Organic Chemistry c3444y

4th Hour Exam

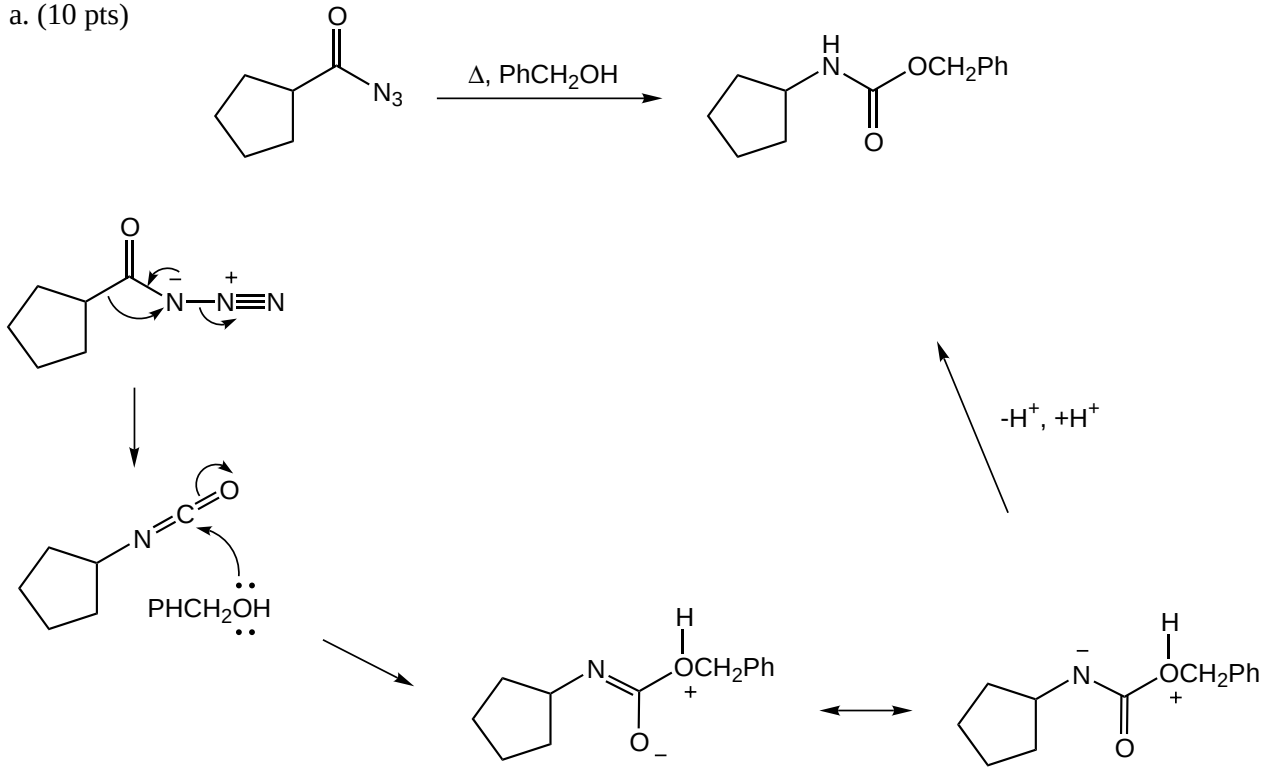
Monday, April 29, 2002
Prof. Leighton

Answer Key

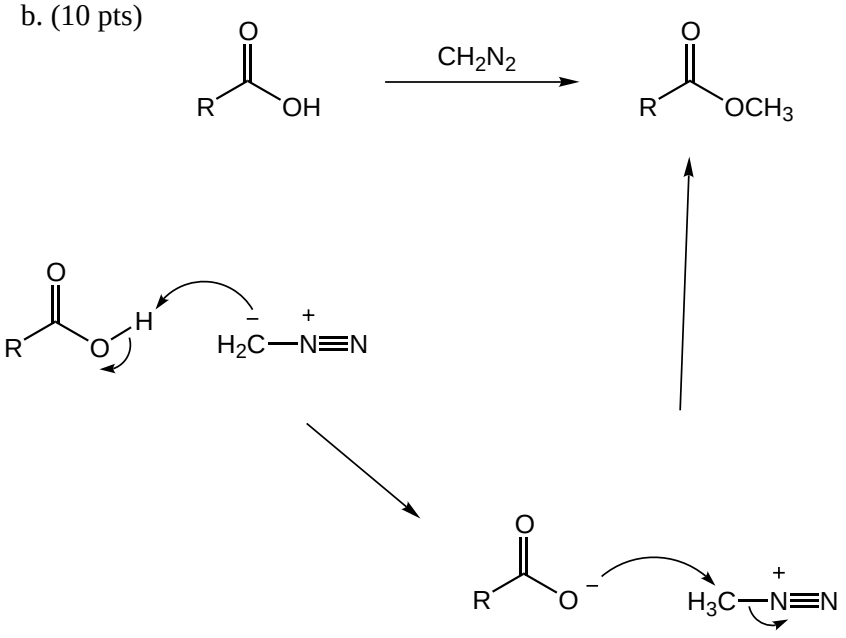
Name: _____

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)



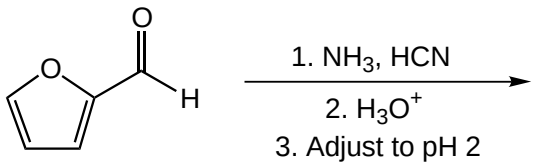
b. (10 pts)

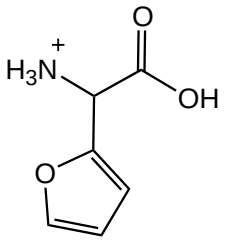


