Organic Chemistry c3444y
4th Hour Exam

Monday, April 29, 2002
Prof. Leighton

Name:_____   **ID#**_____

Signature:_____

■ Write your name on every page.

■ The exam is 5 pages long (*not* including this one). Please make sure you have all of the pages.

■ Write complete *but succinct* answers. **Good Luck!**

Question 1 (20 pts): _____

Question 2 (30 pts): _____

Question 3 (20 pts): _____

Question 4 30 pts): _____

Total (100 pts):_____
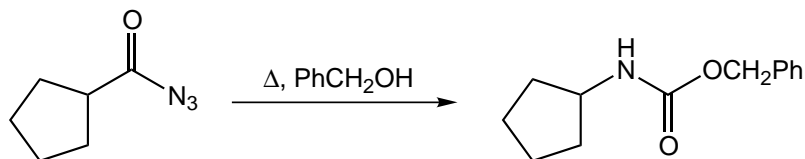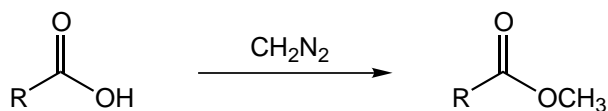
1. Provide detailed mechanisms for the following transformations:
   (*If you have trouble getting started on these problems, it will be helpful to begin by drawing out detailed Lewis dot/resonance structures.*)
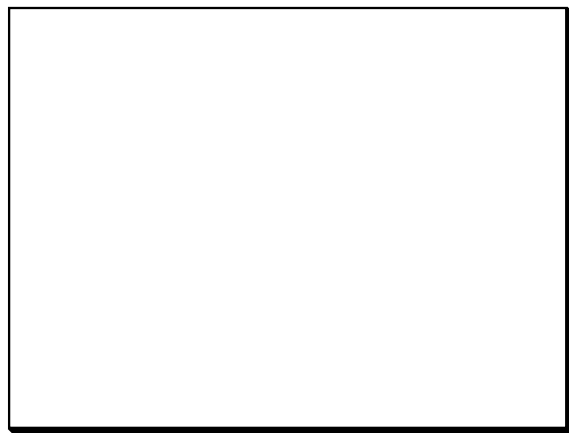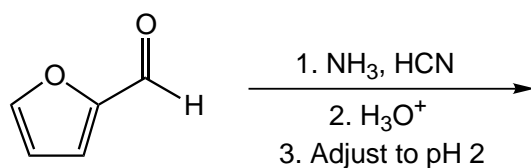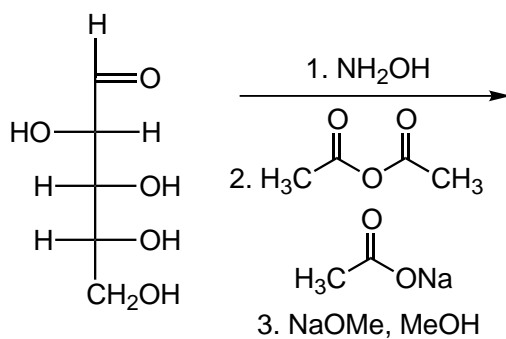
   a. (10 pts)

   Δ, PhCH$_2$OH

   b. (10 pts)

   CH$_2$N$_2$

2. Predict the major product(s) of the following reactions:

a. (10 pts)

1. NH_3, HCN

2. H_3O^+

3. Adjust to pH 2

b. (10 pts)

1. NH_2OH

2.

3. NaOMe, MeOH

c. (10 pts)

1.

