Name_____

PID_____

CHEMISTRY 252

Exam 2 – 100 pts.

Section 703 – Grand Rapids

10 August 2006

- Make sure you have all 8 exam pages
- You will have 90 minutes to complete the 5 questions
- Please sign your name at the bottom of this page.
- Try to make your answers as **clear** as possible. You don't need to be an artist, but if an answer is ambiguous it may be marked incorrect.
- Keep all answers inside the designated boxes.
- Read the directions, and don't be distracted by the large molecules.
- **Good luck!**

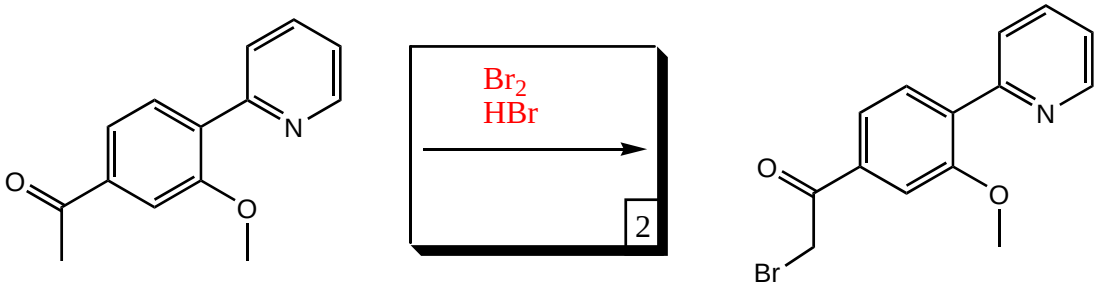
By signing this test, I certify that this is my own work and that my work is in accordance with MSU's policy on academic honesty, as stated in the Academic Freedom Report.

X_____

I		28
II		14
III		24
IV		16
V		18
Total		100

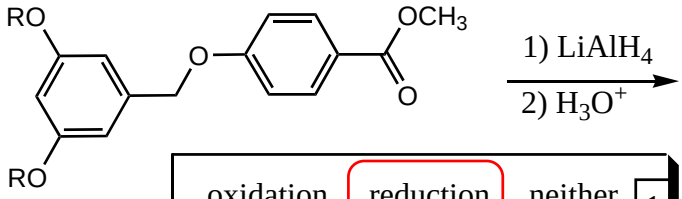
I. (28 pts.)
Complete the following reactions and syntheses. Use numbers (1,2,etc.) where necessary to indicate subsequent steps.

a) Synthesis of glutamate receptor antagonist for treatment of psychiatric and neurological disorders (*Bioorg. Med. Chem.* **2004**, *12*, 17-21).

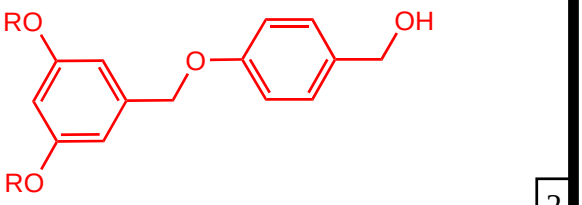


oxidation reduction neither 1

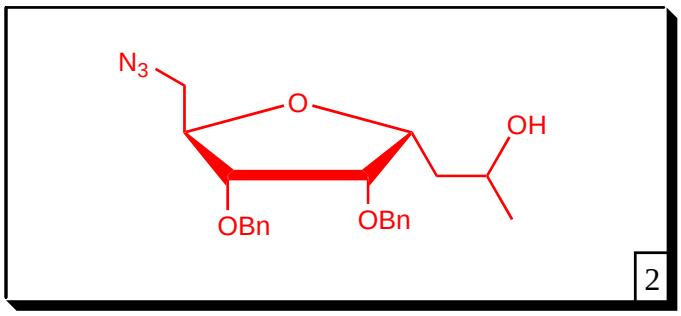
b) from *J. Am. Chem. Soc.* **2006**, *128*, 6713-6720.