Name: _____

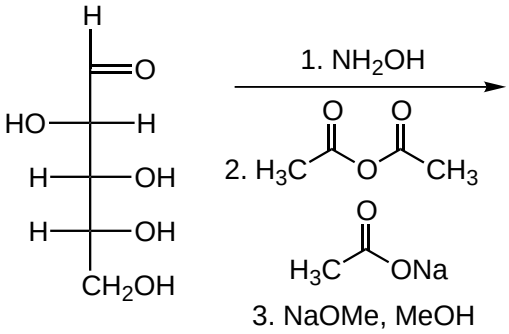
2. Predict the major product(s) of the following reactions:

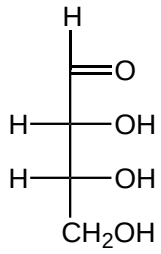
a. (10 pts)





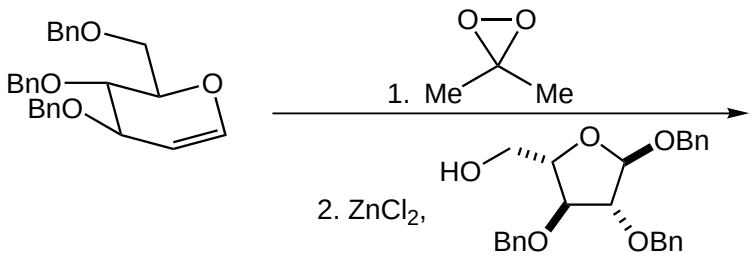
b. (10 pts)

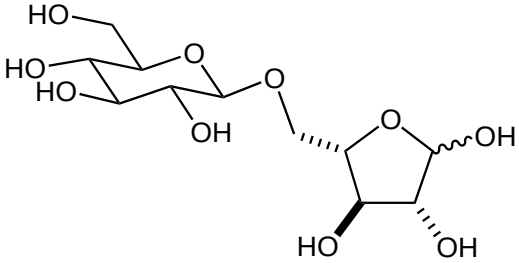




(Wohl Degradation)

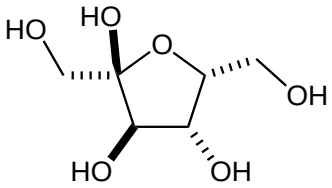
c. (10 pts)

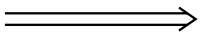


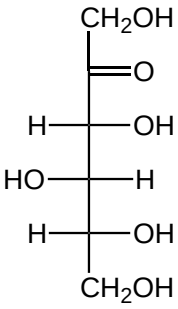


Name: _____

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





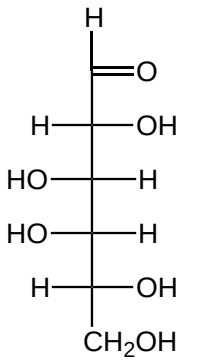


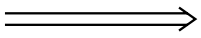
Fischer Projection

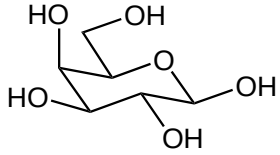
D-ketohexose

Classification

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



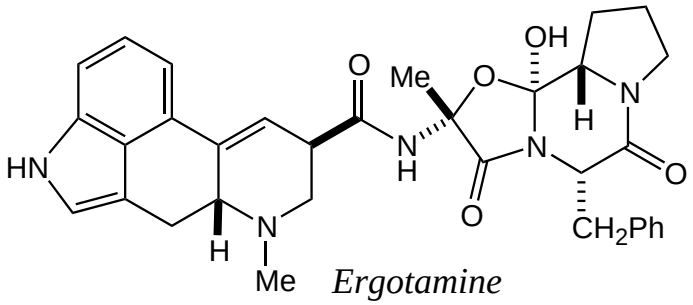




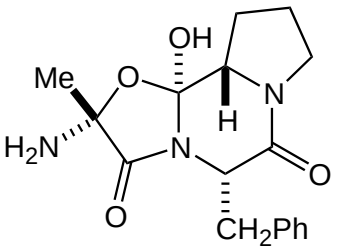
Name: _____

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.

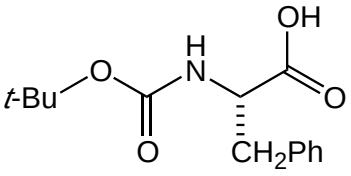
ONCE AGAIN, DO NOT BE INTIMIDATED BY THE SIZE OF THESE MOLECULES. Just focus in on what is changing in each step. If there is a transformation that you do not know, move on to the next and come back if there is time.



Ergotamine



"Right Half"



N-protected Phenylalanine

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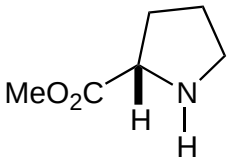
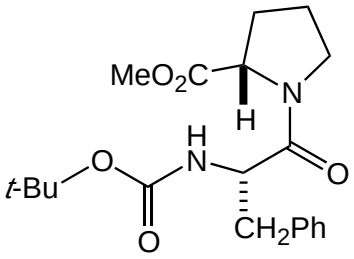
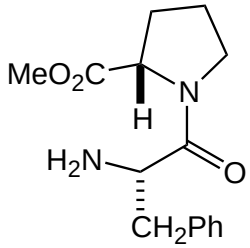


Proline Methyl Ester

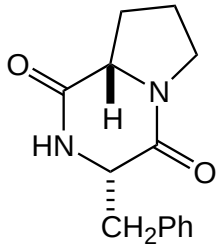
DCC



H+



This reaction happens spontaneously.



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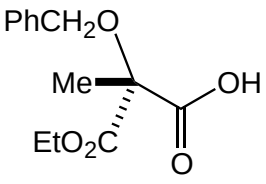
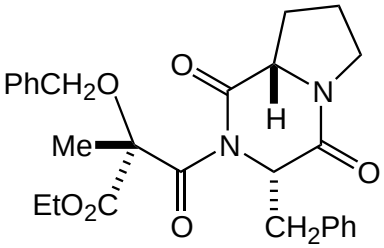


DCC



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4. continued.