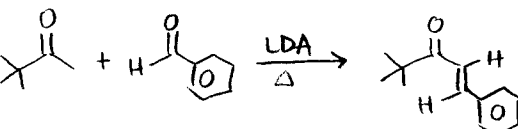
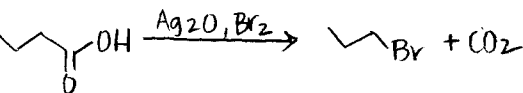
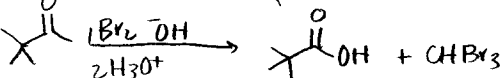
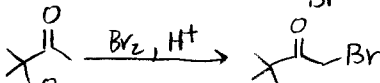
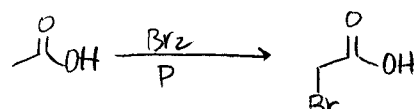
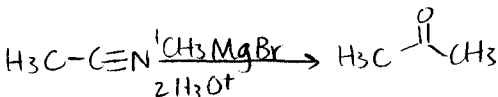
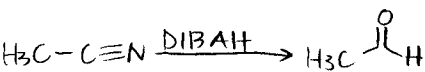
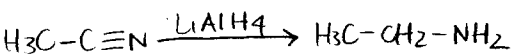
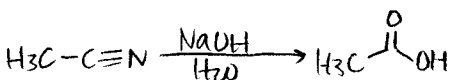
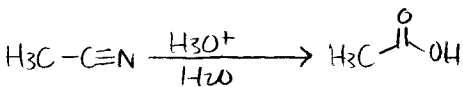
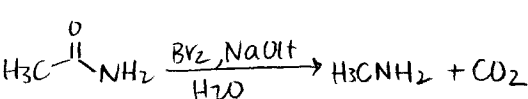
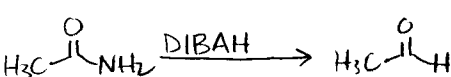
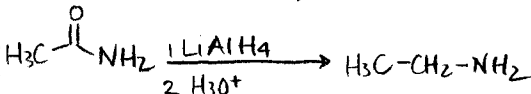
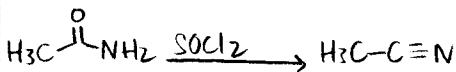
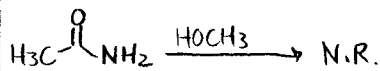
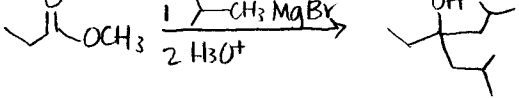
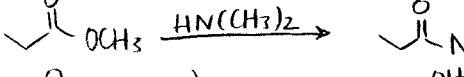
