

Third 2-Hour Exam

By printing your name below, you pledge that

"On my honor, as a University of Colorado at Boulder student,
I have neither given nor received unauthorized assistance on this work."

Name _____

Recitation TA's Name: _____ [Amy, Kate or Katie] [1 pt]

Recitation Day and Time: _____

Points:

Page #	Max. Points	Your Score
1	1	
2	10	
3	9	
4	10	
5	20	
6	10	
7	15	
8	15	
9	10	
		_____ TOTAL (out of 100)

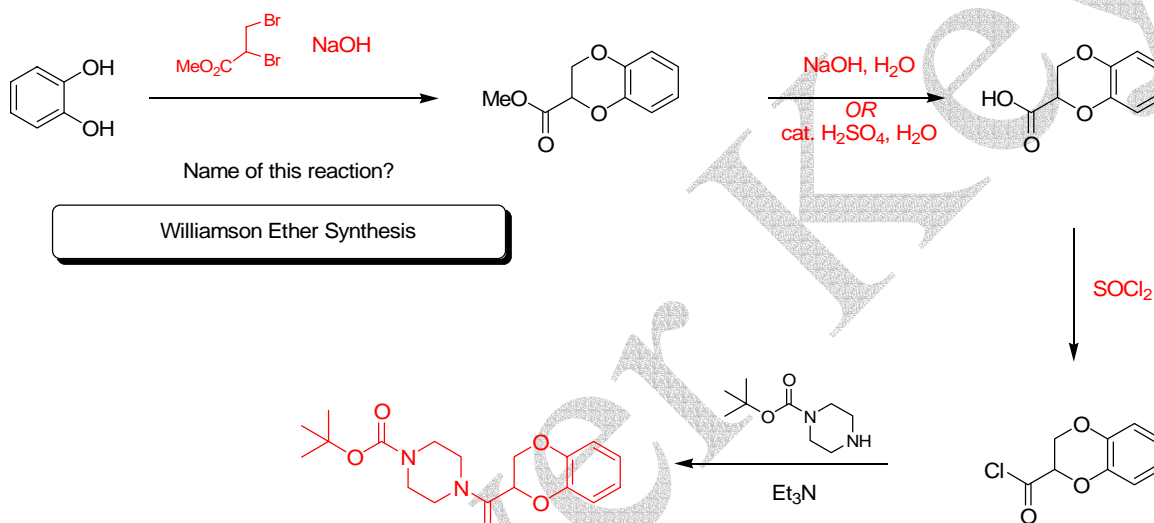
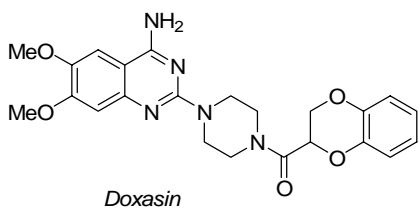
General Instructions:

- This is a closed book exam! No notes and no molecular models may be used
- You have 2 hours to complete the exam
- Write your name on the top of each page
- Use the back of pages for scratch paper
- Please draw neat cyclohexanes where required!
- PLEASE Don't cheat!

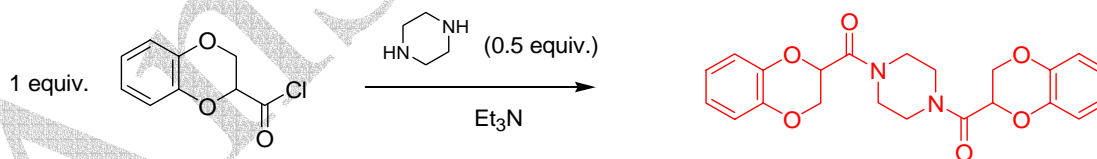
Question # 1

10 pts total

The sequence below comes from part of a synthesis of Doxasin, a drug used to treat hypertension. Fill in the reagents required for each step and answer any associated questions.



