UNIVERSITY OF VICTORIA

CHEMISTRY 335

MIDTERM #1 — February 5, 2010

NAME:_____ **STUDENT ID:**_____

INSTRUCTOR: DR. FRASER HOF

TOTAL MARKS = **37**
DURATION: **50 minutes**

QUESTIONS ARE TO BE ANSWERED IN THE SPACE PROVIDED ON THE EXAM FORM

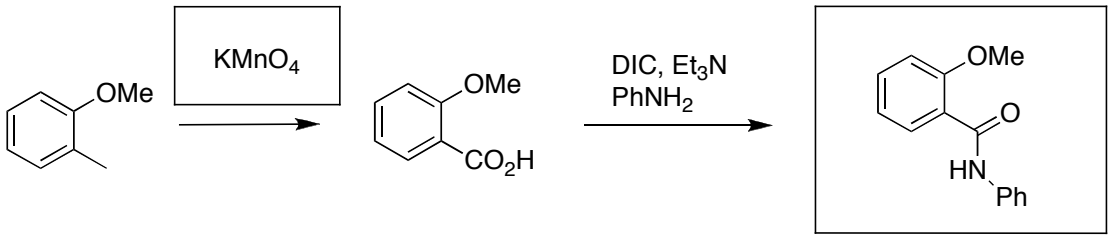
THIS EXAMINATION PAPER HAS **6 PAGES**, INCLUDING THIS COVER PAGE. COUNT THE NUMBER OF PAGES IN THIS EXAMINATION PAPER BEFORE YOU START TO WRITE, AND IMMEDIATELY REPORT ANY DISCREPANCY TO THE INVIGILATOR.

ANSWERS IN PENCIL ARE ACCEPTABLE, BUT WILL NOT BE ELIGIBLE FOR RE-GRADING.

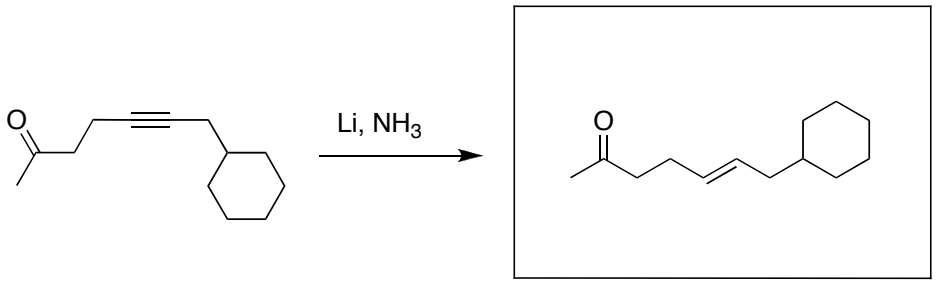
ANSWER KEY

1. (16 points total, 1 for each box) Fill in the boxes for each reaction with the major products, intermediates, or reagents and reaction conditions.

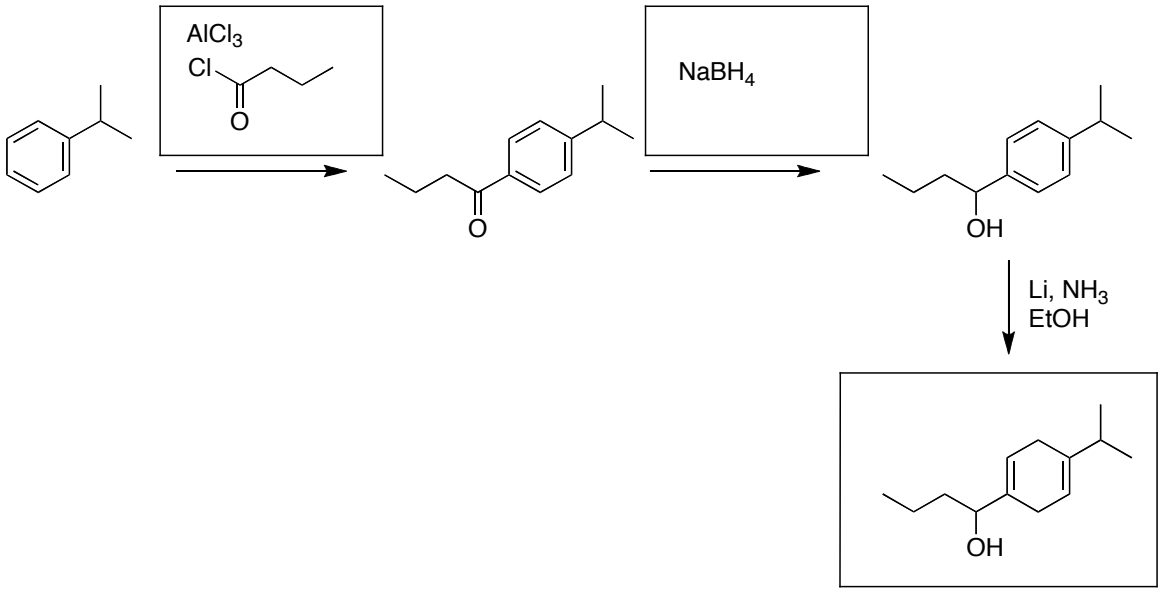
a)