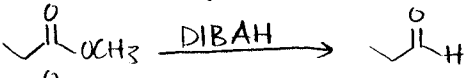
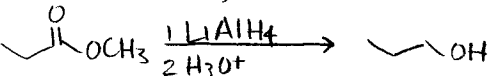
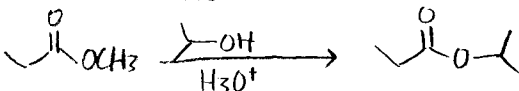
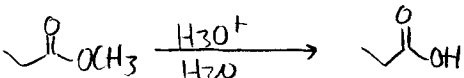
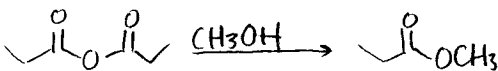
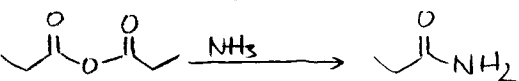
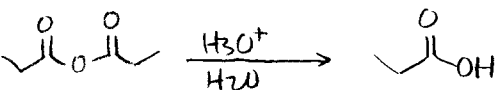
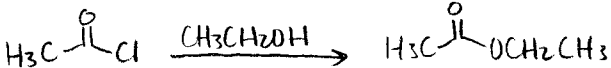
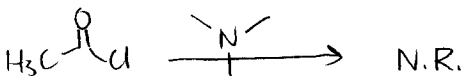
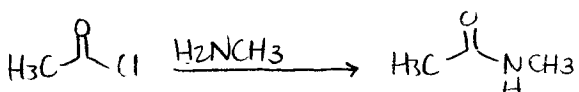
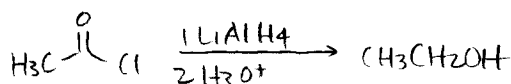
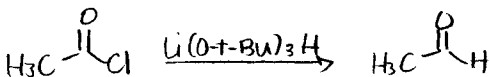
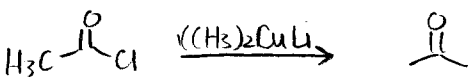
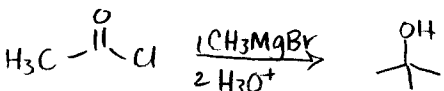
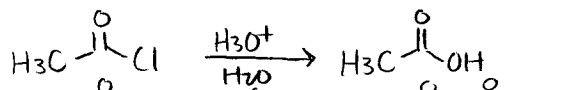
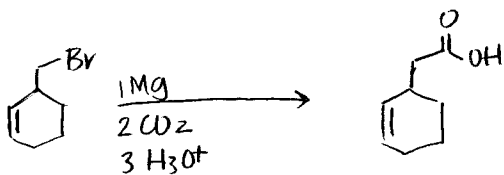
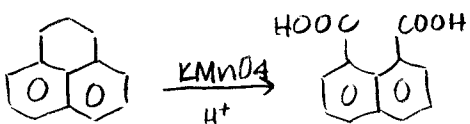