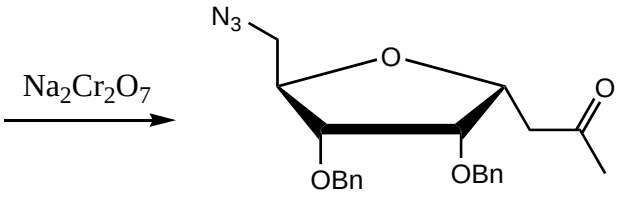


oxidation reduction neither 1



c) Synthesis of enzyme-inhibiting azasugars (*Tetrahedron*, **2005**, *61*, 11716-11722).

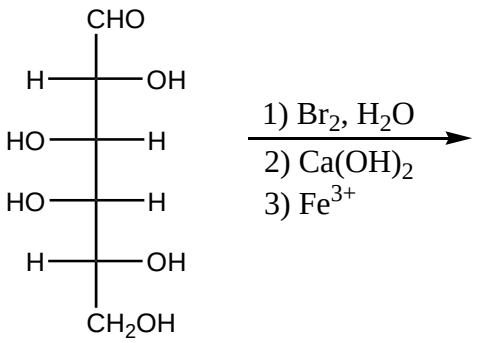


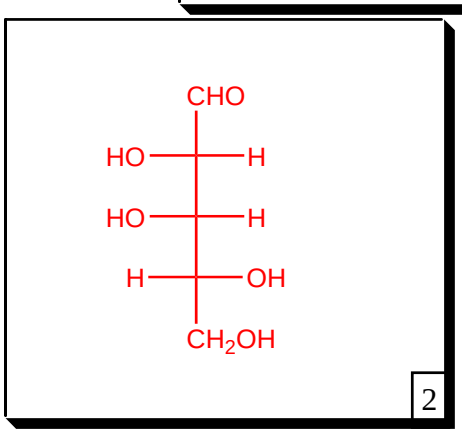


oxidation reduction neither 1

Bonus! What is the name of the reagent used above? Jones' reagent 1

d)