The final step requires the use of a protected diamine to ensure selectivity. What would you expect to get as the product if the reaction below were performed:



Question # 2

9 pts total

Circle the correct answer (1 pt each):

a) NaOMe is a stronger base than LDA

TRUE FALSE

b) LDA is used to form the more substituted enolate

TRUE FALSE

c) LDA is a synthetically useful reagent for the enolization of aldehydes

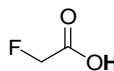
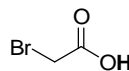
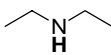
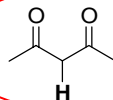
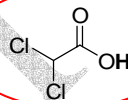
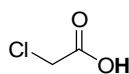
TRUE FALSE

d) The haloform reaction only works on methyl ketones

TRUE FALSE

e) For each of the following pairs of compounds, consider the proton shown in bold, and circle the stronger acid of the pair:

(1 pt each)

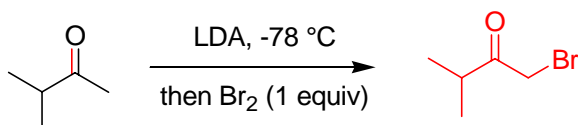


Question # 3

10 pts total

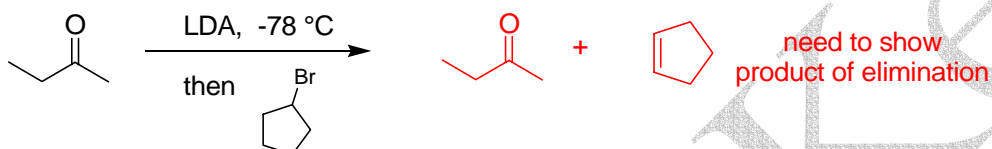
Draw the major product of the following reactions/reaction sequences. For part (d) be sure to indicate the stereochemistry of the product.

a)



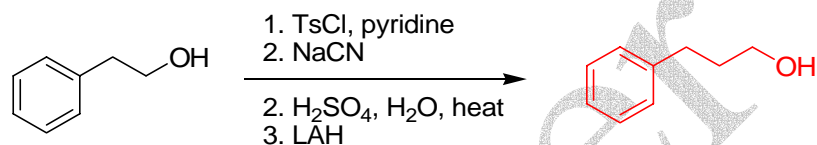
2 pt

b)



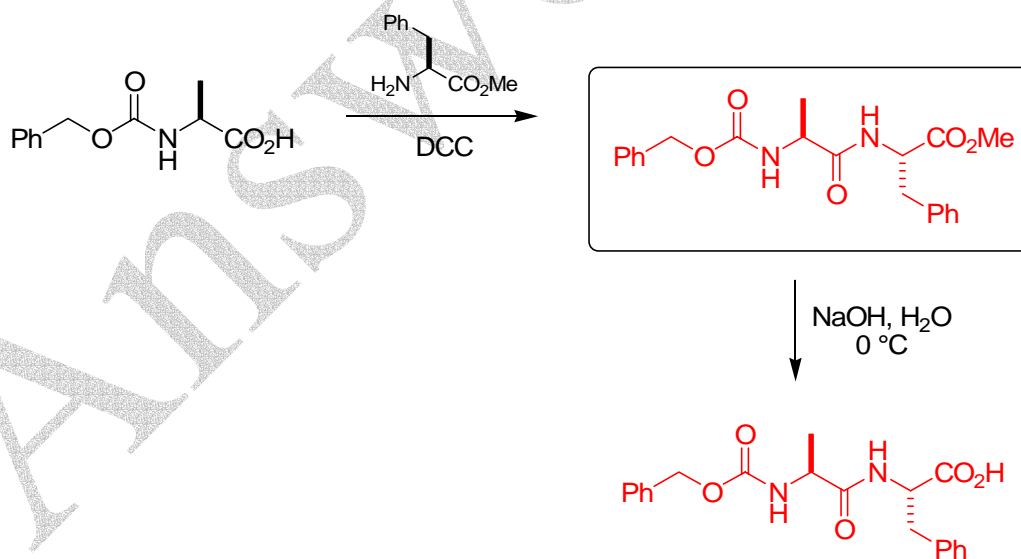
2 pt

c)



