Chem 332
Exam 1
March 3, 2006
Prof. Fox
50 minutes
100 points

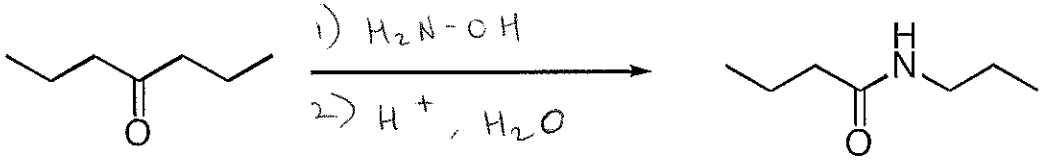
Show your work in detail

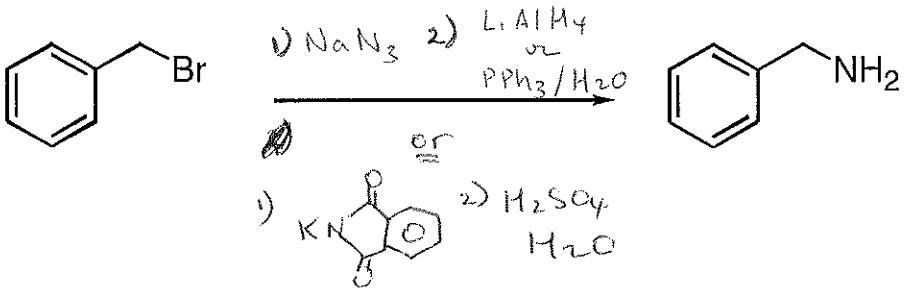
WRITE YOUR NAME ON EVERY PAGE

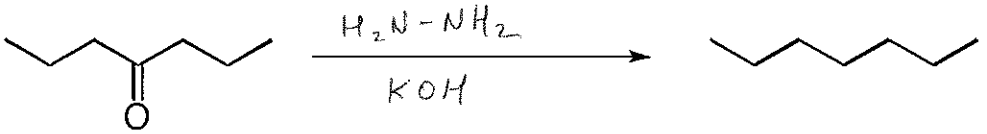
NAME _____

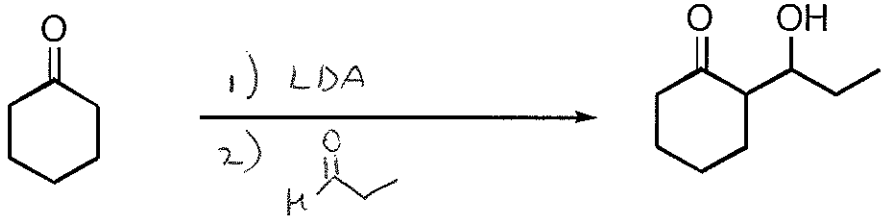
Chem 332, Exam 1 Spring 2006 **NAME** Key

1. Provide reagents for the following transformations (5 pts each)



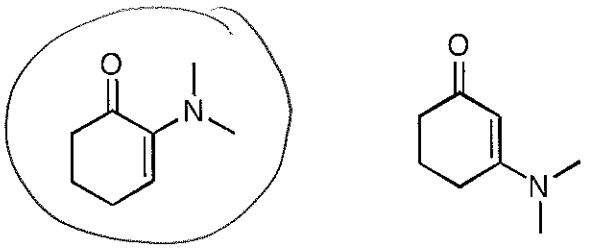


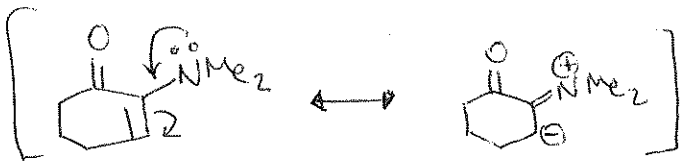




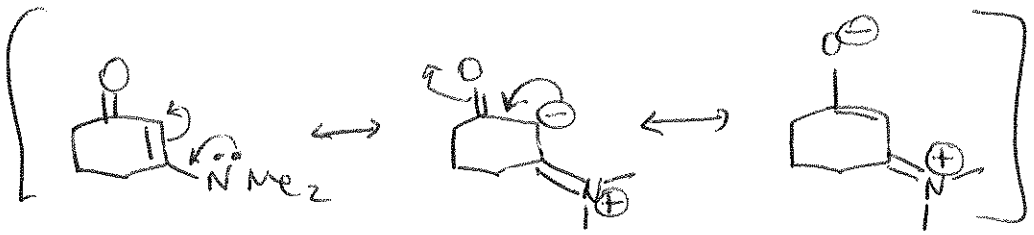
Chem 332, Exam 1 Spring 2006 **NAME** _____