2. $ZnCl_2$,

3. H_2, Pd
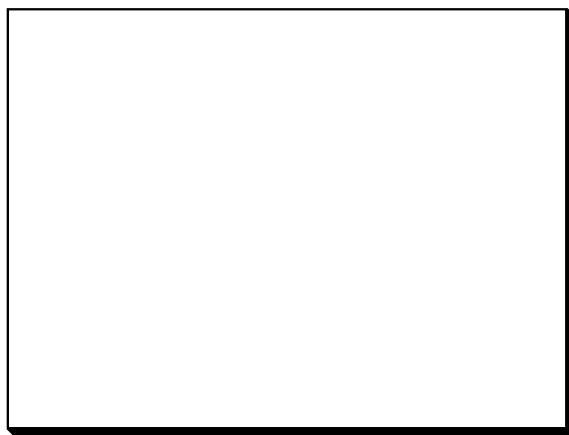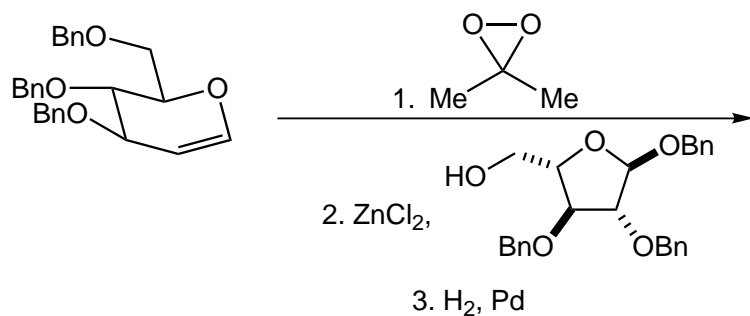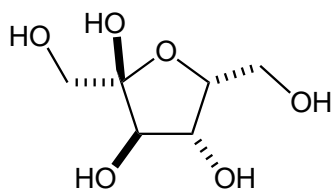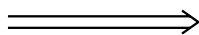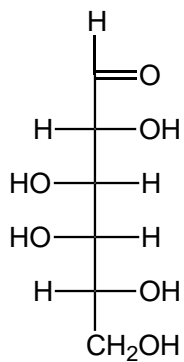
3. a. (10 pts) Provide a Fischer projection and a classification (*e.g.* D-aldotetrose) for the following carbohydrate:
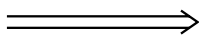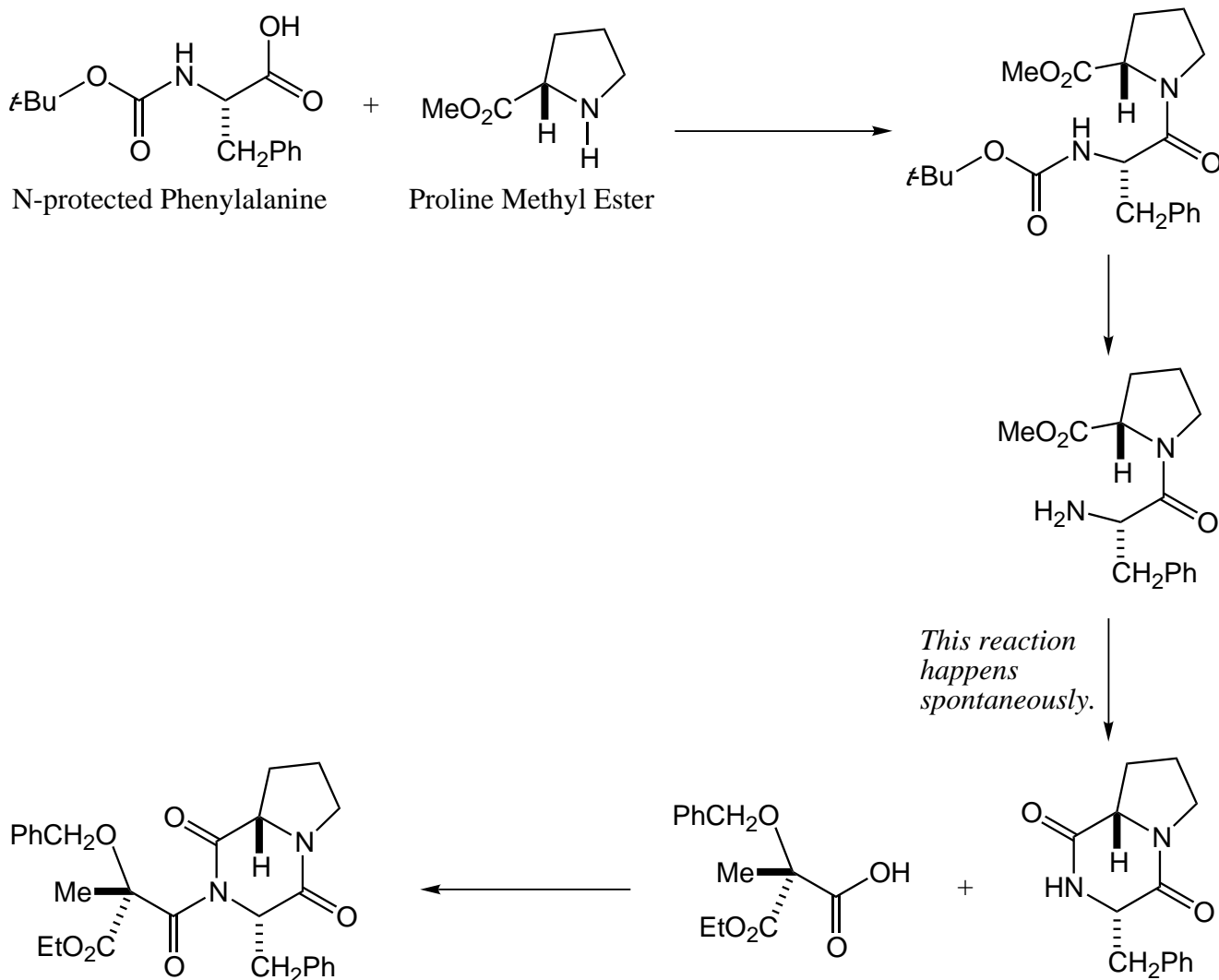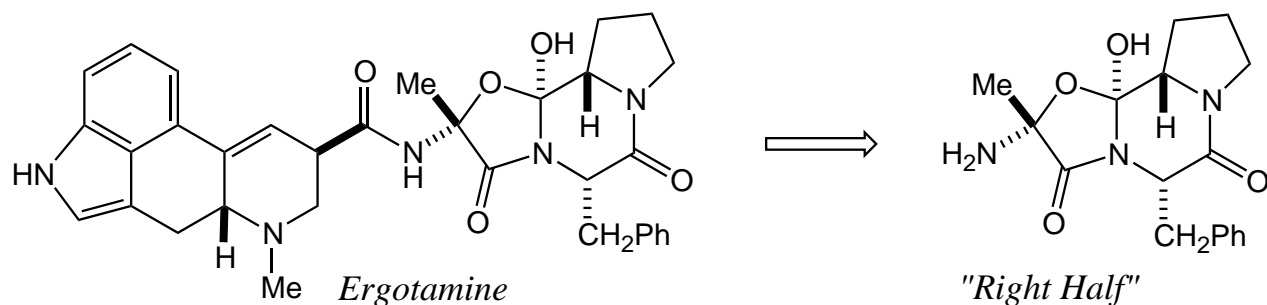

Fischer Projection

Classification

b. (10 pts) Provide a clear drawing of the most stable **β-PYRANOSE** form of the following aldohexose.

4. (30 pts) One of the lysergic acid amides produced by *Claviceps purpurea* is ergotamine. The synthesis of the "right half" portion of this molecule was accomplished in 1961. All of the reactions used in the synthesis are known to you. Your task is to fill in the reagents required to bring about the illustrated reactions. *You may need more than one step per arrow*. The problem is continued on the next page.

ONCE AGAIN, DO NOT BE INTIMIDATED BY THE SIZE OF THESE MOLECULES. Just focus in on what is changing in each step. If there is a transformation that you do not know, move on to the next and come back if there is time.

Ergotamine

"Right Half"

N-protected Phenylalanine   Proline Methyl Ester

This reaction happens spontaneously.

4. continued.

*This reaction
happens
spontaneously.*

"Right Half"