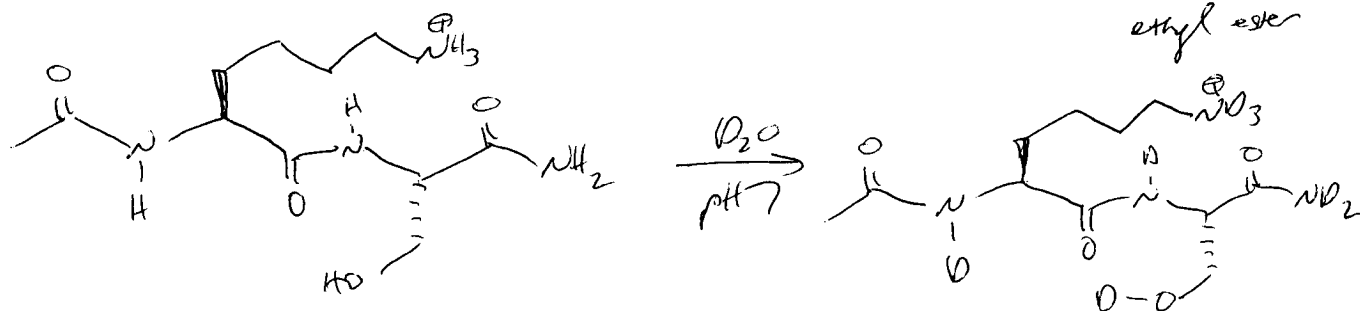
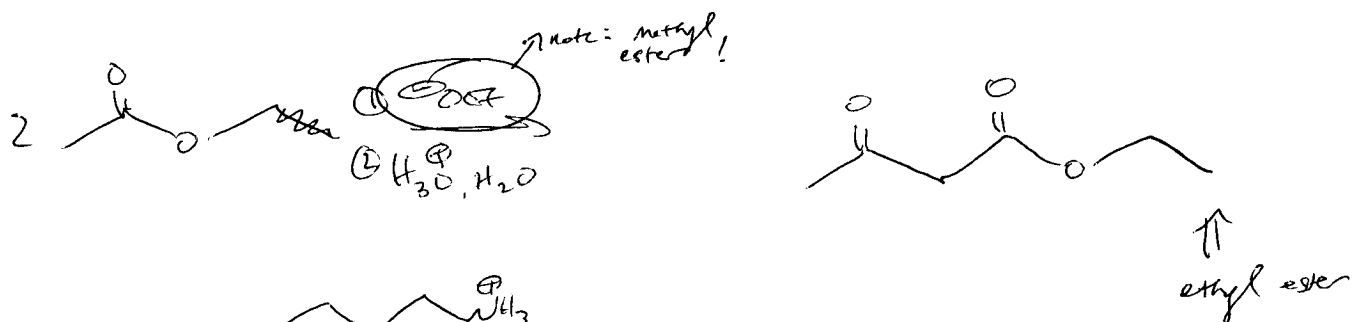
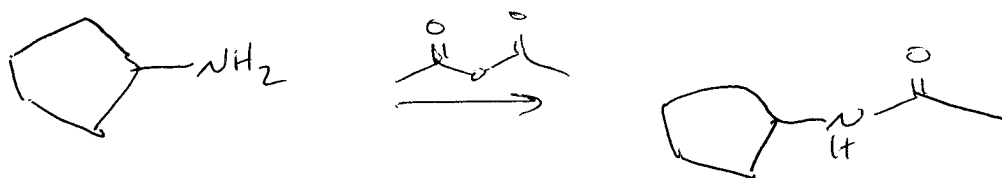
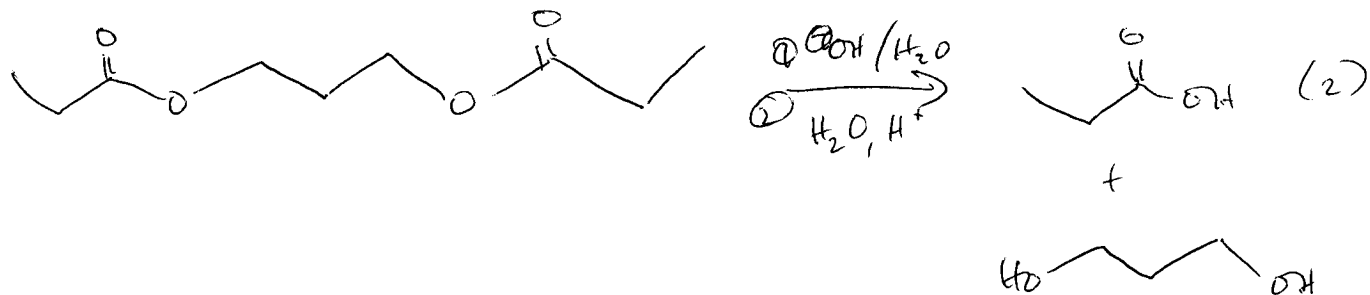
(a) Soap exists as micelles of fatty acids; acid is  $H_2O$ -soluble, fatty acid hydrophobic tails associate. Grease/oil is ~~more~~ hydrophobic / soluble in alkyl tails (grease has low polarity, like the alkyl tails) and is "dissolved" by then (as it would be by organic solvents = dry cleaning).