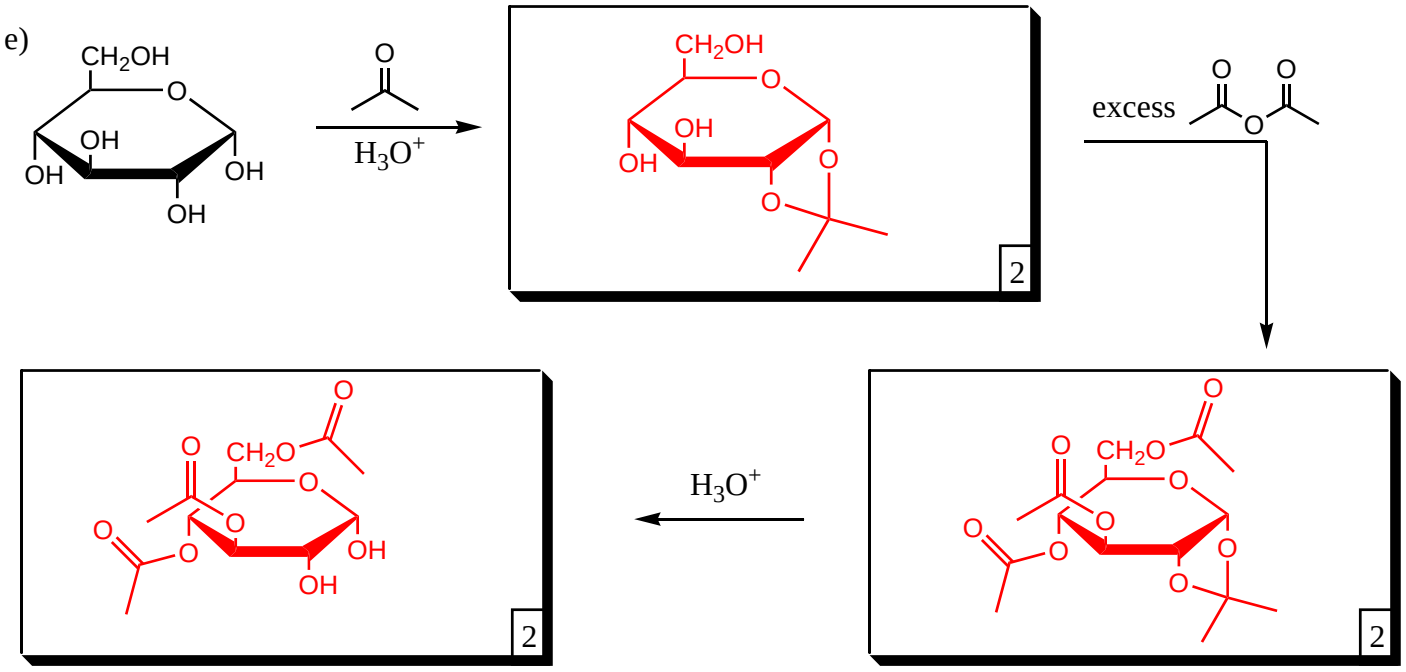




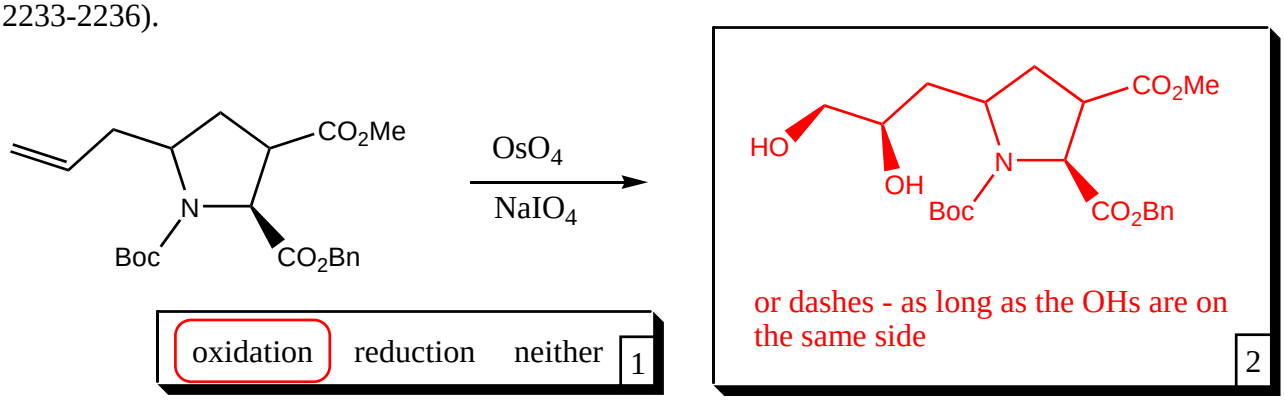
Bonus! Name this reaction:

Ruff
chain degradation 1

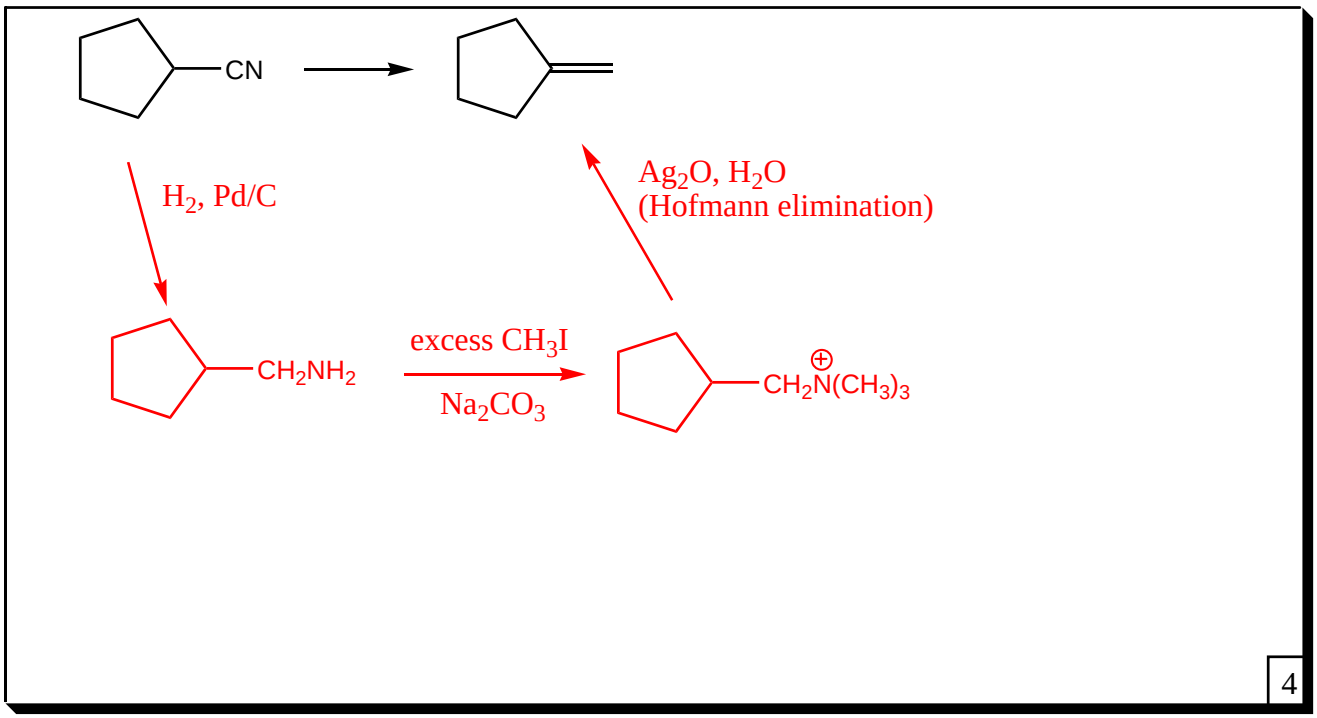
e)



f) Synthesis of chimeric peptides to interact with CCK and opioid receptors (*Tetrahedron Lett.* **2006**, *47*, 2233-2236).

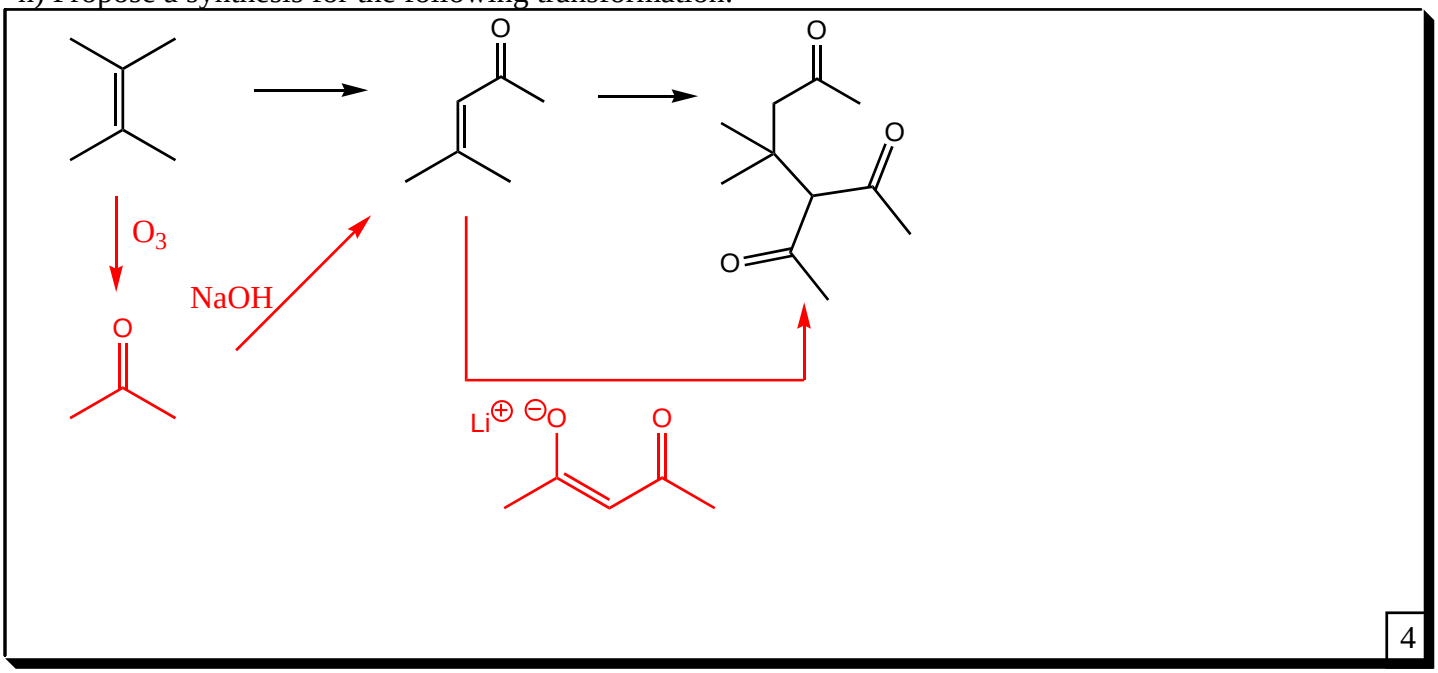


g) Propose a synthesis for the following transformation:



I. continued

h) Propose a synthesis for the following transformation:



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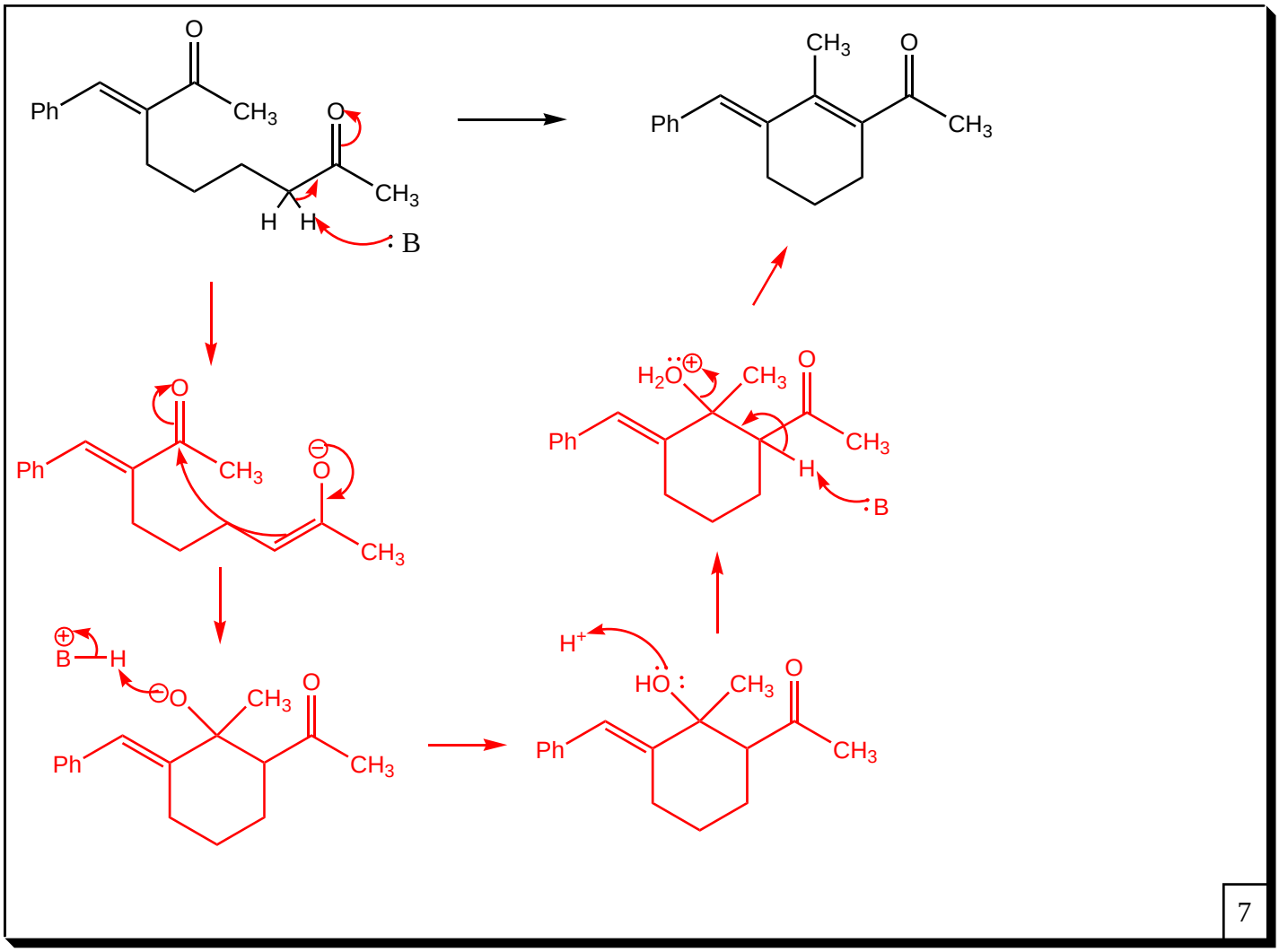
II. (14 pts.)

