

Chem 0320
Dennis P. Curran
Mar. 2, 2010
Exam 2

Name: _____

Signature: _____

Answer all questions on this exam. If you need more space than that provided, use the back of any page.

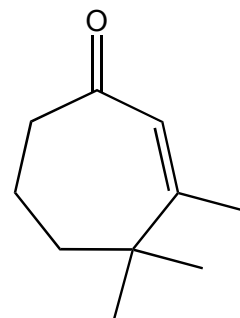
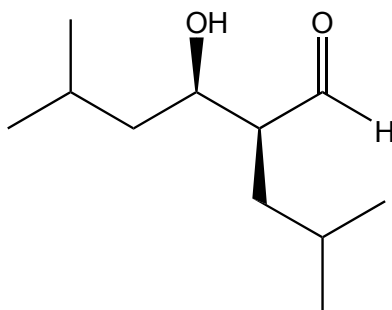
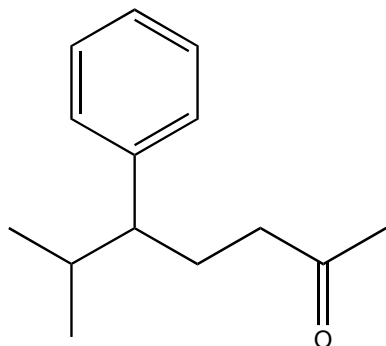
1. _____ (10 points) Names
 2. _____ (30 points) Short Answers
 3. _____ (30 points) Reactions
 4. _____ (20 points) Mechanisms
 5. _____ (10 points) Multi-step Syntheses
- TOTAL _____ (100 points)

The test has **9** pages (including this cover page) and **5** questions
The exam ends at 12:15 pm sharp.

Good Luck !!!

1) Names (10 points)

a) Provide acceptable names for the following compounds (don't forget stereochemical descriptors, *R/S*, *E/Z*, cis/trans, if needed). (6 points)



b) Draw clear structures of the following compounds. (4 points)

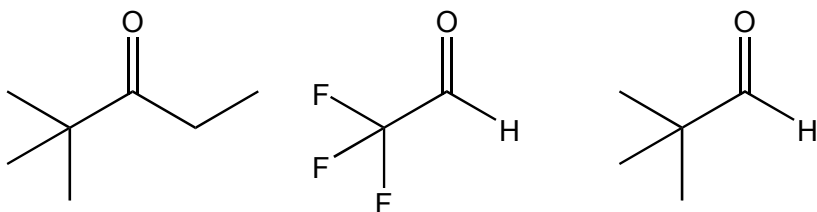
3,3-dimethylcyclohexanone dimethyl acetal