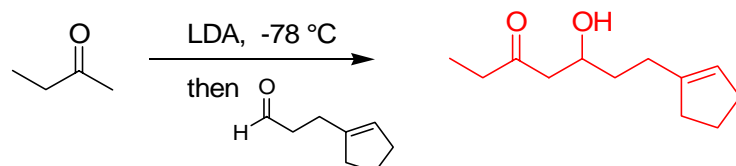
2 pt

d)



2 pt

e)

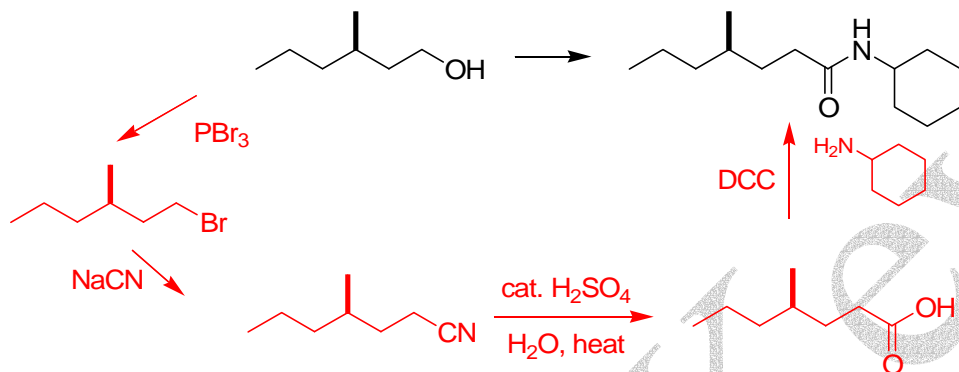


2 pt

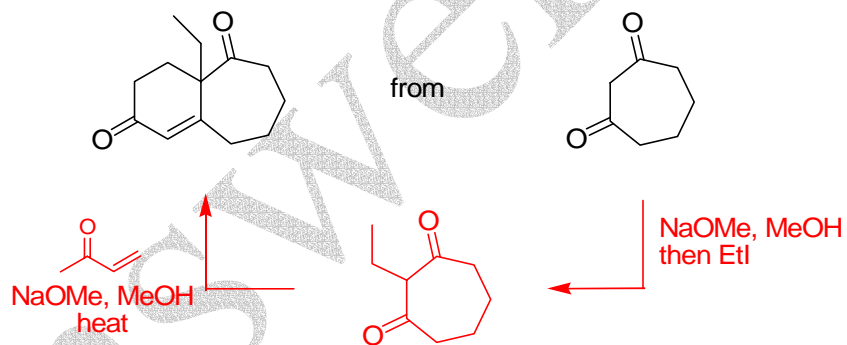
Question # 4

30 pts total

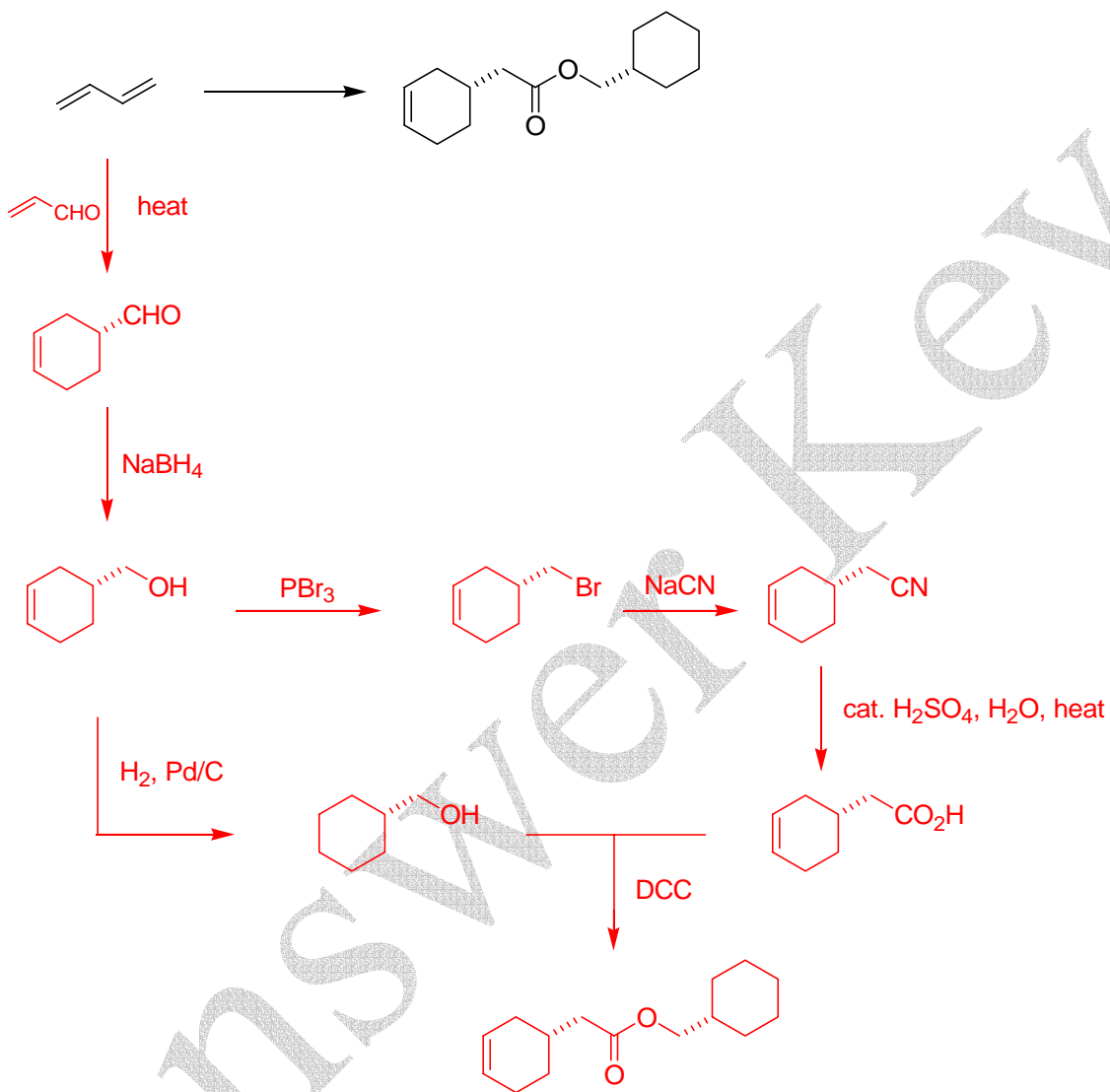
a) Complete the synthesis below from the starting material shown. You may use any inorganic reagents you chose plus any organic compounds you chose. If your synthesis requires more than one step show the products of each step.



b) Complete the synthesis below from the starting material shown. You may use any inorganic reagents you chose plus **organic compounds and reagents of 4 carbons or less**. If your synthesis requires more than one step show the products of each step.



c) Complete the synthesis below from the starting material shown. You may use any inorganic reagents you chose plus organic compounds and reagents of **3 carbons or less**. If your synthesis requires more than one step show the products of each step.

