

CHEM 3331, Professor Zhang, Spring 2017
Third hour exam, April 18, 2017

Printed Name: _____ Student ID: _____

Recitation TA Name: _____ Recitation day and time: _____

Scores:

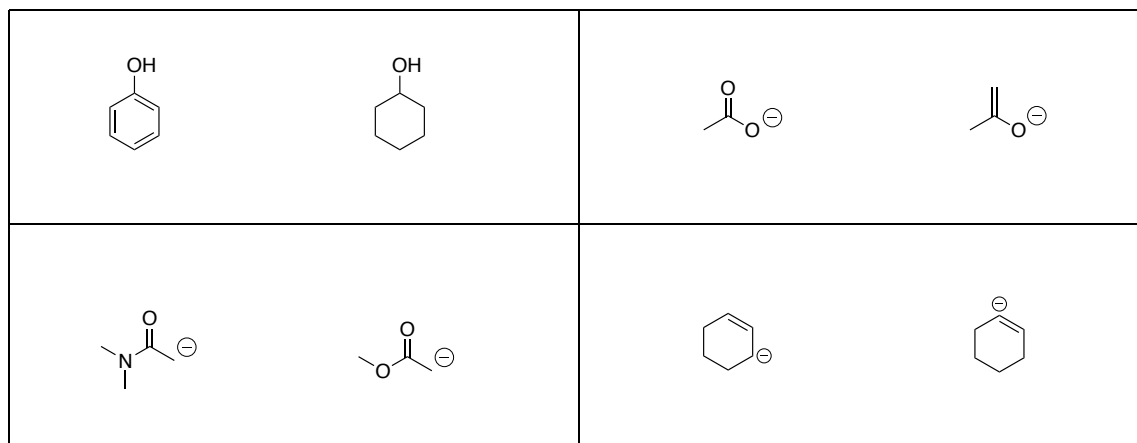
- 1)
 - 2)
 - 3)
 - 4)
 - 5)
-

CU Honor Code Pledge: On my honor, as a University of Colorado at Boulder Student, I have neither given nor received unauthorized assistance.

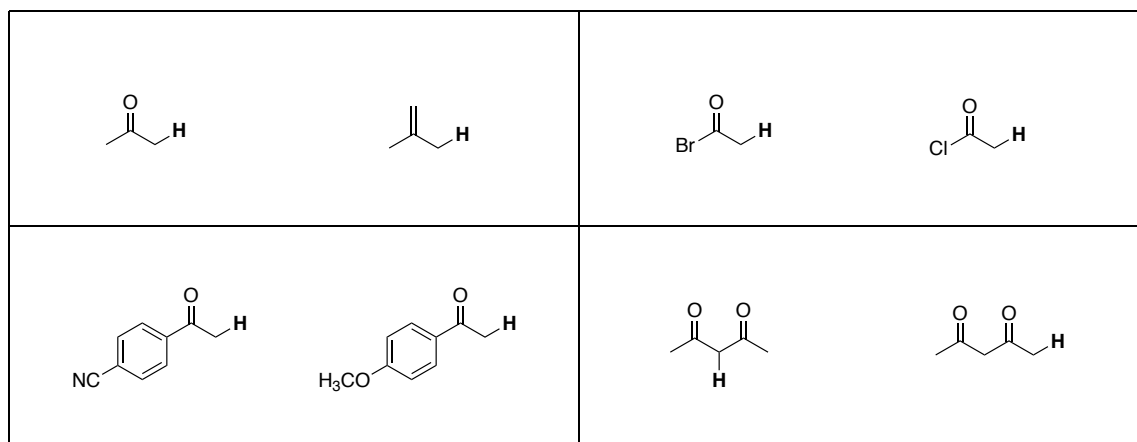
This is a closed-book exam. The use of notes, models, calculators, scratch paper will not be allowed during the exam. Please put all your answers on the test. Use the backs of the pages for scratch.