(b) (a) Alcohols make morphine more polar (large shell of  $H_2O$  hydrogen-bonded to alcohols) than esters. (Many alcohols are  $H_2O$ -soluble, fewer esters are.) Less polar heroin more readily enters hydrophobic blood-brain barrier. (b) An ammonium can't easily cross a membrane. But,  $pK_a$  of  $HNR_3^+$  is  $\sim 10$  (close to physiological  $pH$ ), so it is readily deprotonated to allow passage across membrane.

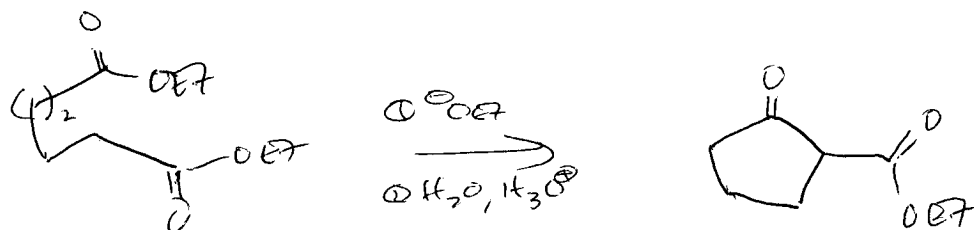
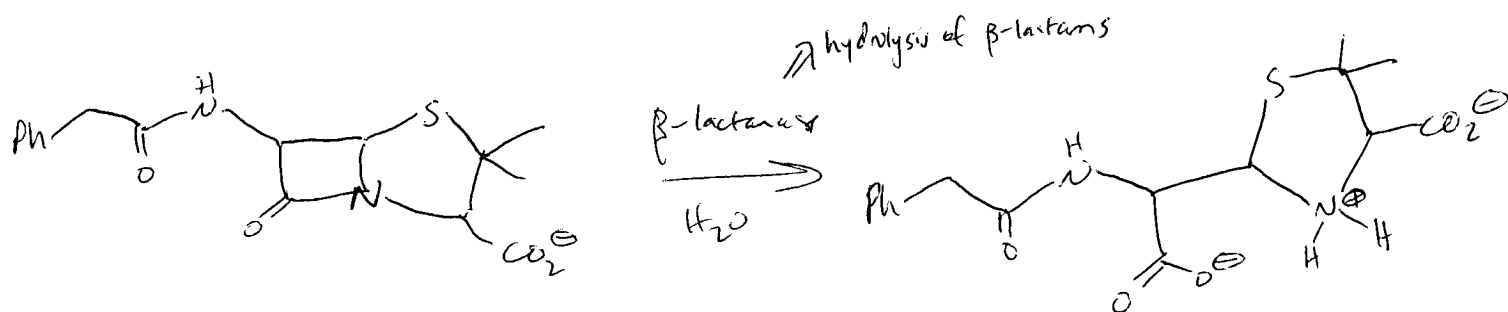
(c) Aspirin  $\Rightarrow$  modifies prostaglandin synthase, thus stopping synthesis of prostaglandins (involved in inflammation response).  
Organophosphate nerve agents  $\Rightarrow$  block <sup>neurotransmitter</sup> acetylcholinesterase, preventing hydrolysis of acetylcholine (ester  $\rightarrow$  alcohol), loss of control of nerve synaptic transmission.