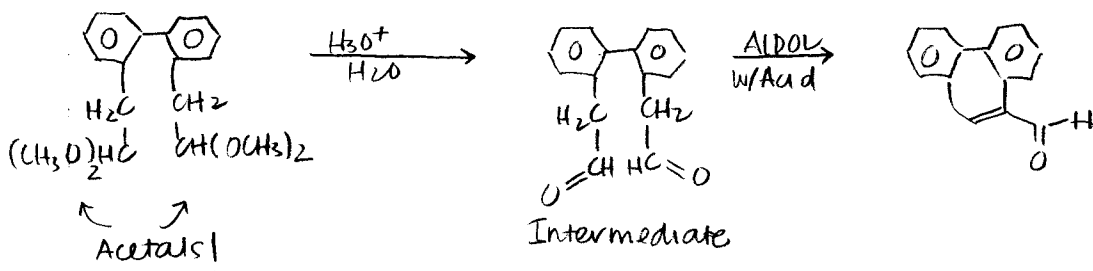
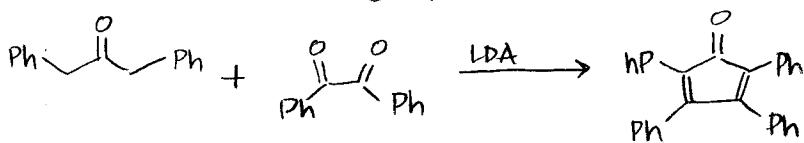
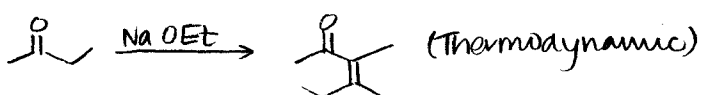
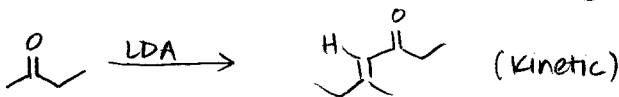
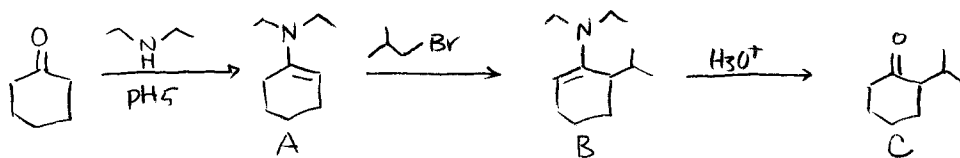
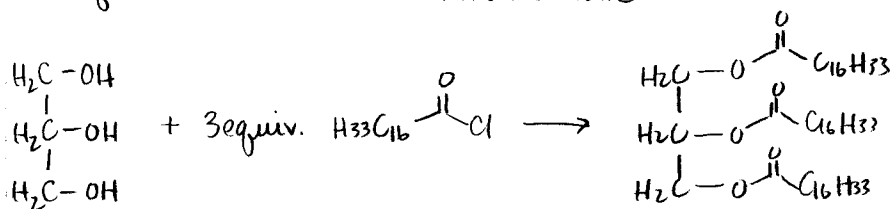
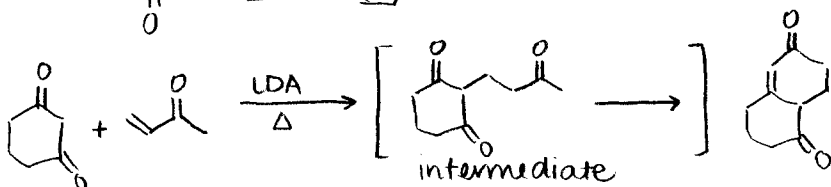
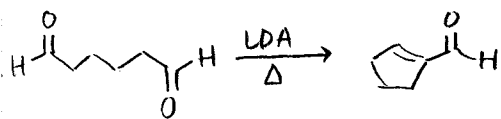
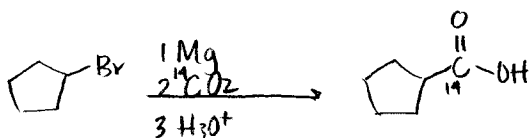
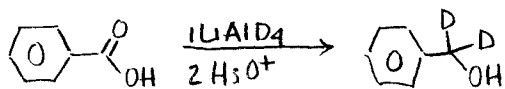
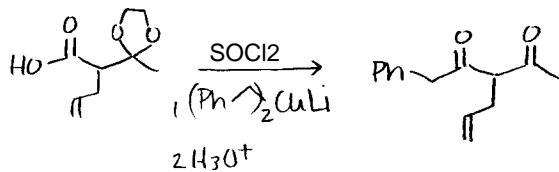
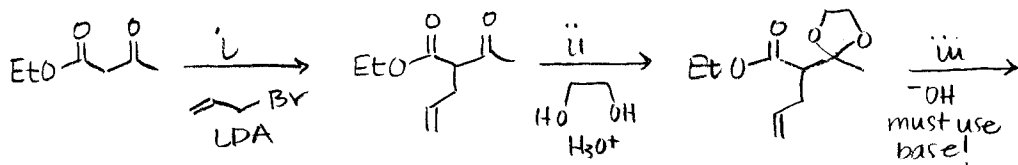
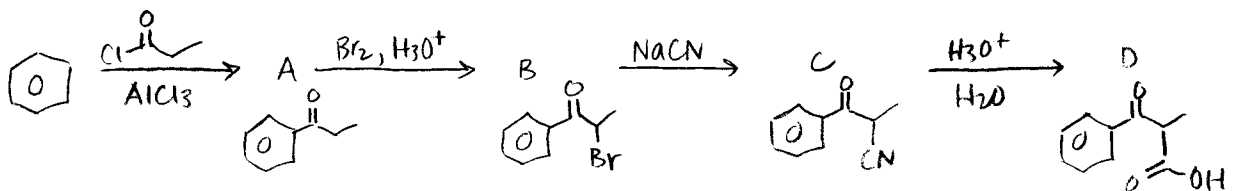
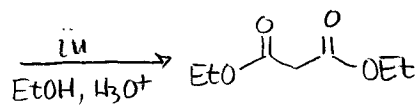
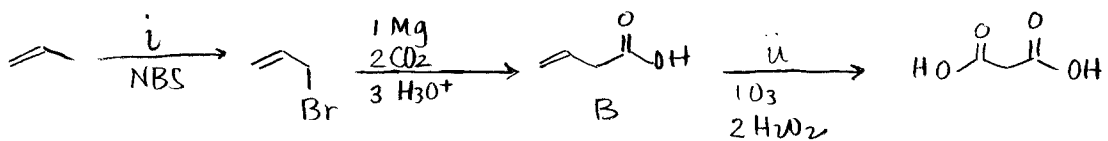
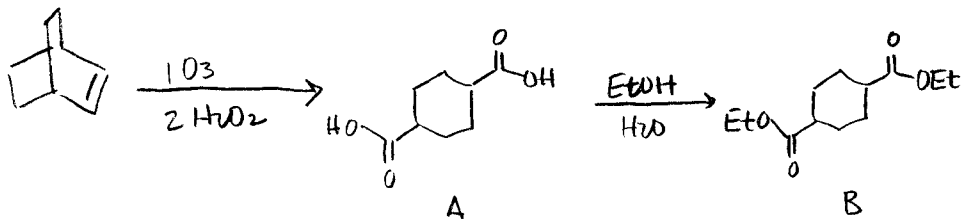
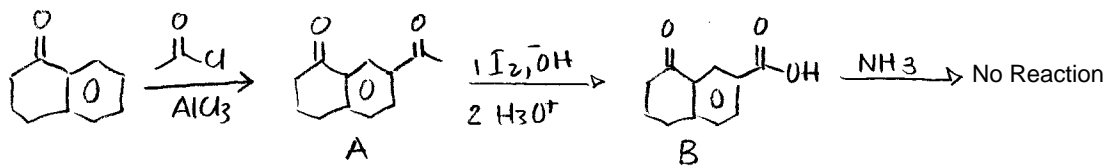