2a Circle the product below that is the stronger amine base. Provide a detailed but brief explanation to support your answer. Use chemical structures to support your answer. (15 points)





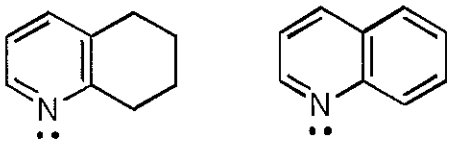
The first compound has only one resonance structure where the lone pair is delocalized with the alkene



The second compound has two resonance structures that are significant contributers to the bonding picture: stabilized enolate

The greater extent of conjugation for the amine of the second compound makes it less basic

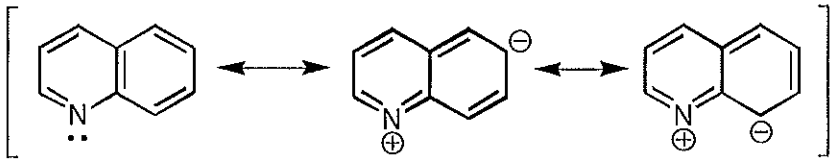
2b Consider compounds **A** and **B** below



A **B**

(15 points)

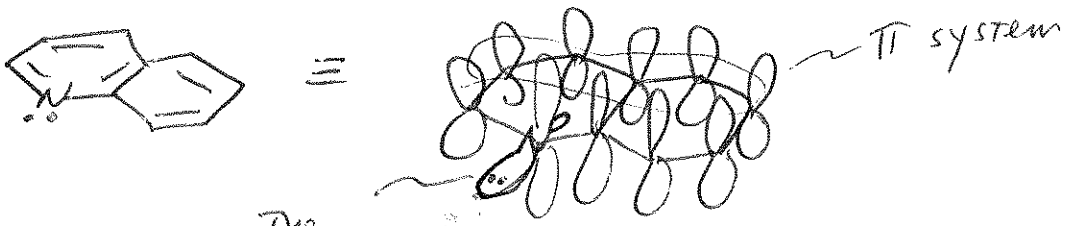
An overly ambitious student might predict compound **B** to be less basic than **A**, because the lone pair of **B** is conjugated with the neighboring aromatic ring as shown below.



B

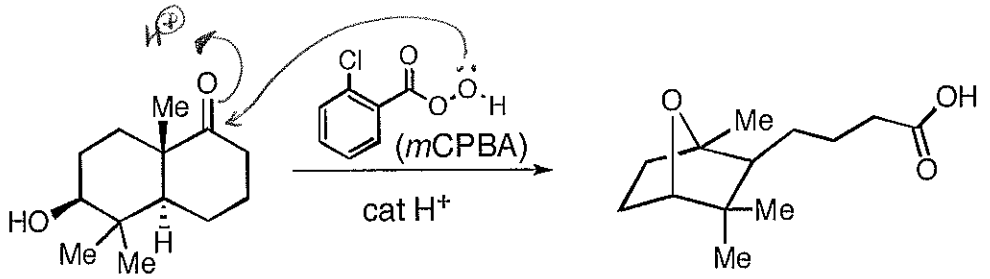
However, the analysis above is **incorrect:** the pKa's of the conjugate acids of **A** and **B** are nearly identical. Explain the flaw in the rationale above.

THESE RESONANCE STRUCTURES ARE INVALID BECAUSE THE LONE PAIR IS ORTHOGONAL TO THE π SYSTEM of the neighboring ring..