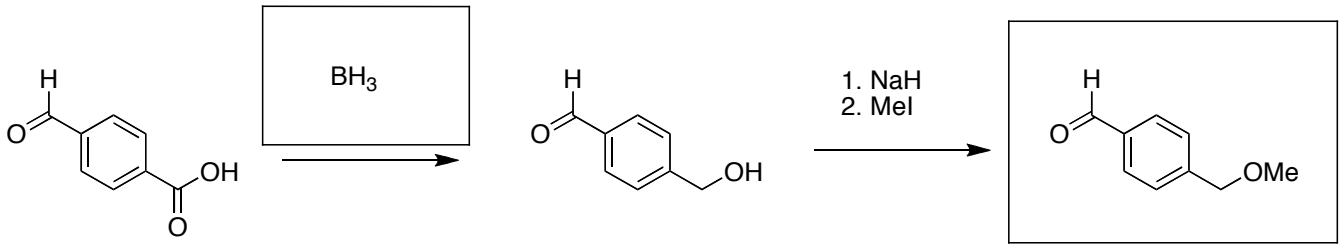
b)



c)

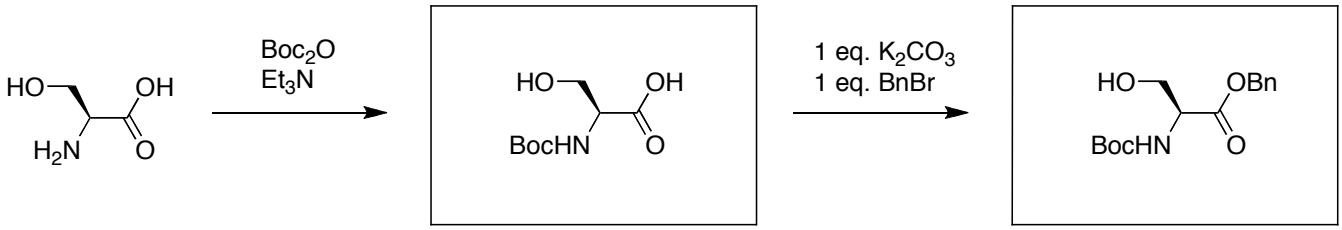


d)



1. (continued)

e)



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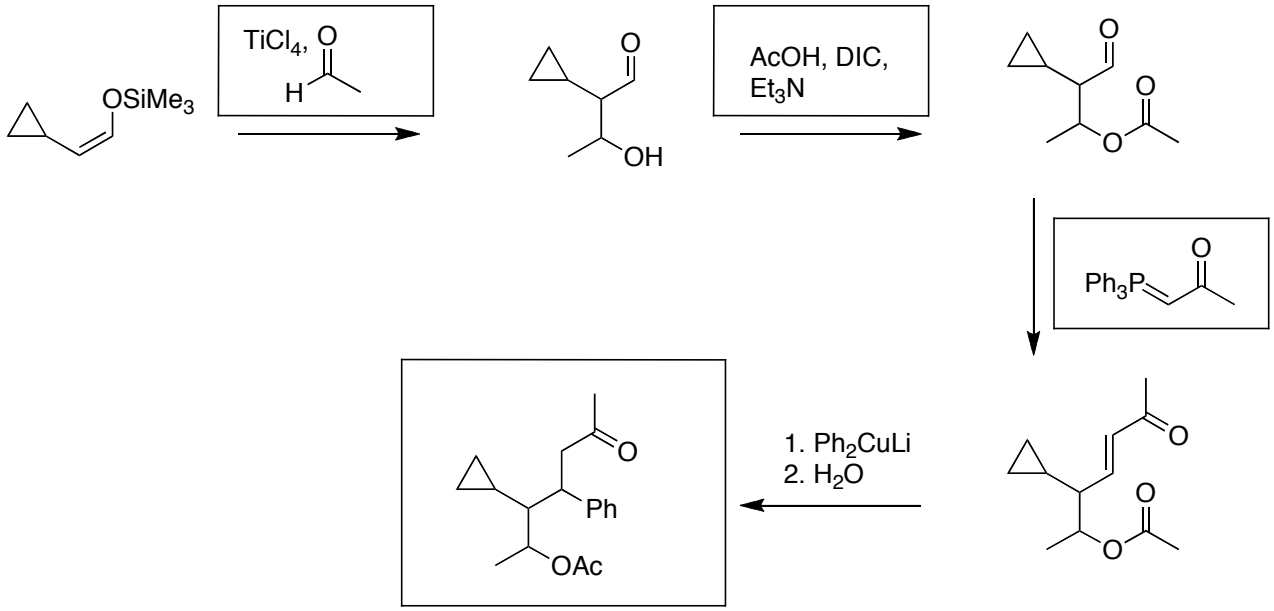
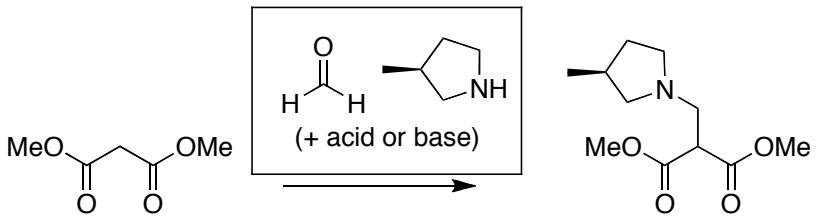
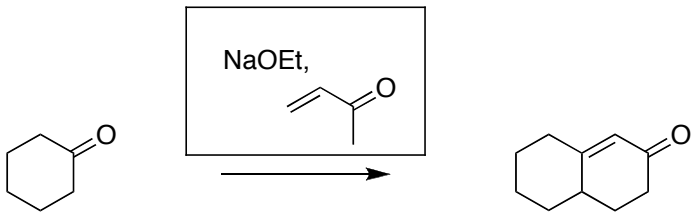


g)

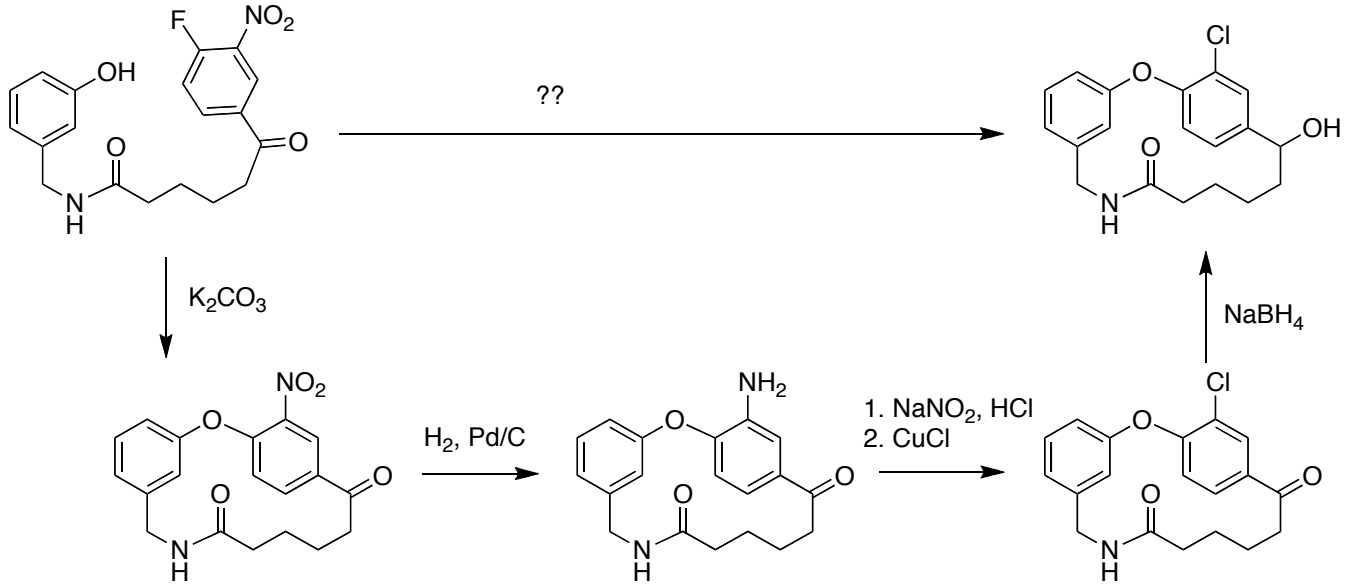


h)



2. (12 points total, 4 for each part) Design a synthesis for ALL of the following multi-step transformations. **Show all necessary reagents, reaction conditions, and intermediates in the space below each reaction.** Do not show mechanisms.

a)



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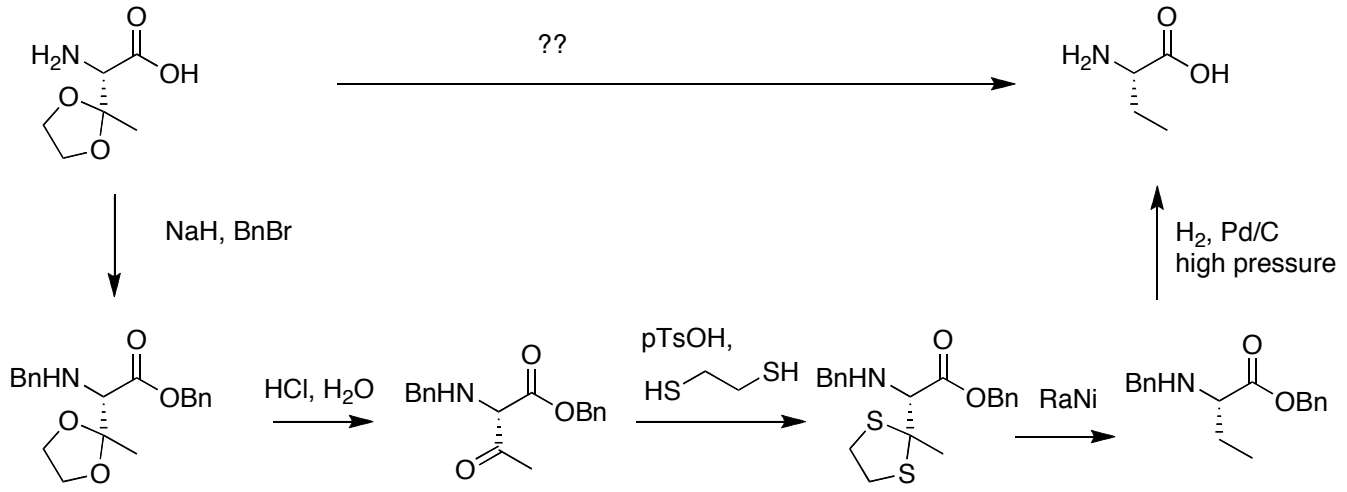
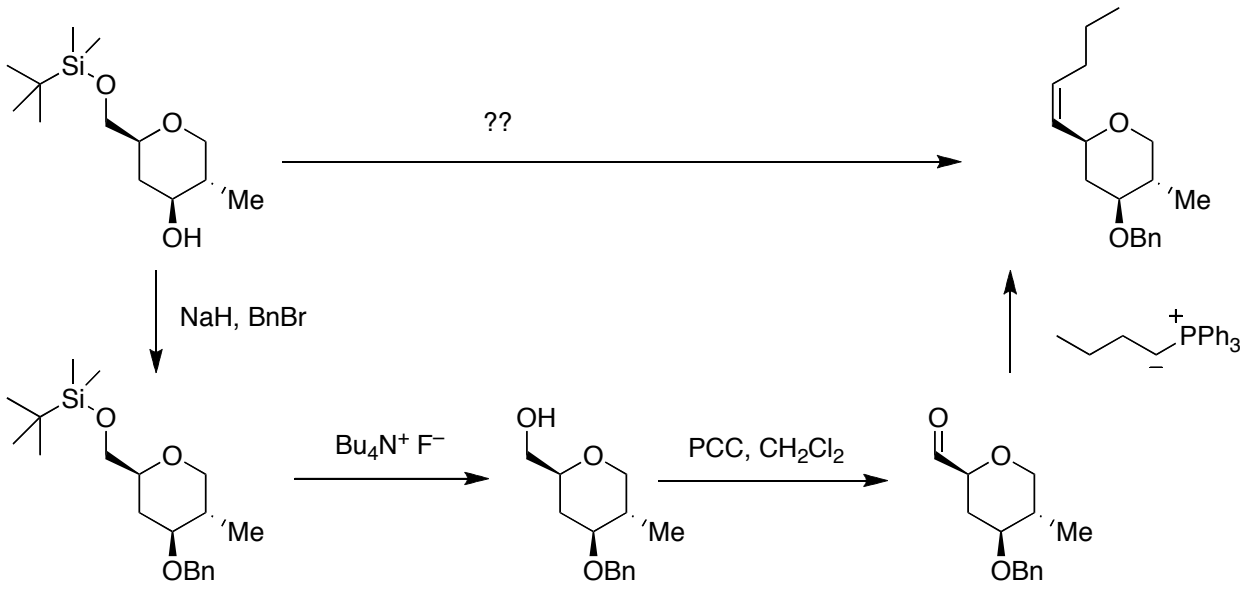
b)



2. (continued)

c)



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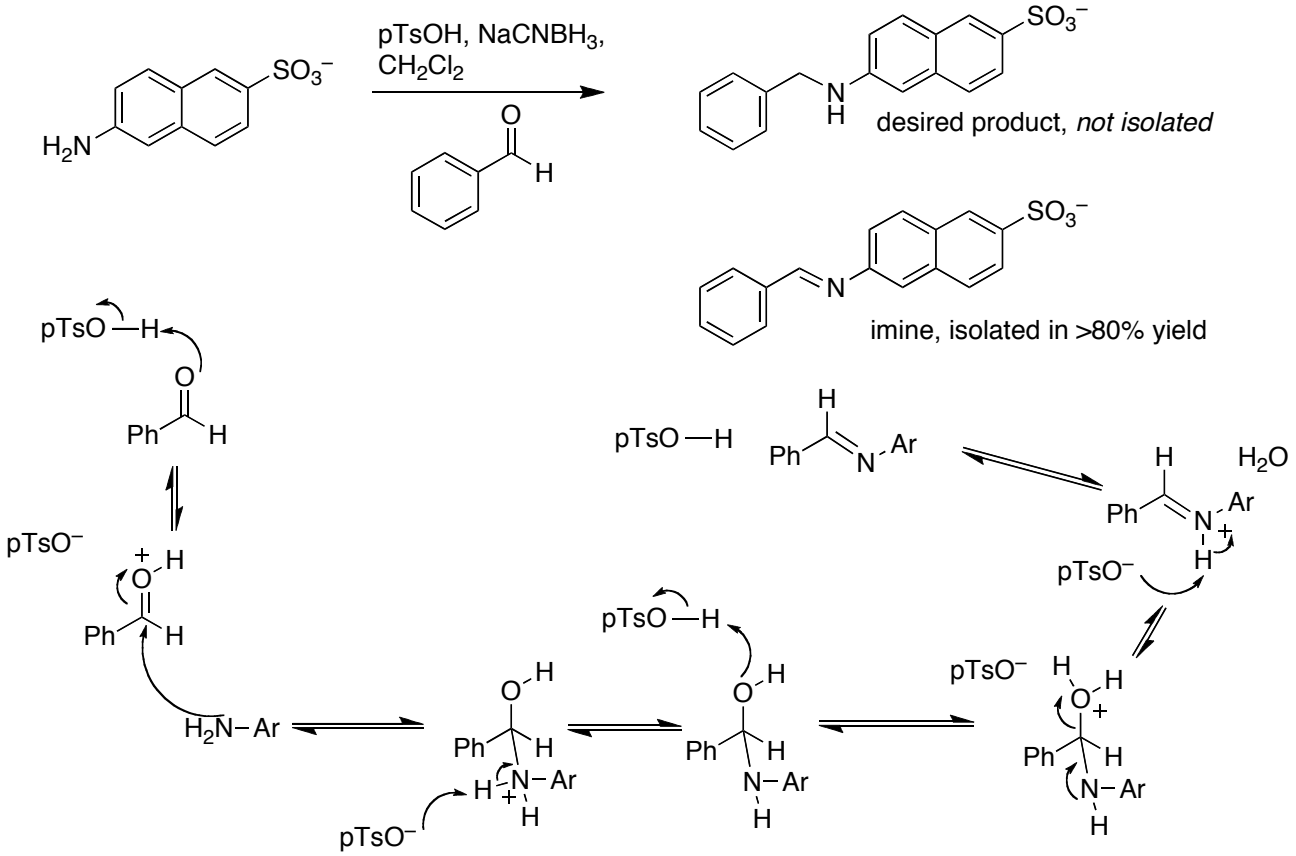
exam continues

3a. (6 points) Last year, a student in my lab (Ben) tried to do a reductive amination, and isolated instead the imine. **Give the detailed mechanism for the production of the imine, including all proton transfers, intermediates, and byproducts**.



3b. (1 point) Based on what you know about organic chemistry, why is this imine more stable than a typical imine?

This imine is conjugated with two aromatic rings, and conjugated functional groups are more stable.

3c. (2 points) Ben dissolved the imine in buffered water and tested it for activity against his protein target. He found instead that the imine decomposed within a few hours. **Why did the imine decompose under these conditions, and what were the products?** (no mechanism necessary)

The excess water pushes the imine-aldehyde equilibrium back to starting materials.