# Practice Exam Answer Key

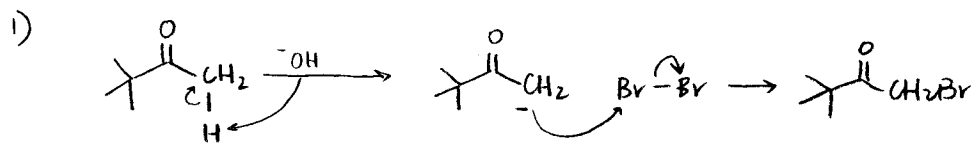
## I Predict the Products



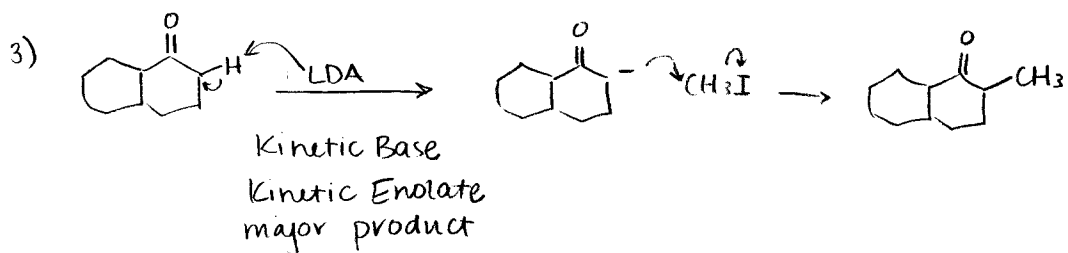
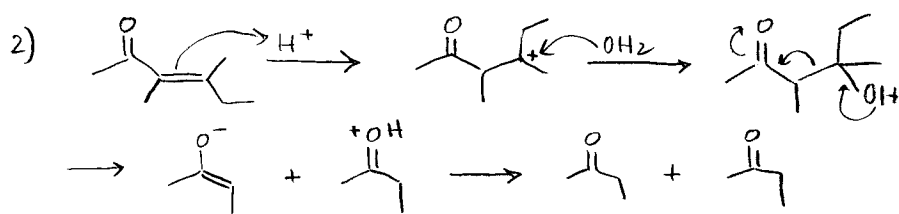
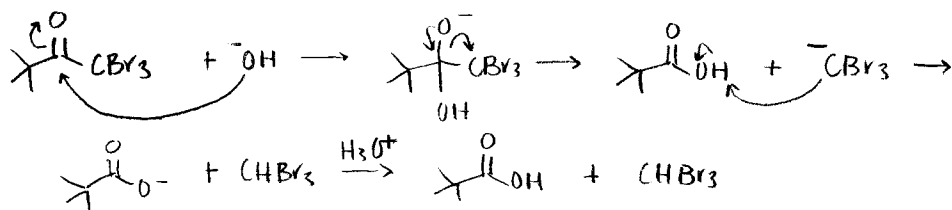