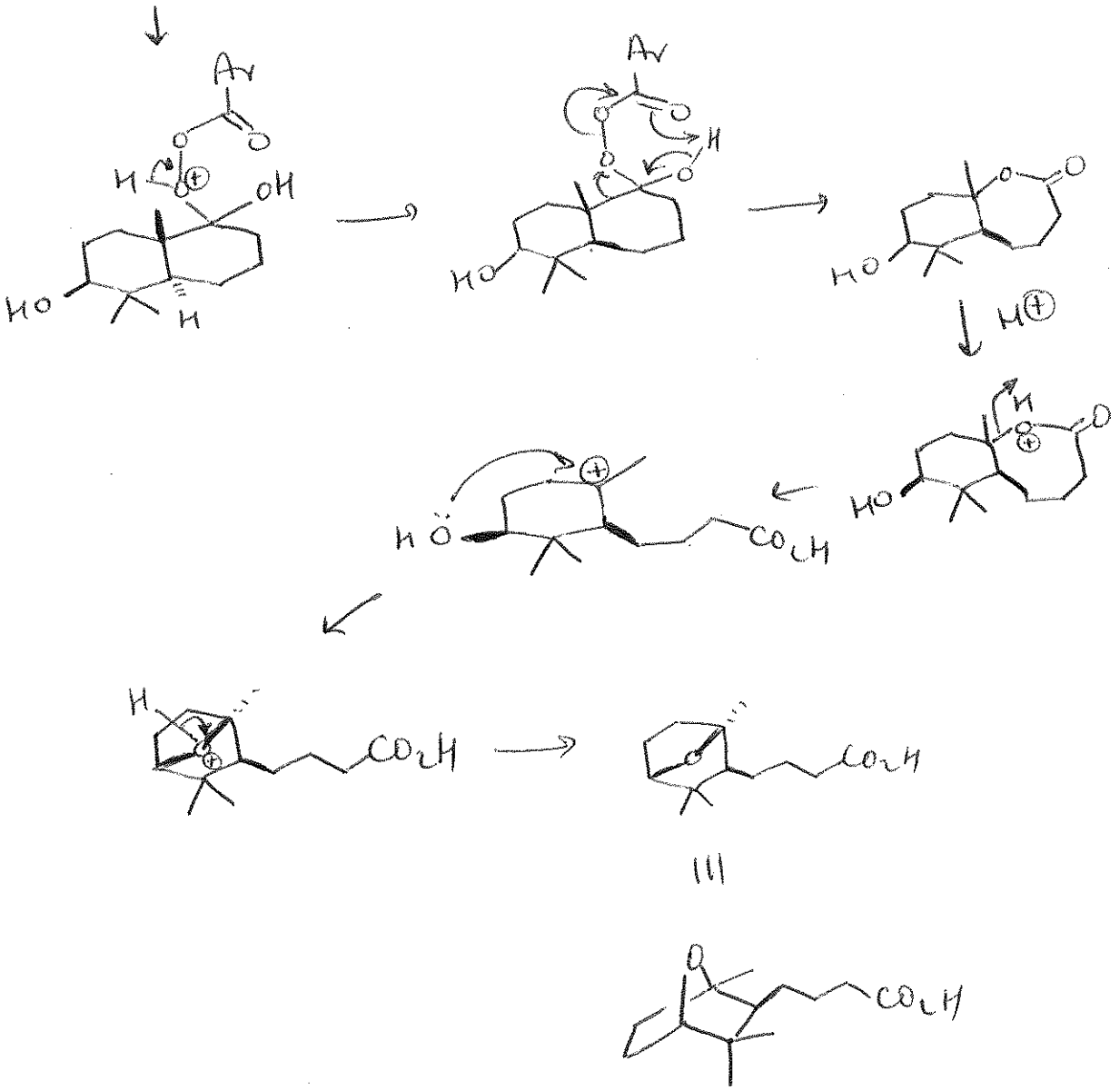


The lone pair NOT IN THE same plane AS THE π SYSTEM : No Conjugation

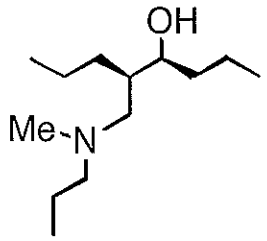
3 Provide a detailed arrow pushing mechanism. Show the mechanism of all steps.



