

Easily Legible Printed Name: _____

CHEM 3451, Spring 2018
Professor Walba
Third Hour Exam
April 17, 2018

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

Signature: _____

Recitation TA Name: _____

Recitation day and time: _____

This is a closed-book exam. The use of notes, calculators, scratch paper, or cell phones will not be allowed during the exam. You may use models brought in a clear Ziploc bag. Please put all your answers on the test in the appropriate place. Use the backs of the pages for scratch (there are two additional blank scratch sheets after the last page of the exam). DO NOT PUT ANSWERS ON THE SCRATCH SHEETS.

scores:

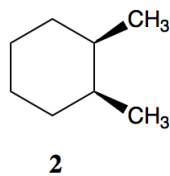
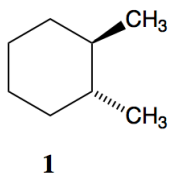
- 1)
- 2)
- 3)
- 4)
- 5)

PLEASE read the questions very carefully!

1A								8A
1 H	2A		3A	4A	5A	6A	7A	2 He
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	

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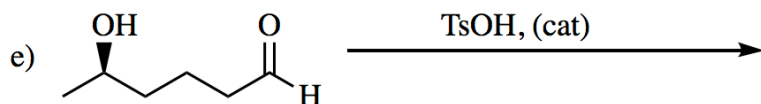
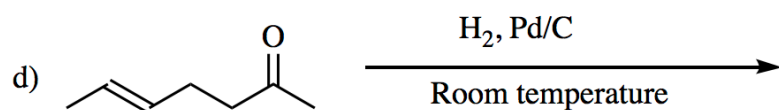
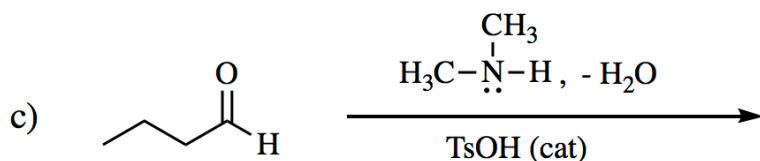
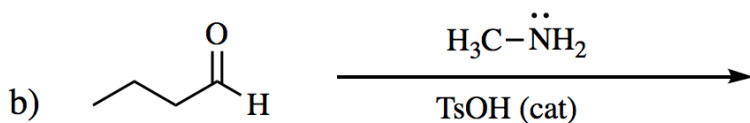
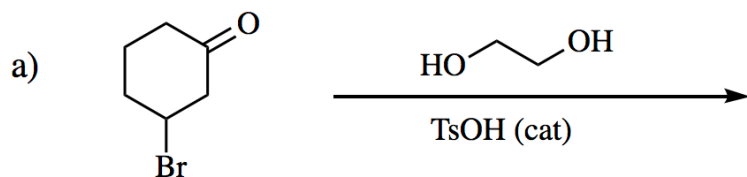
1) (20 pts) a) Carefully draw the **two "flip-chair" conformations for each** of the dimethylcyclohexane isomers below (assume that compound **1** is a single pure enantiomer), **AND circle the most stable conformation for each compound**. If two conformations have the same energy, write "same" in the box.