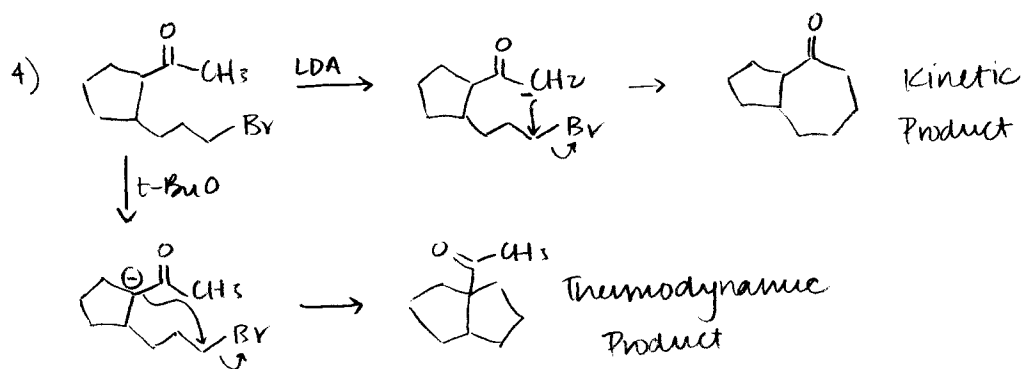
## II Mechanisms

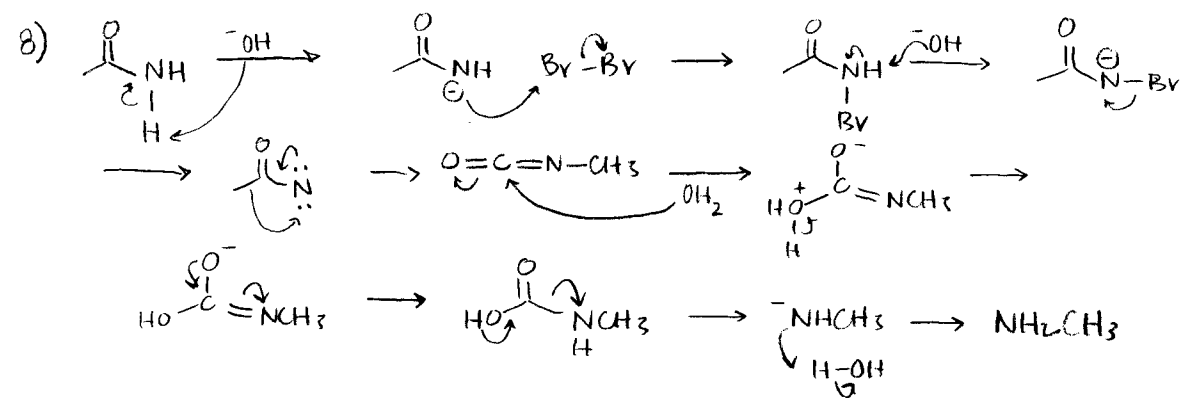
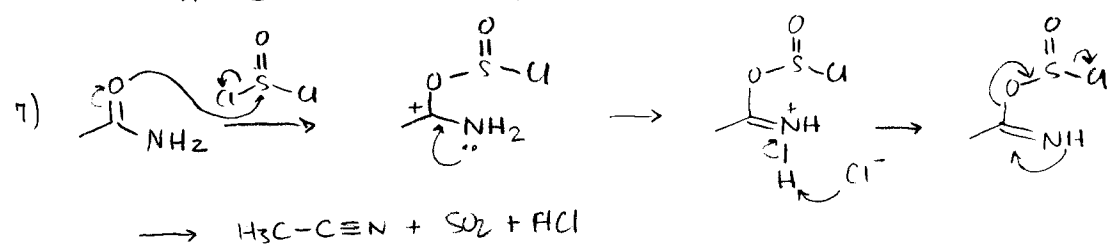
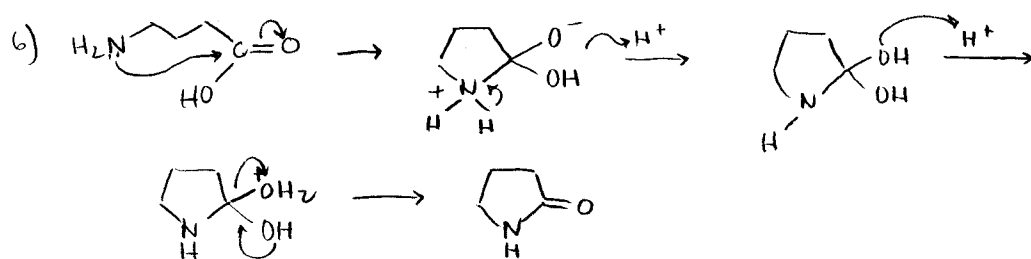
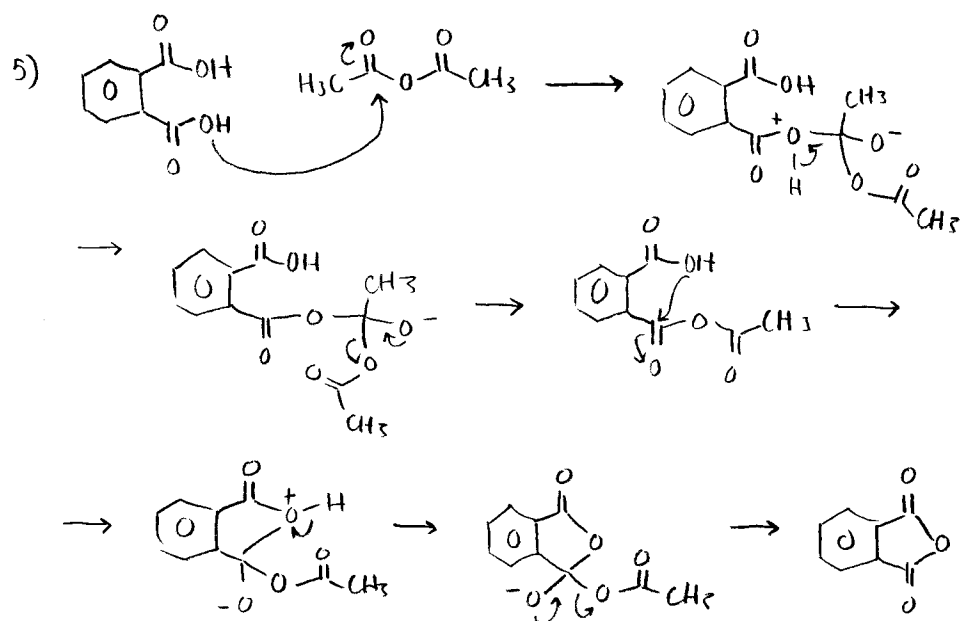


this happens 2 more times to give



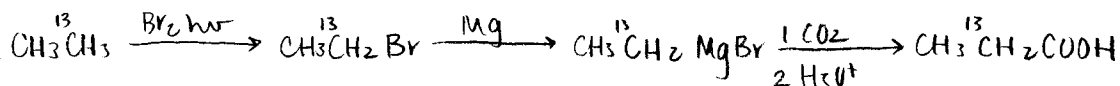
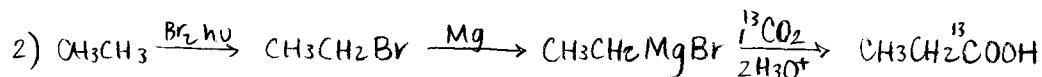
The other  $\alpha$  proton gives a thermodynamic enolate  $\rightarrow$  not the preferred enolate





#### IV. Supplemental Problems

1) Acetic Acid's hydrogen bonding accounts for higher boiling points than the ethyl ester.



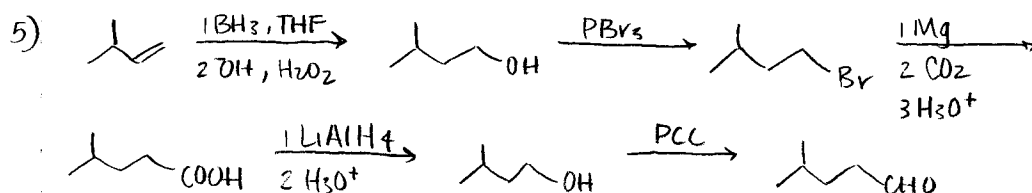
3) for a) the  $\text{CN}^-$  hydrolysis must be used because of the  $^- \text{OH}$  functionality

for b) you can use grignard carboxylation or  $\text{CN}$  hydrolysis

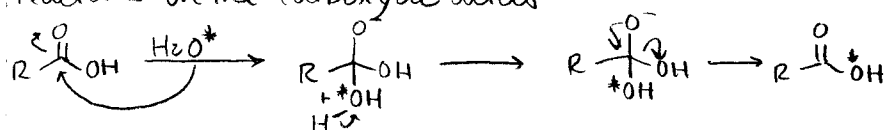
for c) you should use the  $\text{CN}$  hydrolysis; grignards would attack the carbonyl

for d) you must use the  $\text{CN}$  hydrolysis because of the  $^- \text{OH}$  functionality

4) The reaction could not proceed because an  $\text{S}_{\text{N}}2$  reaction cannot be done on a  $3^\circ$  alkyl halide!

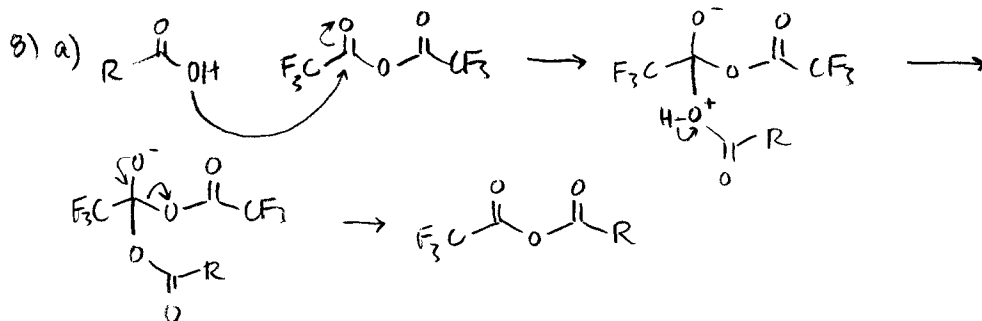
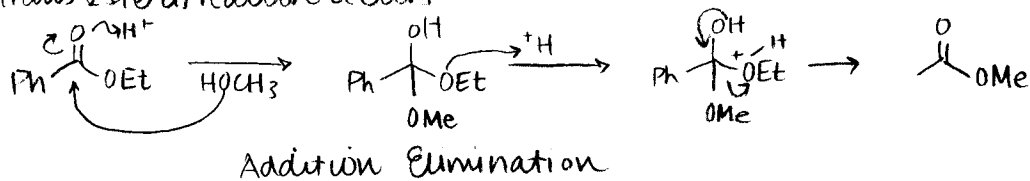