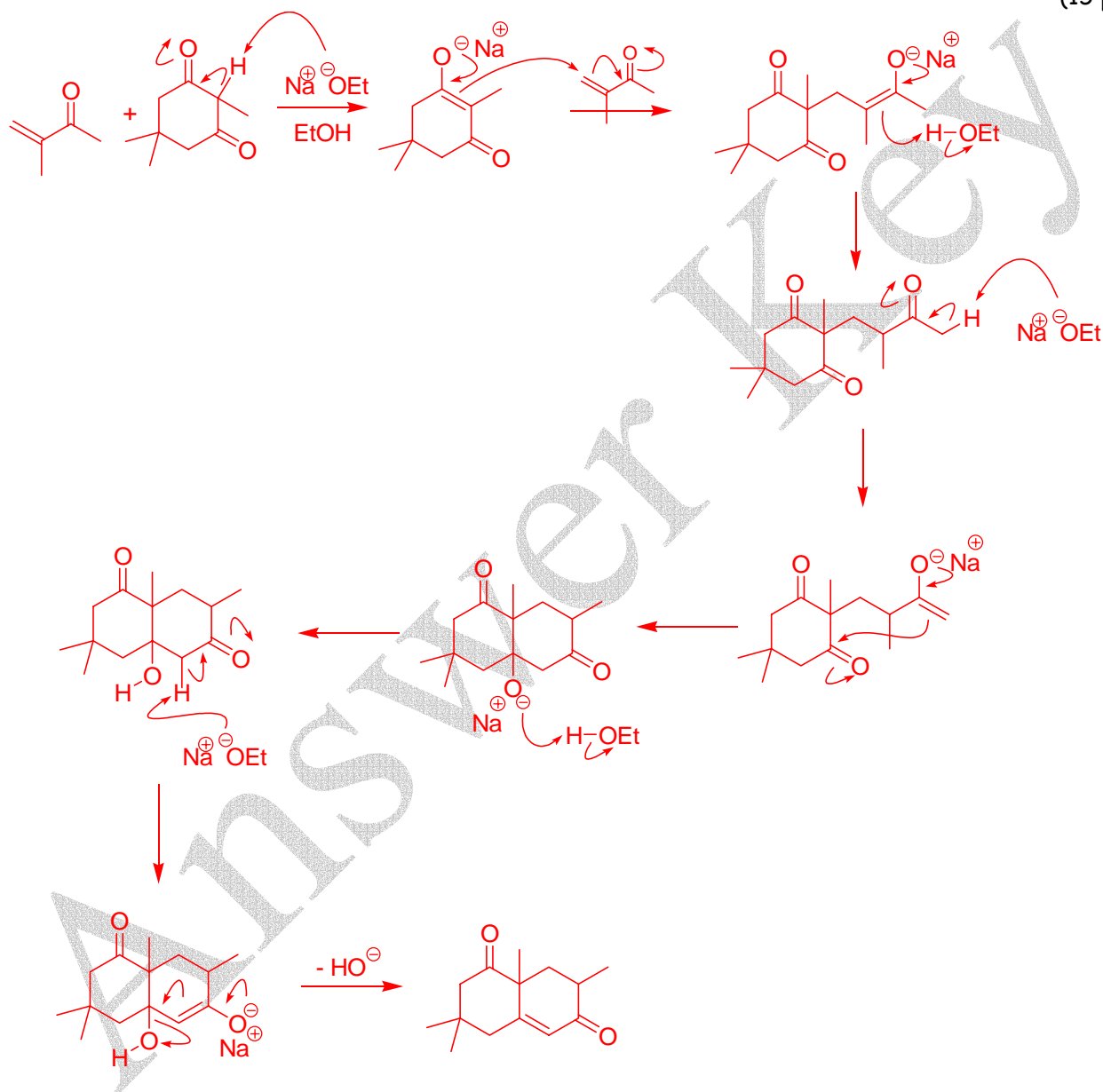


Question # 5**30 pts total**

Write the most plausible mechanism for the two following reactions. Be sure to show all the steps, intermediates, charges, and all the arrows required for each step [including aqueous workup if it is required].

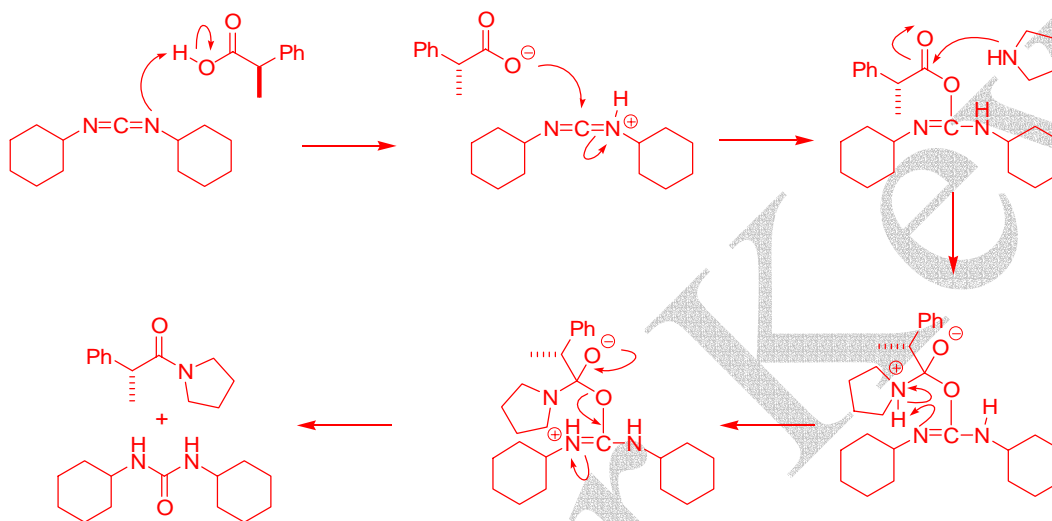
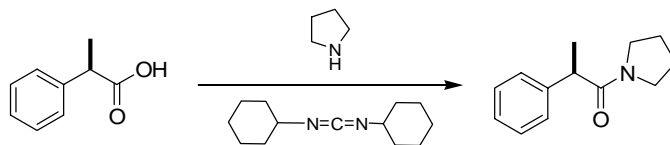
a)

(15 pts)



b)

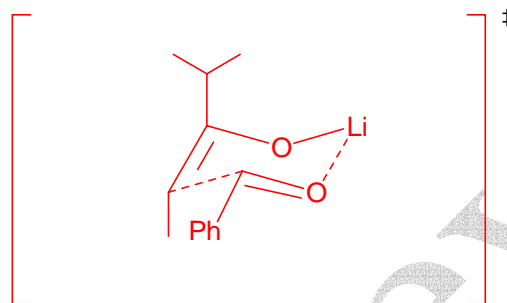
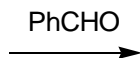
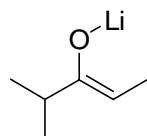
(15 pts)



Question # 6**10 pts total**

For the aldol reactions shown below provide the correct stereochemical descriptor for the enolate, draw the Zimmermann-Traxler transition state, and draw the product showing the relative stereochemistry that would be obtained.

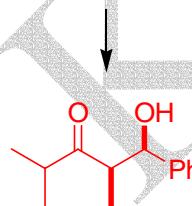
a)



circle the correct stereochemical descriptor for this enolate:

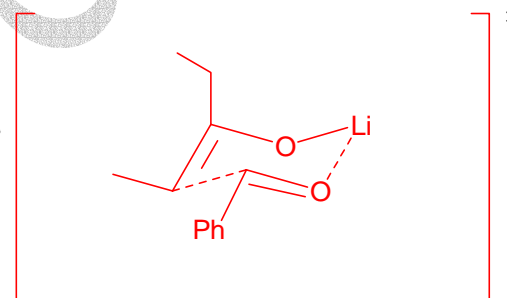
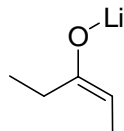
E **Z** R S

draw the correct Zimmermann-Traxler transition state model



draw the product and the correct relative stereochemistry

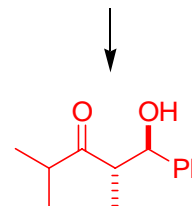
b)



circle the correct stereochemical descriptor for this enolate:

E Z R S

draw the correct Zimmermann-Traxler transition state model



draw the product and the correct relative stereochemistry