(*E*)-5-hydroxy-3-methylhex-2-enoic acid

2) Short Answer Questions

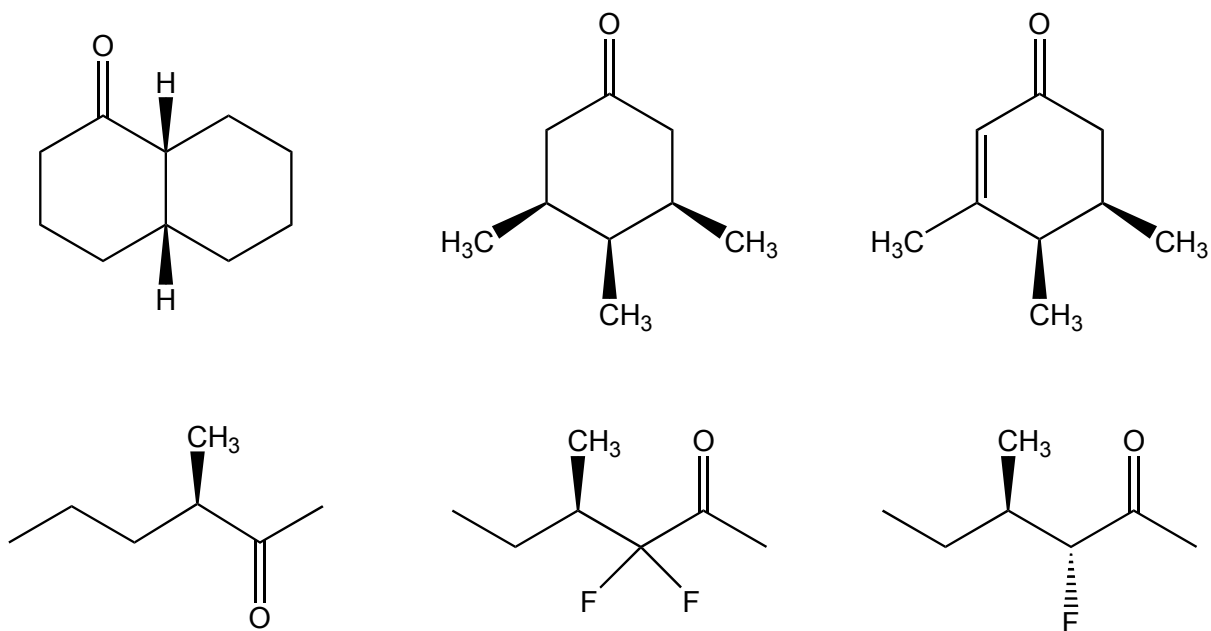
Briefly but clearly answer the following questions (5 x 6 = 30 points).

a) Arrange the following compounds in order of increasing likelihood to form a hydrate in the presence of water. Briefly explain your trend.

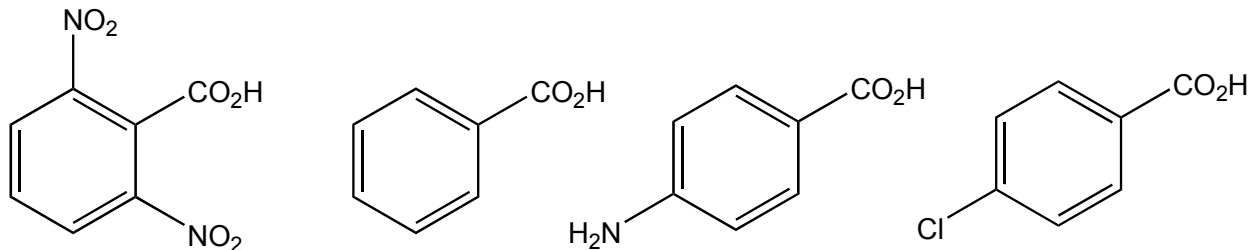


b) Draw the Lewis structure of lithium diisopropylamide (LDA).

c) Indicate which of the following compounds are subject to base-catalyzed epimerization or racemization.



d) Arrange the following acids in order of increasing acidity (most acidic last).



e) Draw a specific example of the following kinds of compounds. Do **not** use "R" groups, or "X" groups, or leave open valencies.

i) an imine derivative of a cyclic ketone

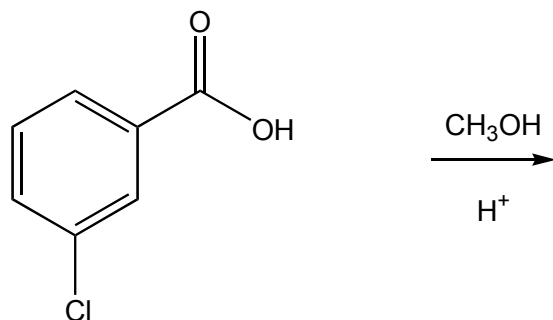
ii) an example of tautomerization (show two tautomers)

iii) a hemi-acetal of an aldehyde

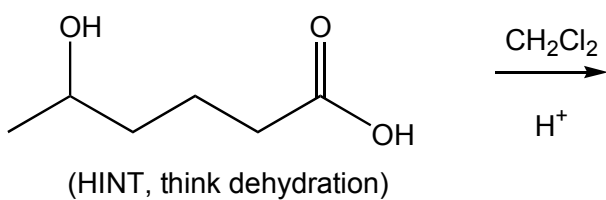
3) Reactions (10 x 3 = 30 points)