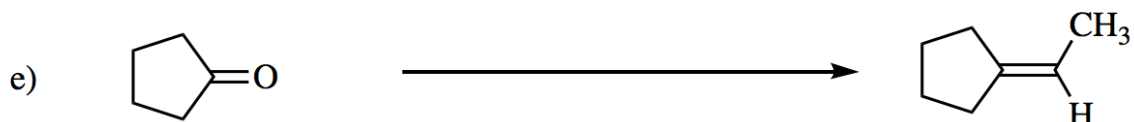
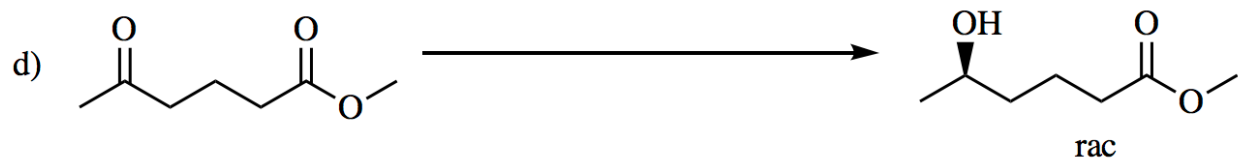
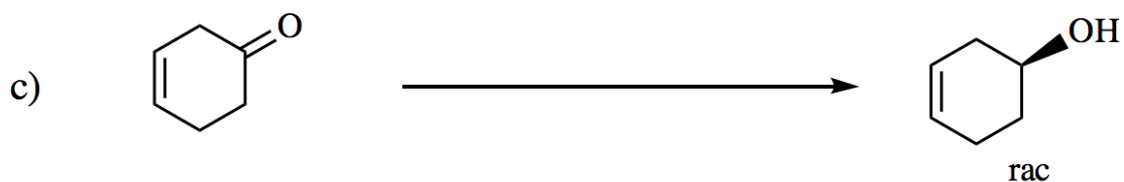
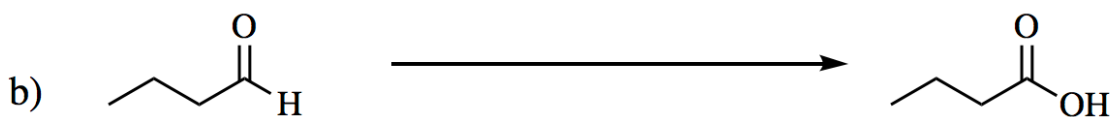
1)

2)

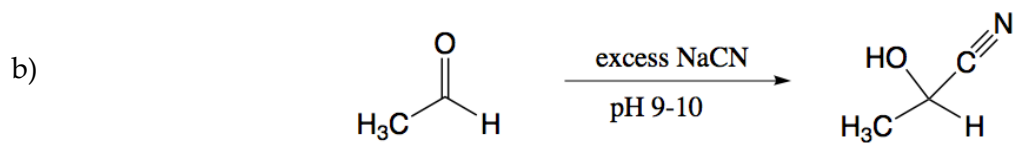
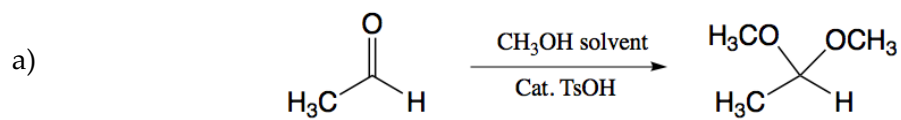
2) (20 pts) Give the single major product (or two major products if two are formed) for each of the following reactions, carefully showing stereochemistry using wedges and dashes if appropriate. If a racemate is formed, show only one enantiomer and label it "rac." Assume chiral starting materials are single pure enantiomers unless they are labeled "rac."



3) (20 pts) Propose reagents for accomplishing each of the following transformations. For reactions involving sequential addition of reagents, label the two steps using letters. Make your synthesis efficient (i.e. the target product should be the major product). Assume chiral starting materials and products are single pure enantiomers unless they are labeled "rac."



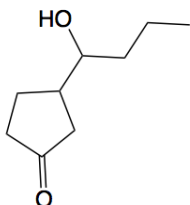
4) (20 pts) Propose an arrow-pushing mechanism for each of the following reactions.



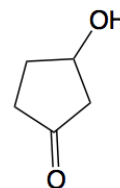
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5) (20 pts) Propose a synthesis for each of the following targets starting with alcohols containing five carbons or less. Assume you have access to necessary inorganic reagents, and triphenylphosphine. You may use any necessary inorganic reagents. Try to make your syntheses efficient (i.e. the target should be produced in the highest possible yield). More than one step will be required. Please show all the intermediates in your synthesis (not intermediates in the mechanisms, but actual isolated molecules on the path from starting material to product). Please put reagents for reactions involving sequential addition of reagents, over an arrow using letters (a, b, c...). Please do **not** put multiple reactions over one arrow.

a)



NOTE: For question **5a** you may start with this keto-alcohol:



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5) – continued

b)