1A							8A
1 H							2 He
	2A	3A	4A	5A	6A	7A	
3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
						35 Br	
						53 I	

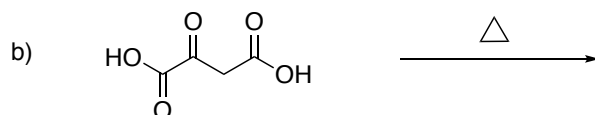
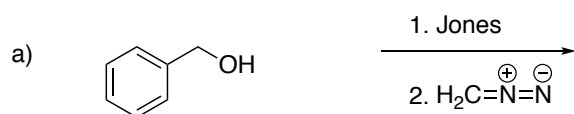
1) (24pts) a) For each of the following pairs of compounds, circle the **stronger nucleophile**. (3pts each)

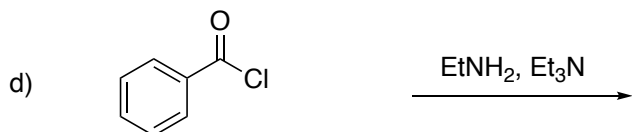
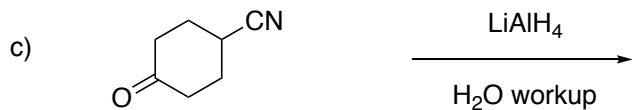


b) For each of the following pairs of compounds, circle the one that has the hydrogen (highlighted) with **lower pKa**. (3pts each)

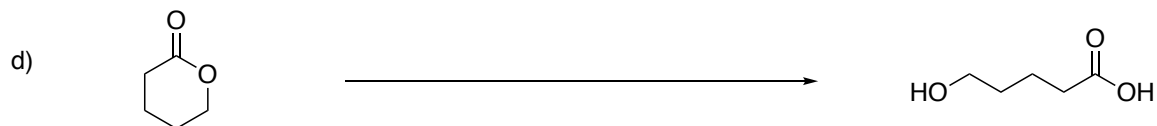
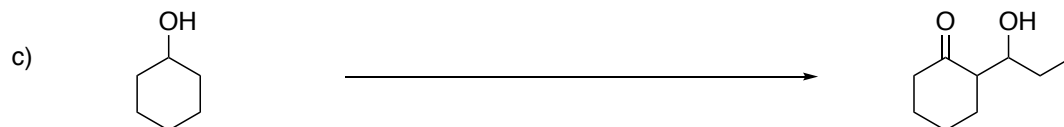
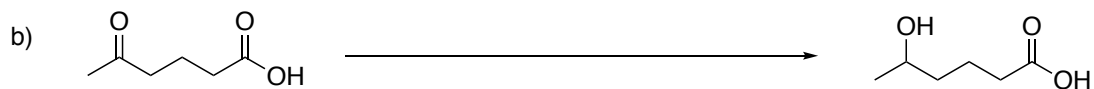


2) (20 pts) Give the single major product of each of the following reactions. For these questions, please ignore stereochemistry – the major product may be a mixture of diastereomers – ignore racemates.

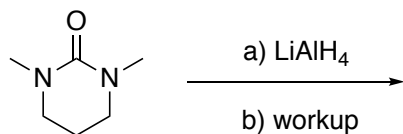




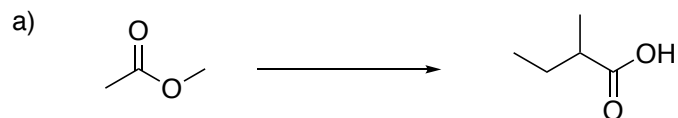
3) (20 pts) Propose reagents for accomplishing the following transformations. NOTE: more than one step may be required! Try to make your synthesis efficient (i.e. the desired product should be the major product, and generally a shorter synthesis is better than a longer one). You must use the starting material given; you may use any other reagents you need, including organometallic reagents such as Grignards, alkyllithiums, and dialkyl cuprates.



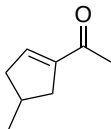
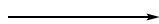
4) (16 pts) Provide the product and mechanism for the following reaction. Show every intermediate with the proper charges and all the arrows required for each step of the reaction. (4 pts for product, 12 pts for mechanism).



5) (20 pts) Propose a synthesis of each of the following **two (2)** targets **from the given starting material**. Other allowed starting materials include organic molecules containing **five (5)** carbons or less. You may use any necessary inorganic reagents. Try to make your synthesis efficient (i.e. the desired product should be the major product, and generally a shorter synthesis is better than a longer one). More than one step may be required.



b)



(ignore the stereochemistry of the methyl group on the ring)