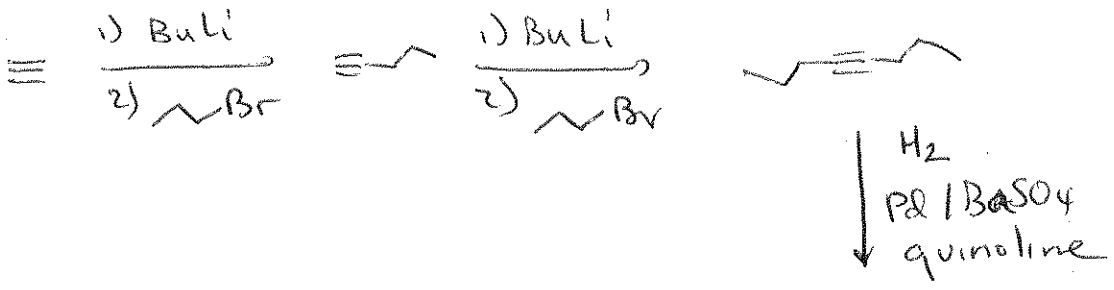
25 pts

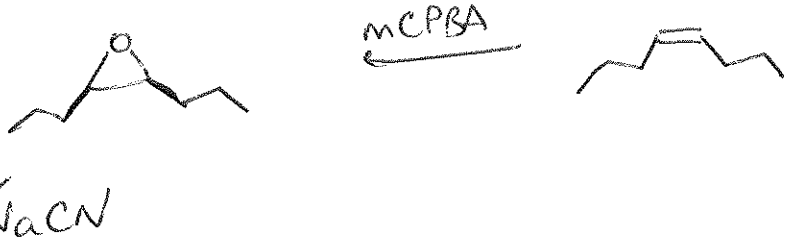


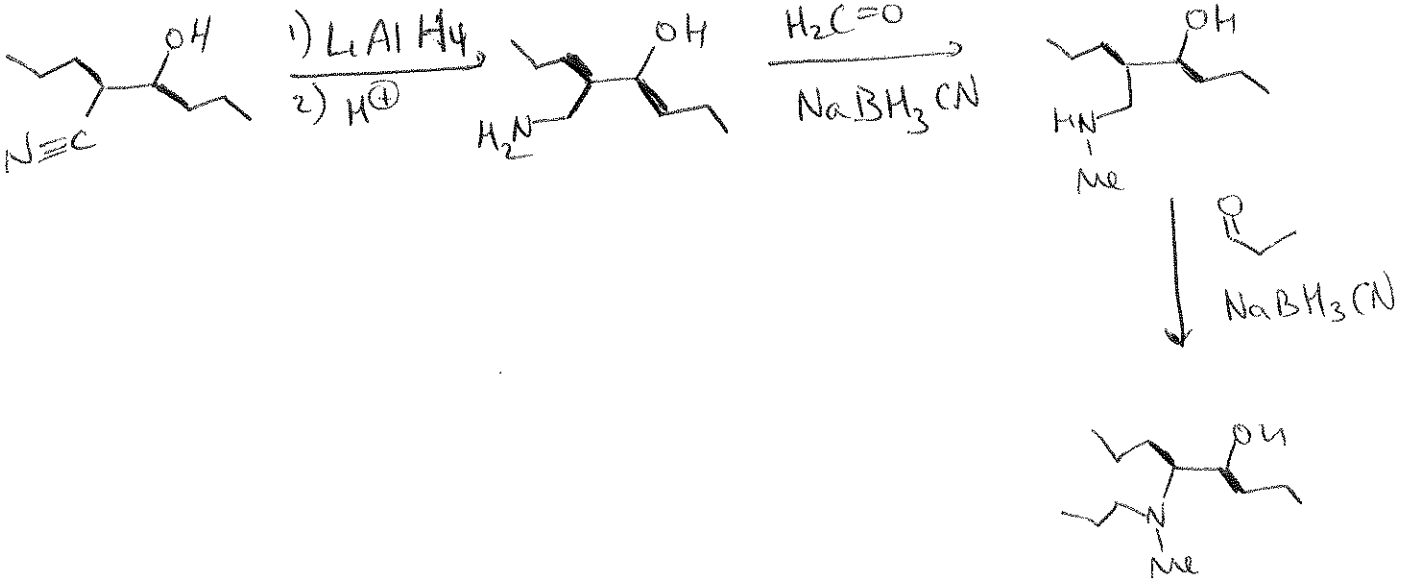
4 Provide a synthesis of **A** using any materials that contain **3 carbons or less.** Reagents that do not become incorporated into the product (e.g. nBuLi, PPh3) may be employed



25 pts







NAME **scratch paper**

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