Show the products of the following reactions:

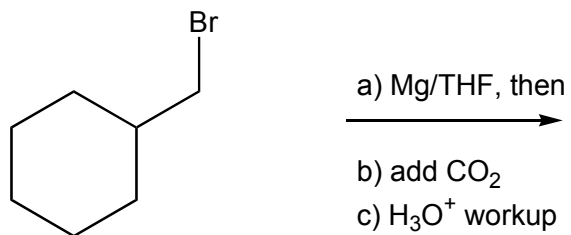
a)



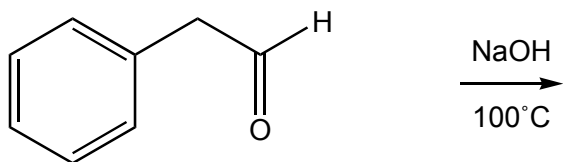
b)



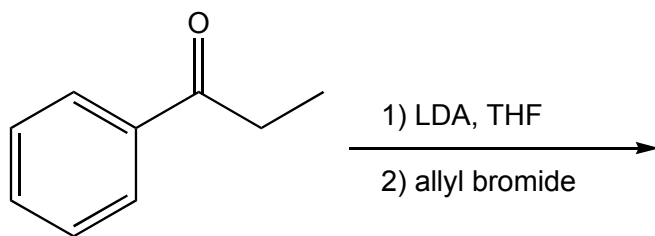
c)

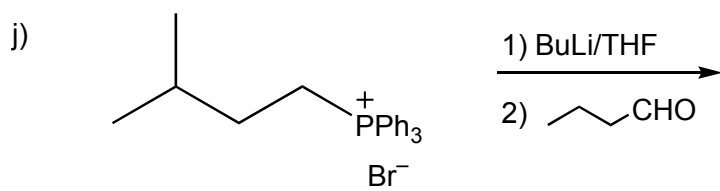
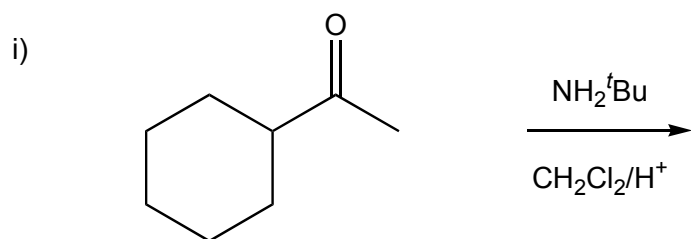
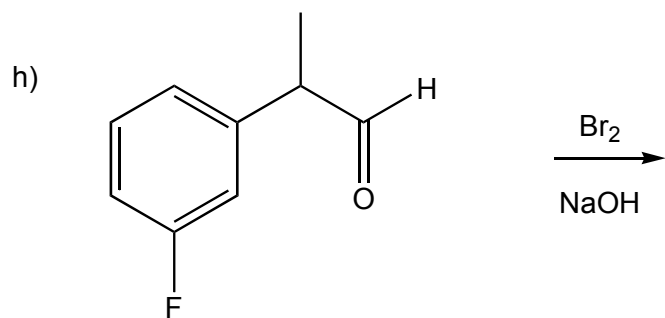
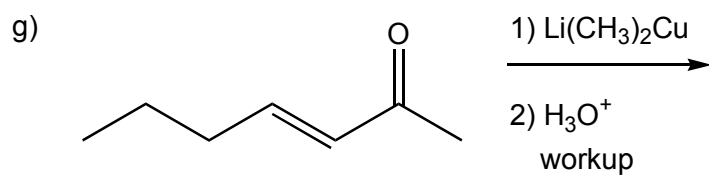
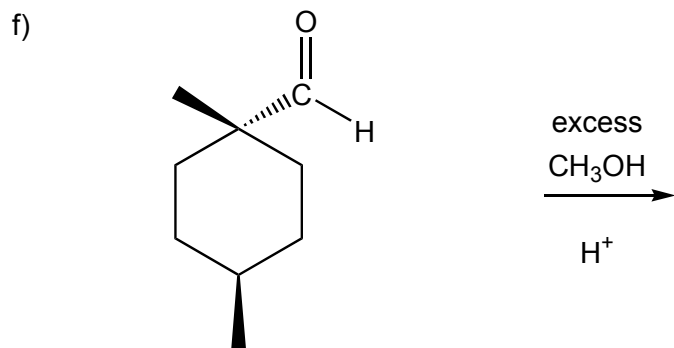