} See notes

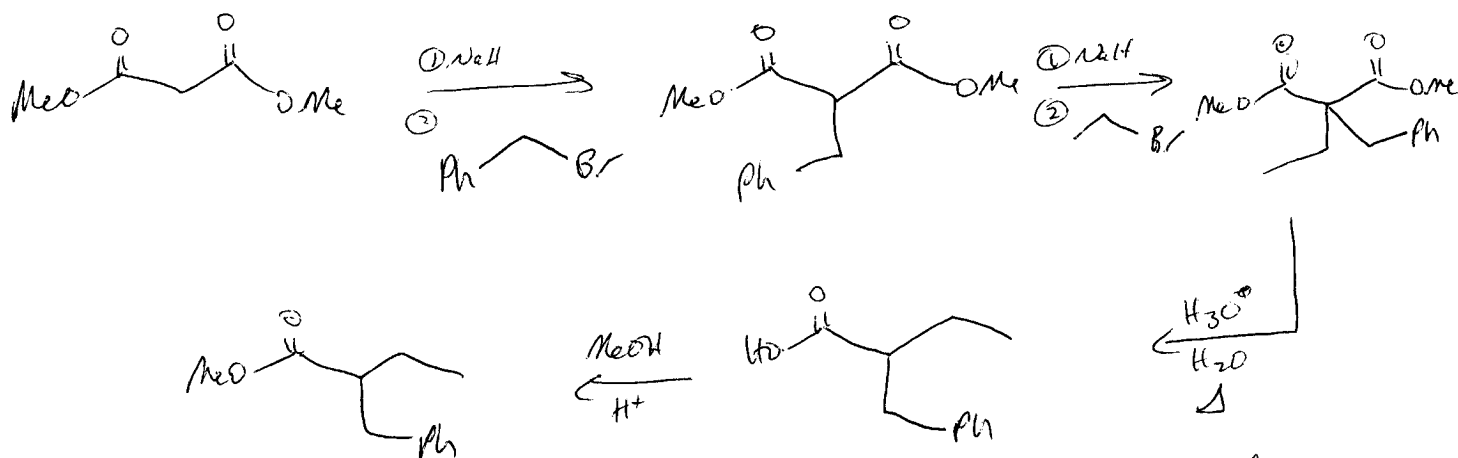
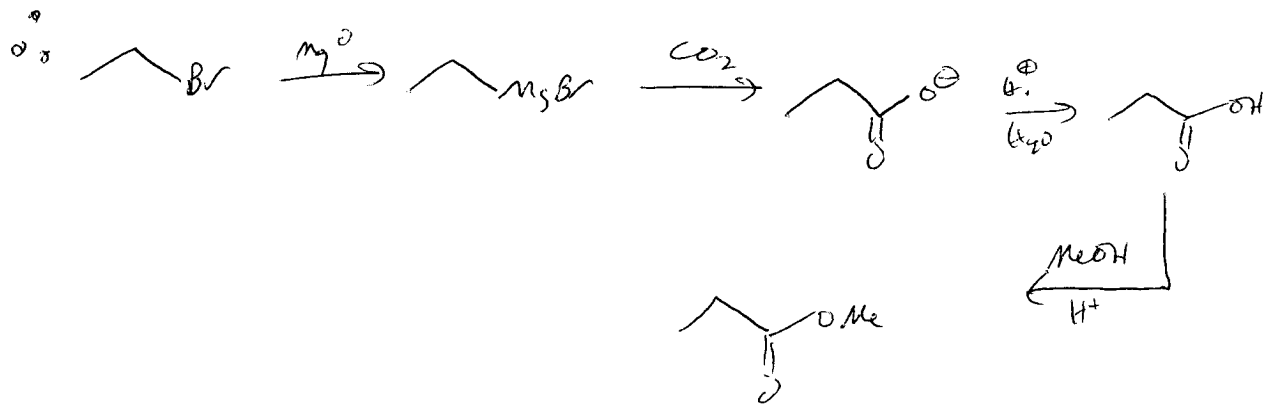
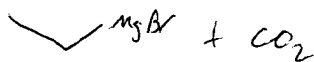
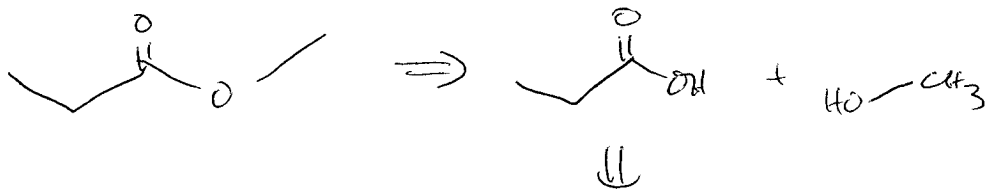




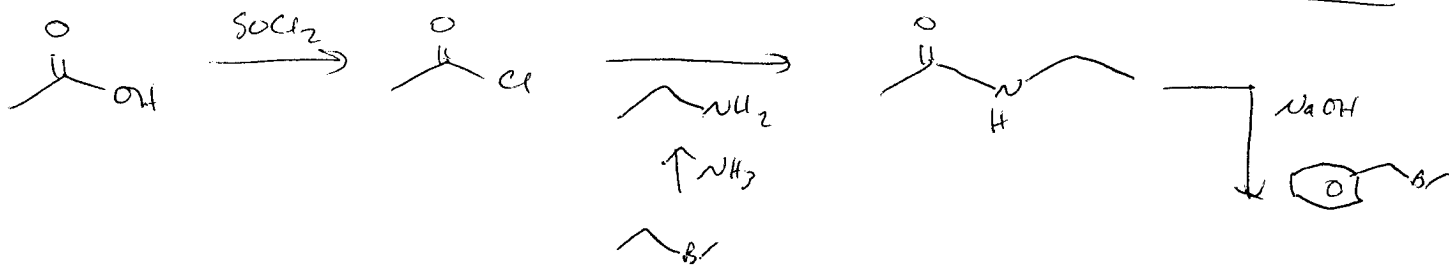
Note: Ammonium / ~~alcohol~~ ~~amino~~ H's are most acidic and exchange almost instantaneously! ( $\mu\text{s}$  timescale)



10.



(this synthesis could be done, by changing the order of the steps, a few related ways)



Also:

