

Practice Exam #4
5.13: Organic Chemistry II
Fall 2003

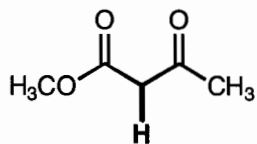
Key

- Midterm exam #4 will be held on Friday, December 5, from 12–1pm.

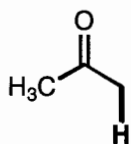
- Ten points will be subtracted from your exam if you take it in the wrong room.
- Notes, books, and calculators will not be allowed in the exam.
- You will be free to use molecular models during the exam.
- You will be given a periodic table.
- The exam will cover reading (Ch. 22) and lecture material through Unit VII (Monday, December 1st). Knowledge of prior material (5.12 & 5.13) is also assumed.
- For best results, take this test as if it were your exam (without a key in 50 minutes!). That way, you'll know what areas to work on before you get to the real exam.

Practice, Practice, Practice!!!

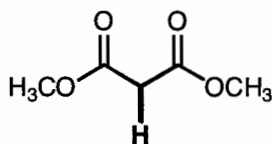
1. a) Rank the following carbonyl compounds based on the acidity of the indicated α -proton. (1 = most acidic, 5 = least acidic)



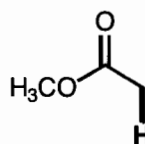
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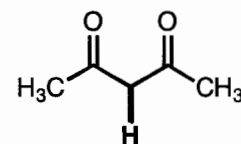
4



3

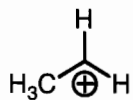


5

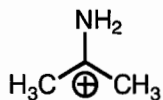


1

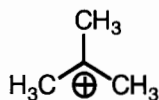
b) Rank the following carbocations based on stability. (1 = most stable, 5 = least stable)



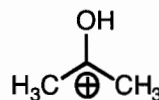
5



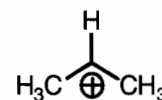
1



3



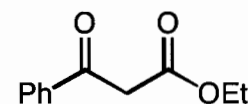
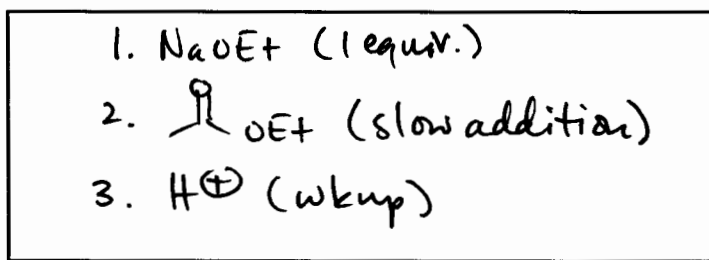
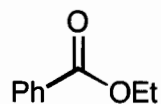
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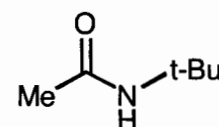
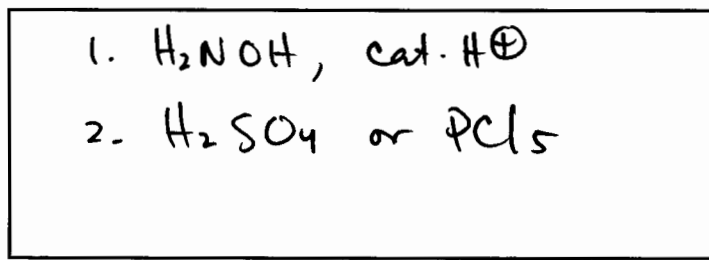
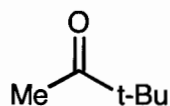
4

2. In the boxes, please provide the reagents for the illustrated transformations. Include work-up steps and be specific about quantities of reagents where relevant. More than one step may be required.

a)

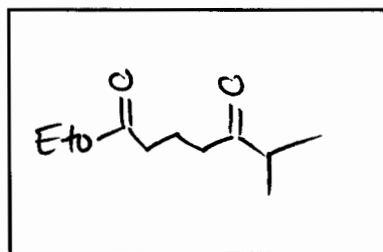
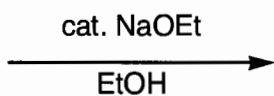
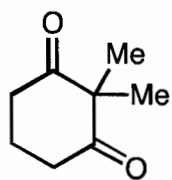


b)

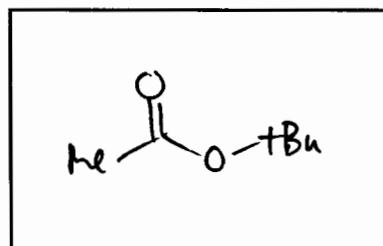
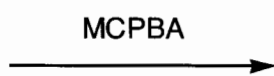
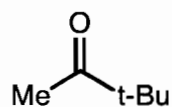


3. Please provide the products of the following reactions. If no reaction is expected, write "NR".

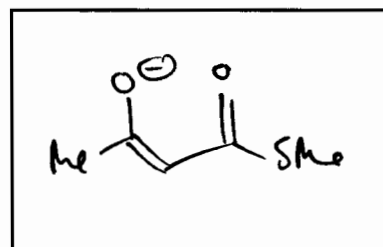
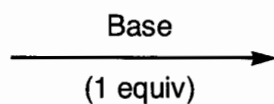
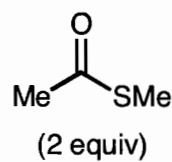
a)



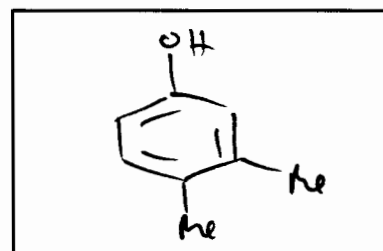
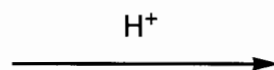
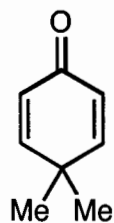
b)



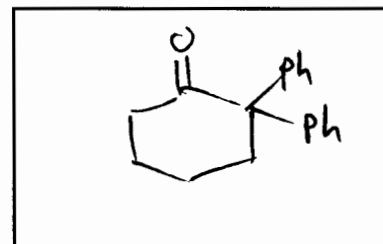
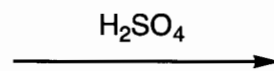
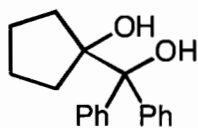
c)



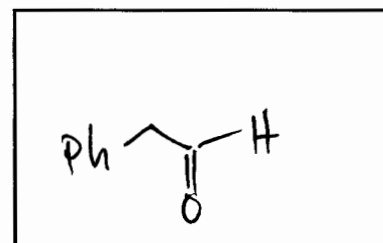
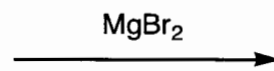
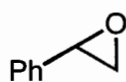
d)



e)

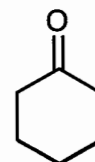
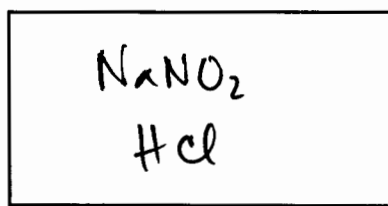
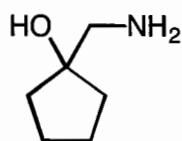


f)

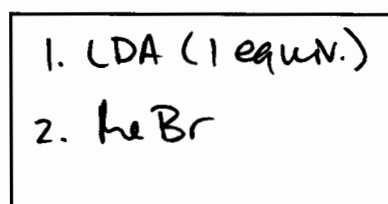
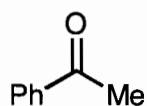


4. Please provide the reagents for the following transformations. Be specific about quantities of reagents where relevant.

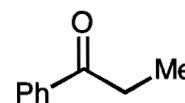
a)



b)

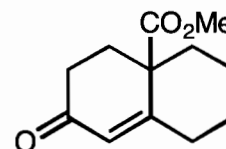
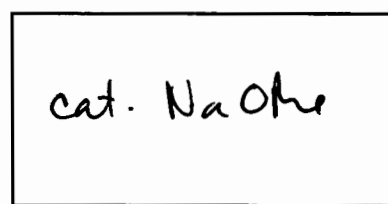
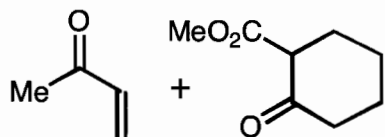


can also go through enamine intermediate

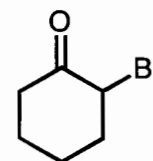
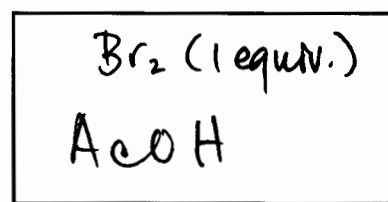
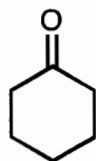


without over-alkylation

c)

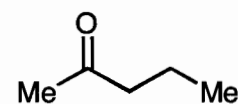
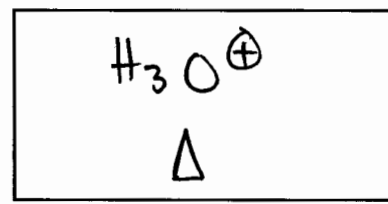
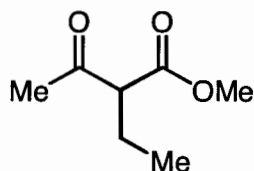


d)

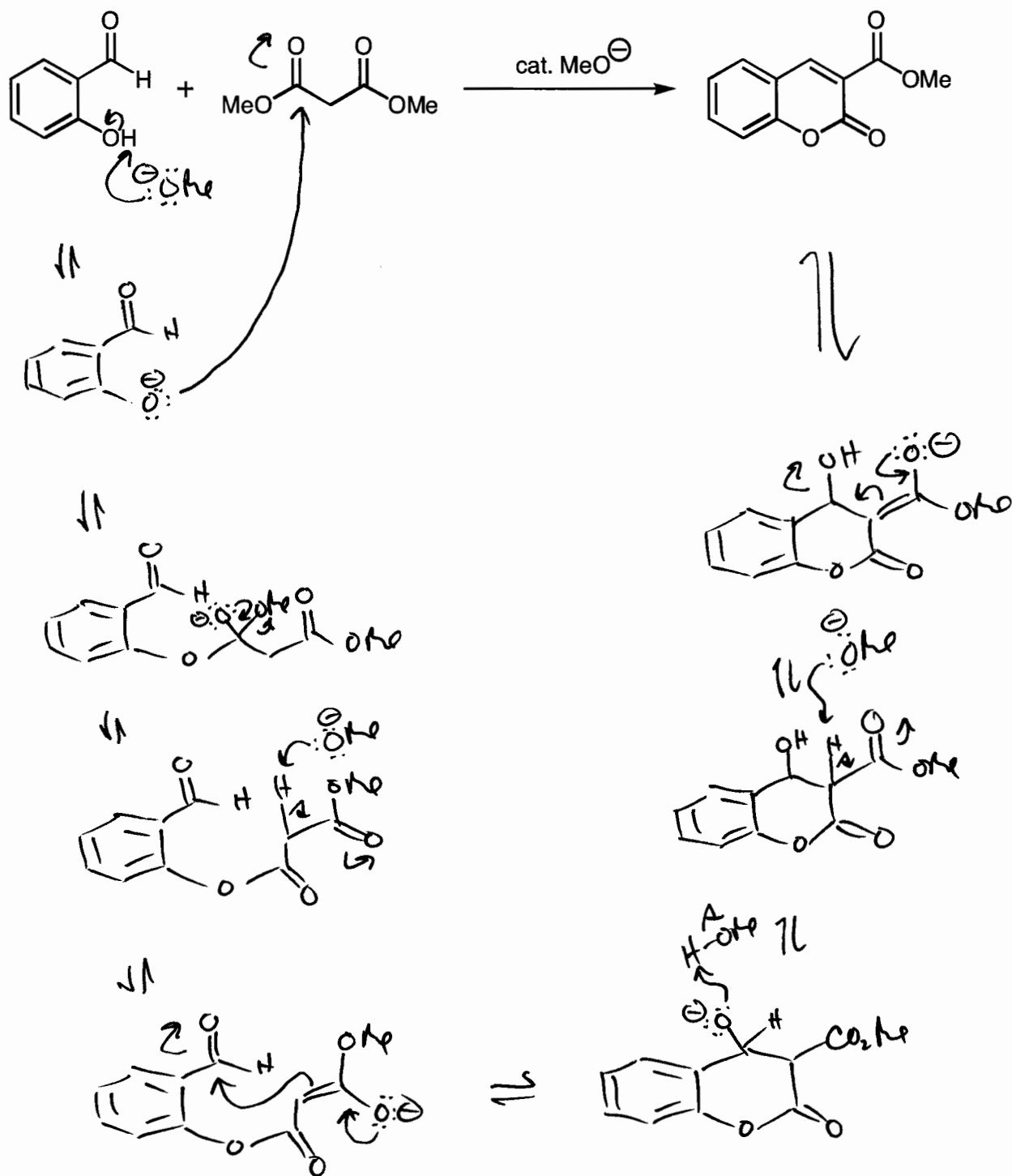


without over-bromination

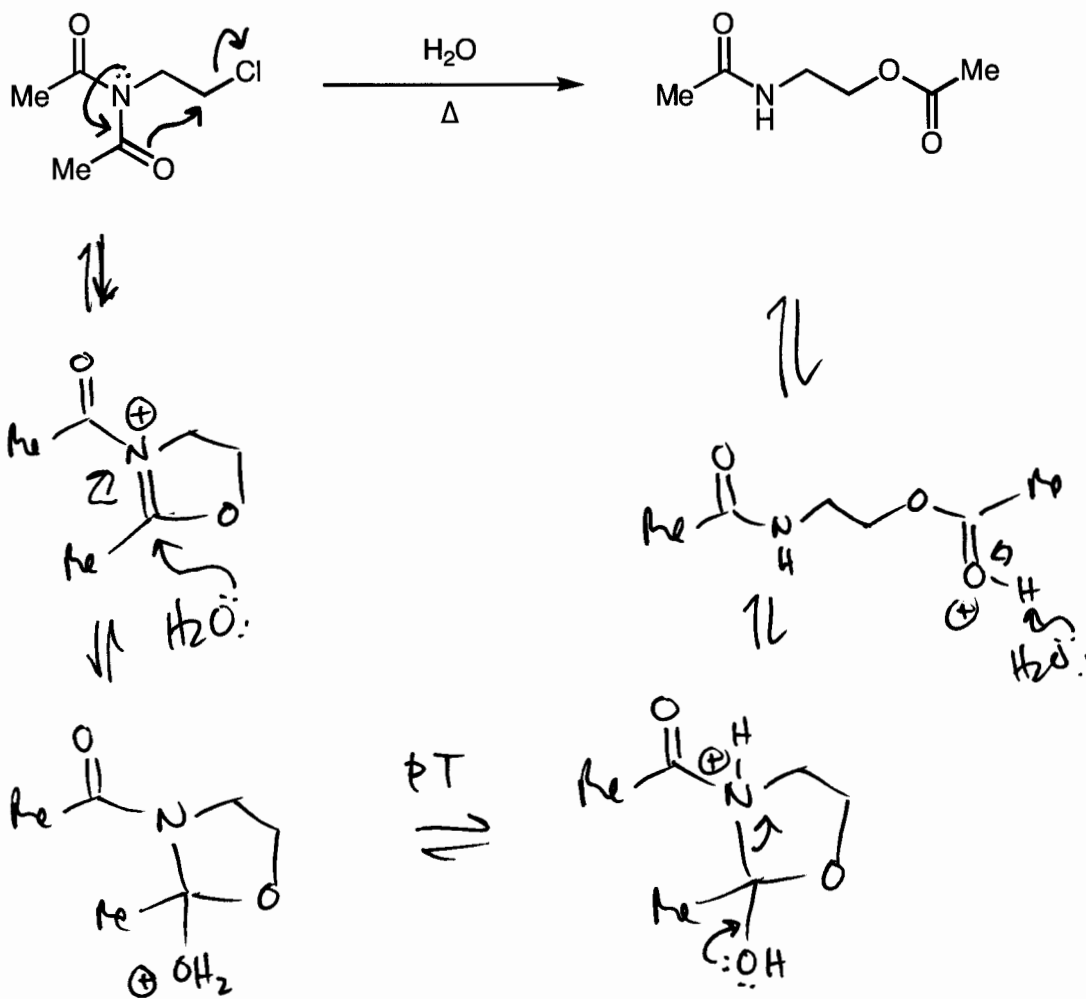
e)



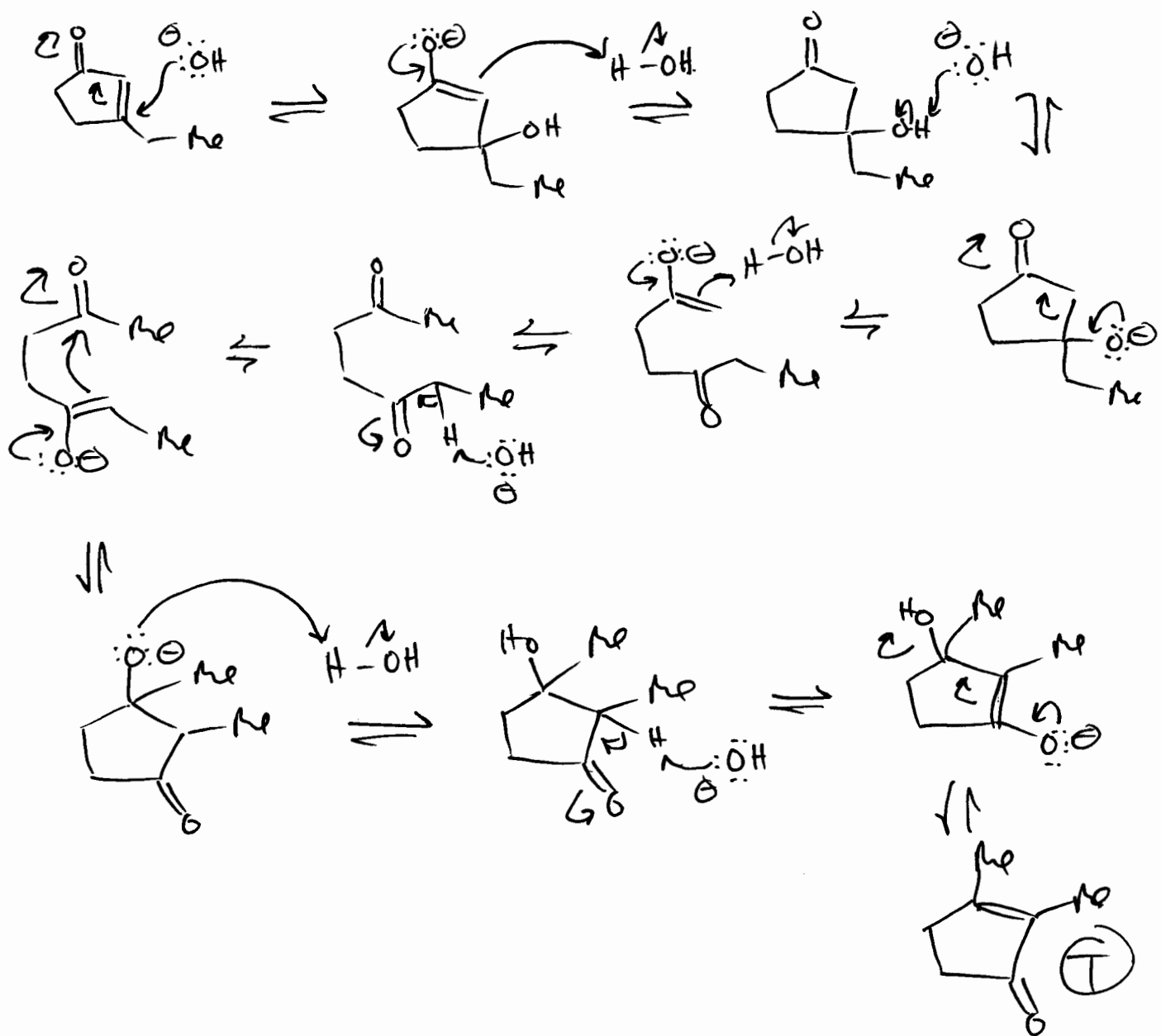
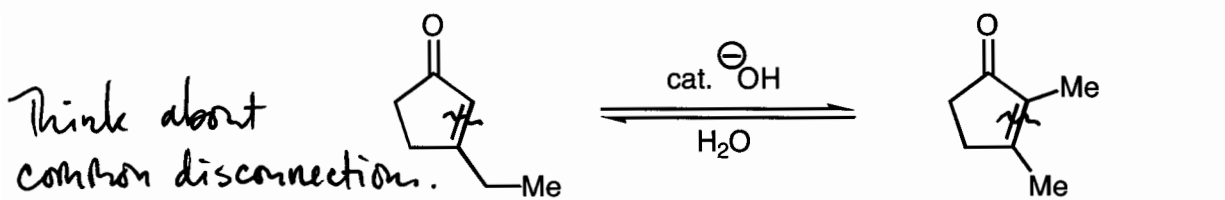
5. Please provide a detailed mechanism for the following transformation. Show all arrow pushing.



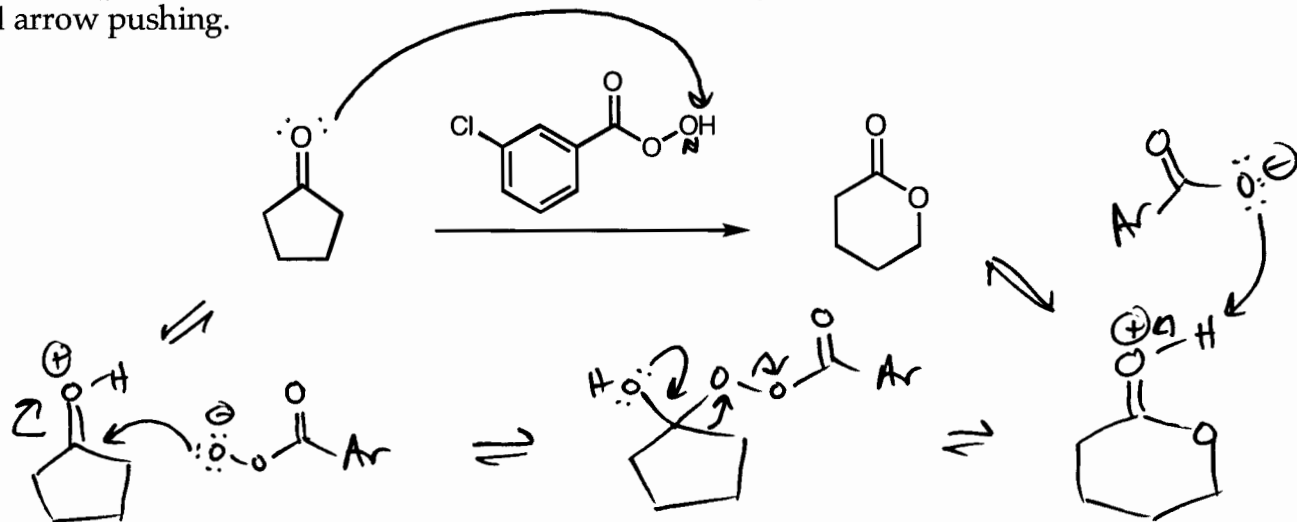
6. Please provide a detailed mechanism for the following transformation. Show all arrow pushing.