6) The isotopically labeled waters can do addition-elimination reactions on the carboxylic acids



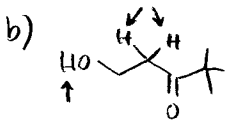
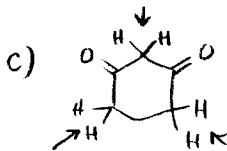
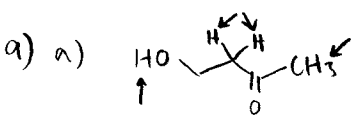
do this again to replace the other oxygen.

7) Transesterification occurs



b) The unit  $\text{F}_3\text{C}-\text{C}(=\text{O})\text{O}^-$  is very stable because of the  $e^-$ -withdrawing  $-\text{CF}_3$  group. Thus this group is a very good leaving group

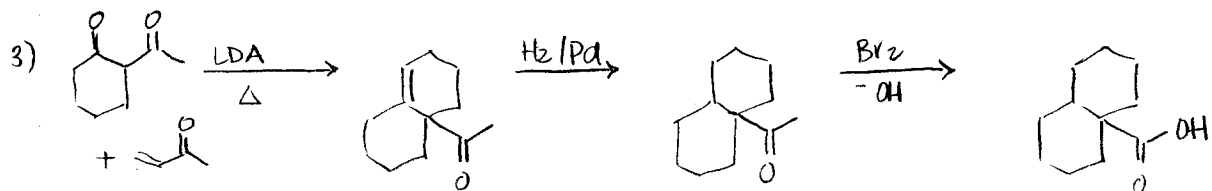
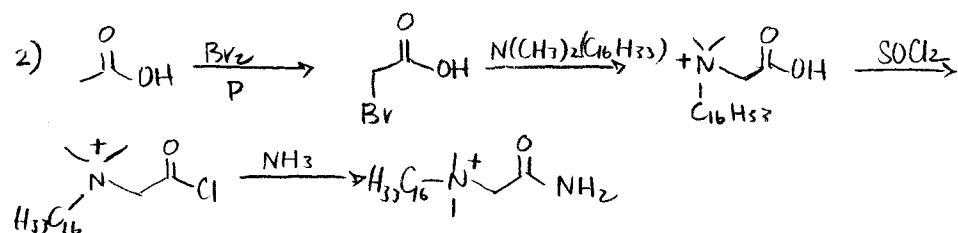
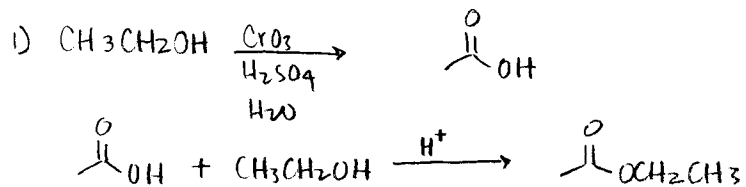
c) The addition elimination gives a very good leaving group  $-\text{O}-\text{C}(=\text{O})-\text{CF}_3$ . The other possible leaving group is not as stable  $-\text{O}-\text{C}(=\text{O})-\text{R}$ . Thus elimination of the trifluoroacetate is preferred.



10) In acid the enol is formed which is planar. Thus optical activity is lost.

11) The chiral carbon has no  $\alpha$  hydrogens so this can't racemize.

### III Synthesis



Robinson Annulation