d)



e)

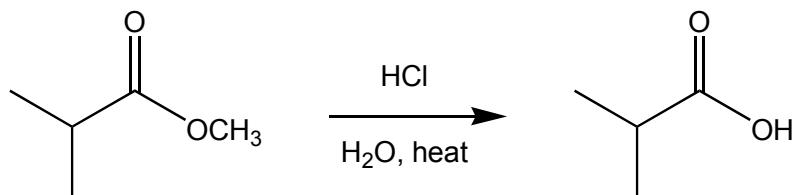




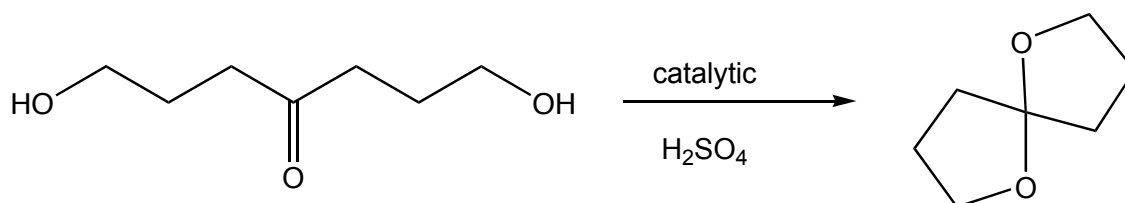
4) Mechanisms

Show a clear, step-by-step mechanisms for the following reactions. Use arrows to track electron flow (4 x 5 = 20 points):

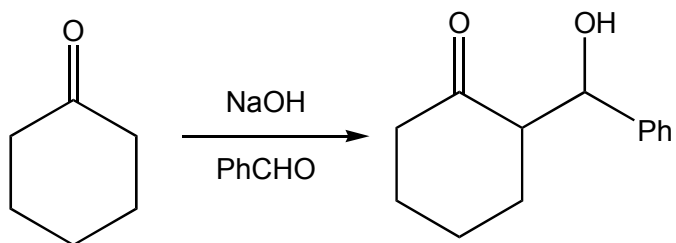
a) acid hydrolysis



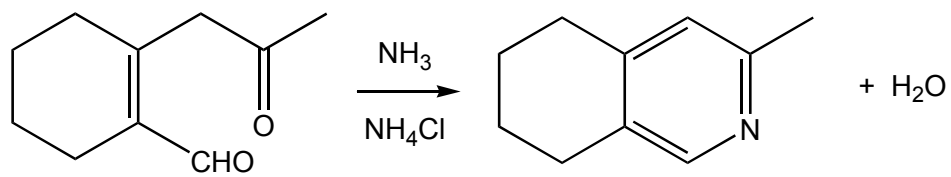
b) spiroacetal formation (an intramolecular acetal-forming reaction)



c) Cross-aldol reaction.



d) Formation of a pyridine ring (HINT, think imine/enamine formation).



5) Multi-step Synthesis (10 points)

Propose an efficient sequence of reactions for **two of the following three** transformations.