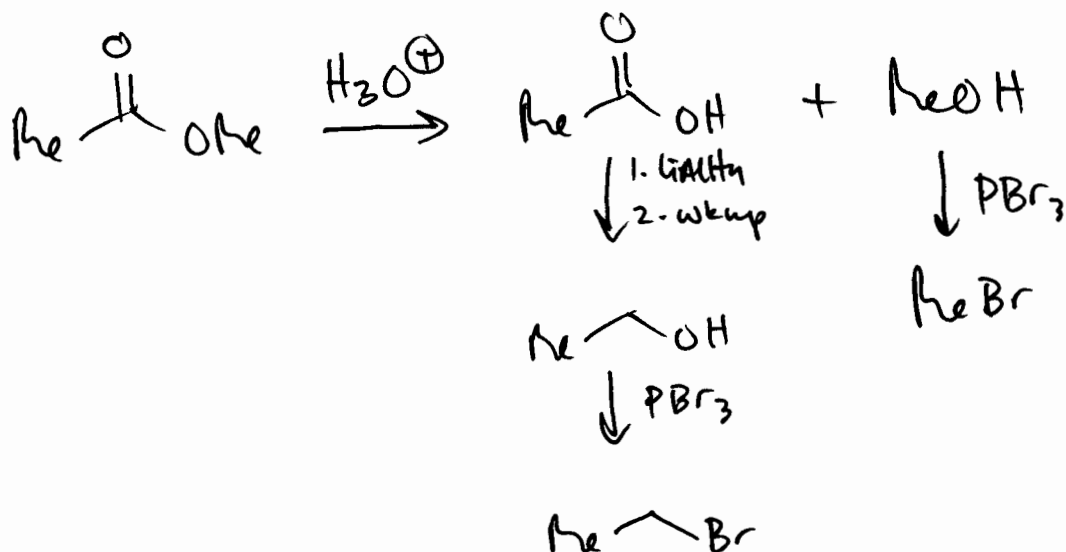
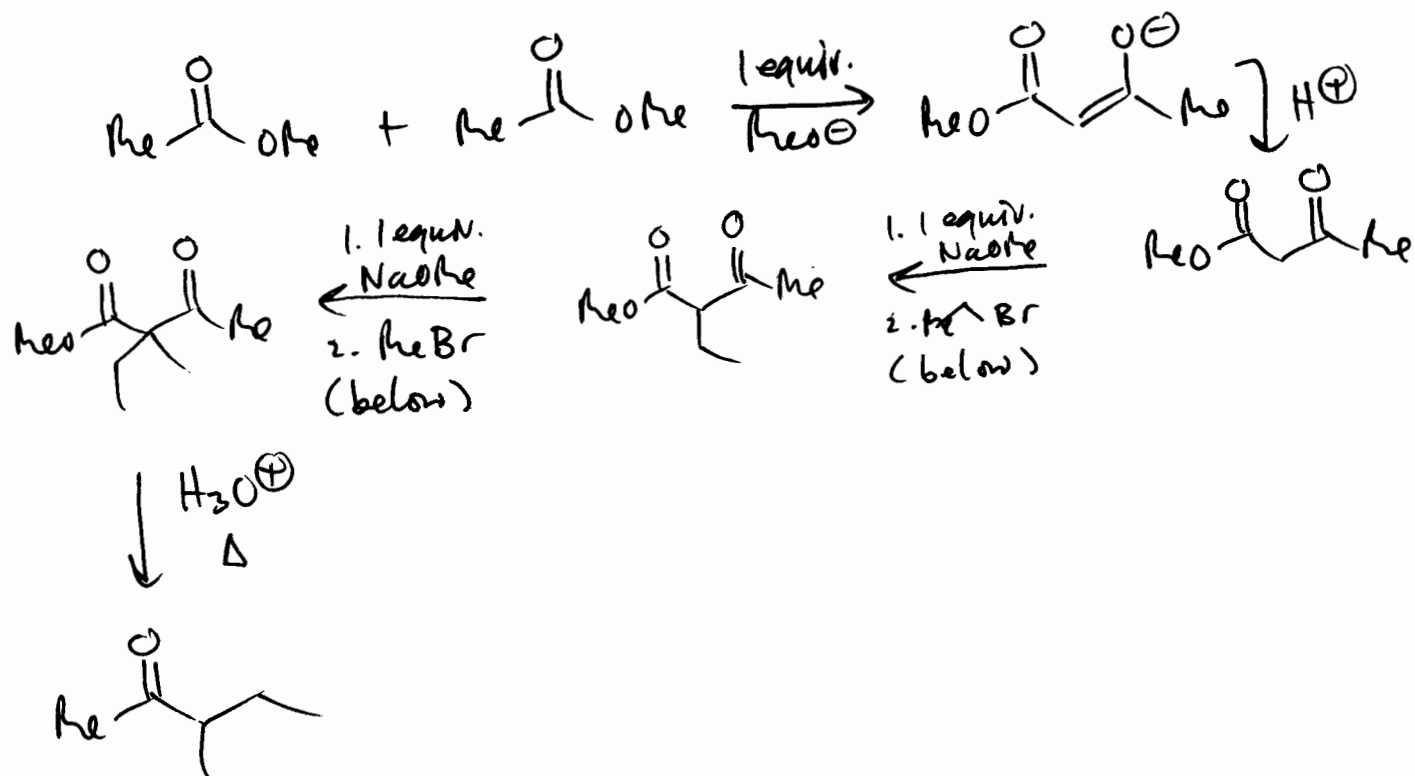
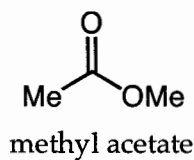
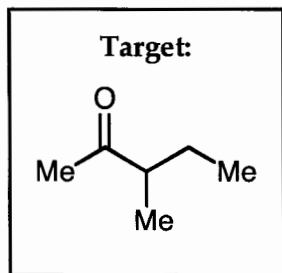
7. Please provide a detailed mechanism for the following transformation. Show all arrow pushing.



8. Please provide a detailed mechanism for the following transformation. Show all arrow pushing.



9. Please provide a synthesis of the indicated compound. All of the carbon atoms should be derived from methyl acetate.



10. Please provide a synthesis of the indicated compound. All of the carbon atoms should be derived from isopropanol.