Draw mechanisms for the following condensation reactions.

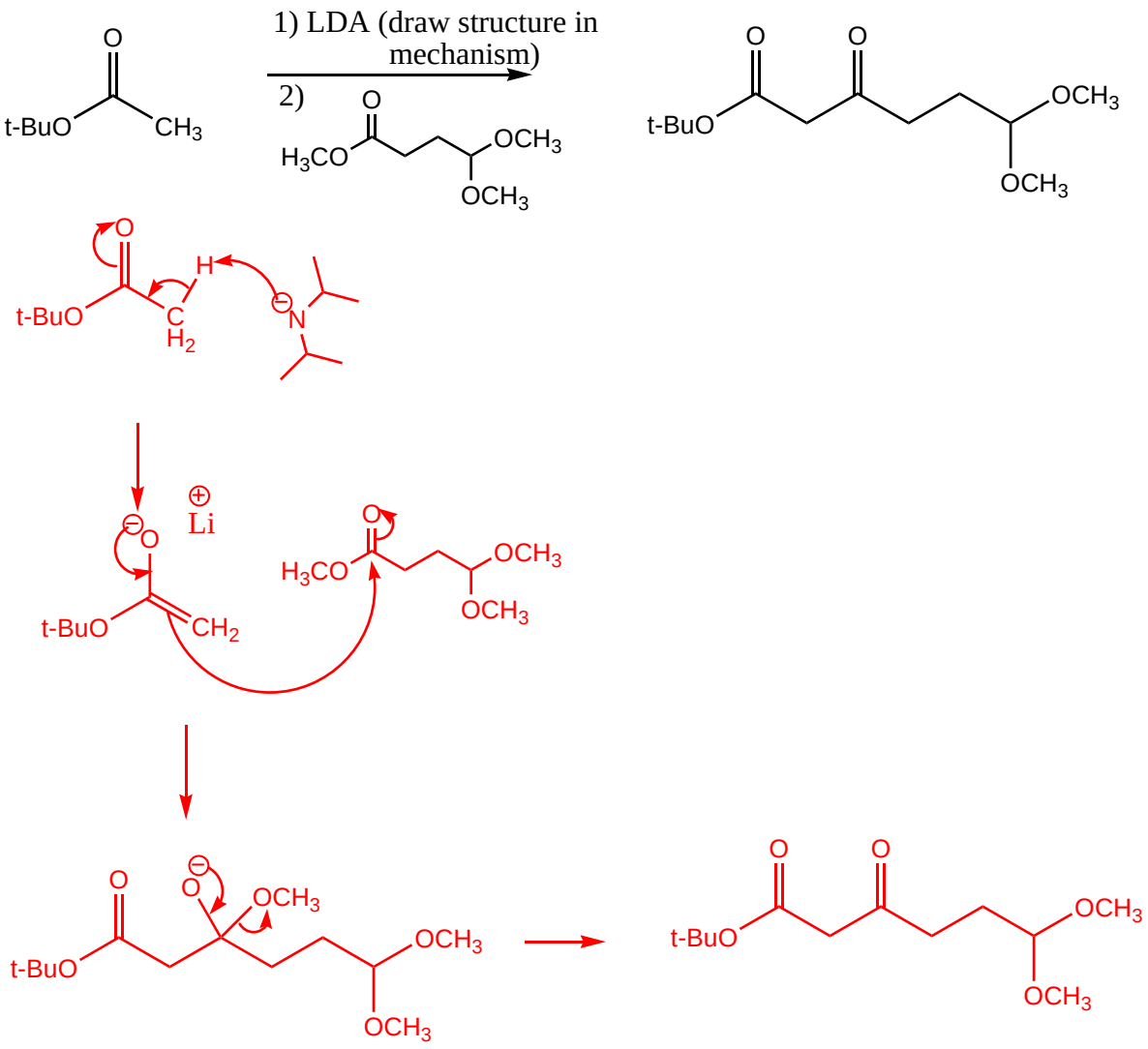
a) Intramolecular aldol condensation (*Tetrahedron Lett.* **2006**, *47*, 1833-1837).



7

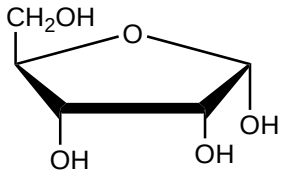
II. continued

b) Claisen condensation used in the synthesis of an ant-secreted poison (*Org. Lett.* **2005**, *7*(20), 4423-4426).

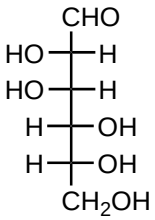


III. (24 pts.)

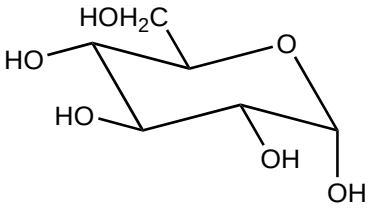
a) Using the structures below, draw the appropriate carbohydrate conformations:



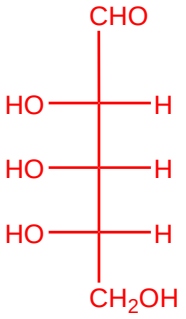
α-D-ribofuranose



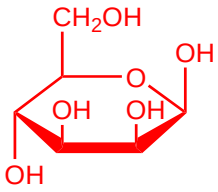
D-mannose



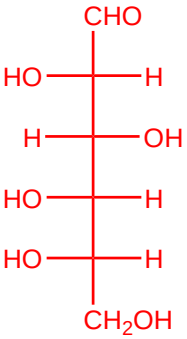
α-D-glucopyranose



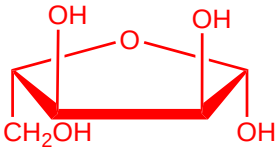
L-ribose (Fischer projection) 3



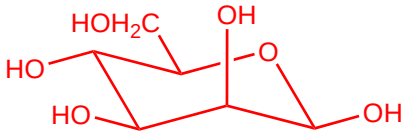
β-D-mannopyranose (Haworth projection) 3



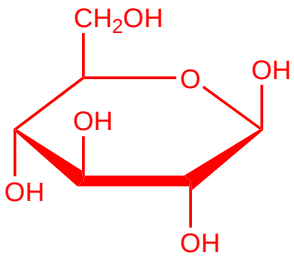
L-glucose (Fischer projection) 3



β-L-ribofuranose (Haworth projection) 3

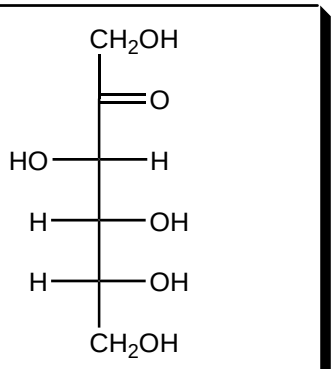


β-D-mannopyranose (chair conformation) 3

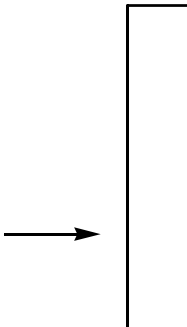


β-D-glucopyranose (Haworth projection) 3

b) Draw the structures in the following reaction:

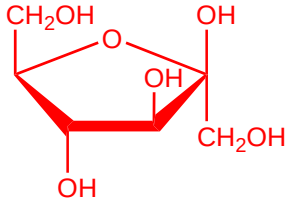


D-fructose 2



α-D-fructofuranose 2

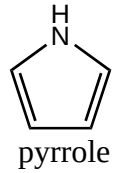
+



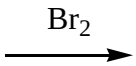
β-D-fructofuranose 2

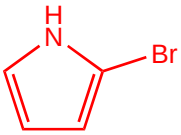
IV. (16 pts.)

a) Draw the two possible products of monobromonation of pyrrole:



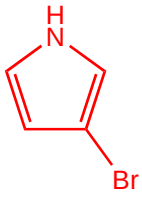
pyrrole





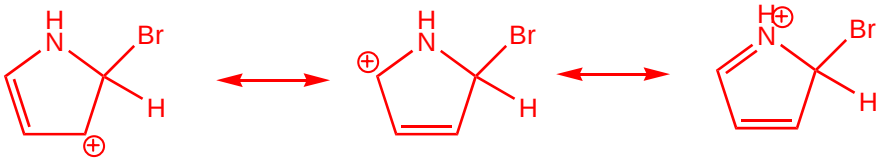
product A 2

+

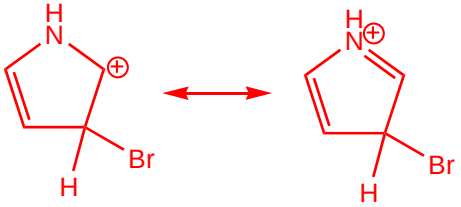


product B 2

b) Draw all contributing resonance structures of the carbocation intermediates from the reaction in part (a).



resonance contributors of carbocation intermediate leading to product A 4



resonance contributors of carbocation intermediate leading to product B 4

c) Which product will be produced in greater yield (circle one)?

Product A Product B 2

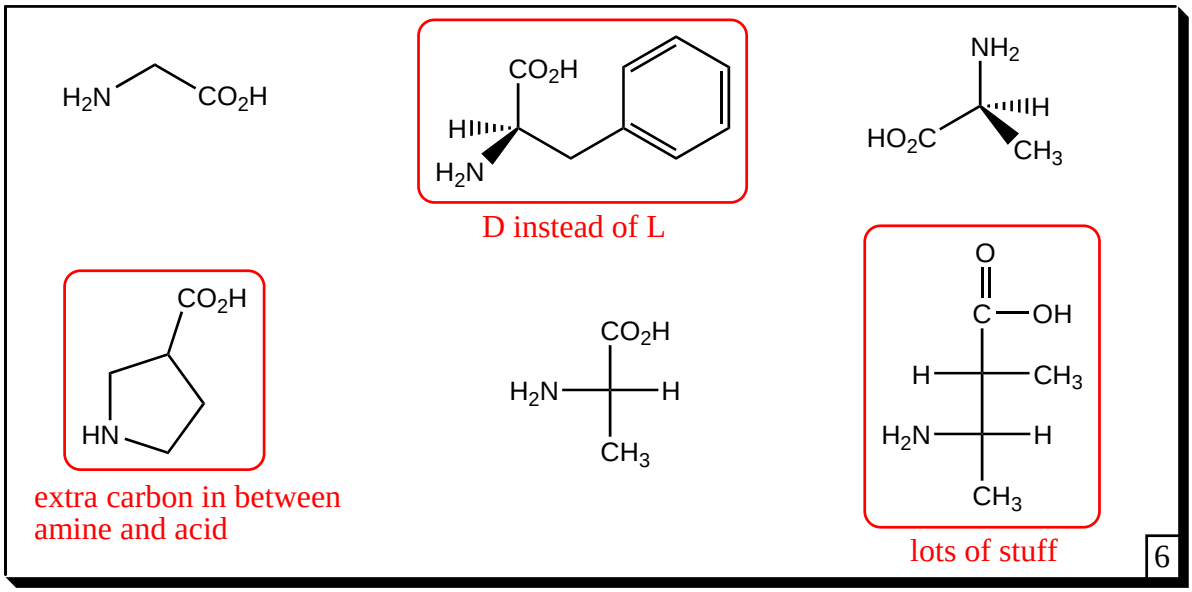
d) Why?

The greater number of resonance forms shown by the intermediate to product A means that the positive charge can be more delocalized. Therefore, this intermediate is more stable and more of product A will be produced.

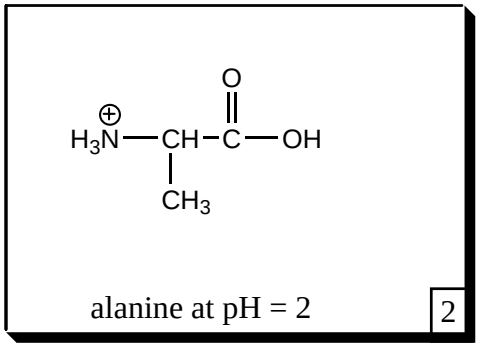
2

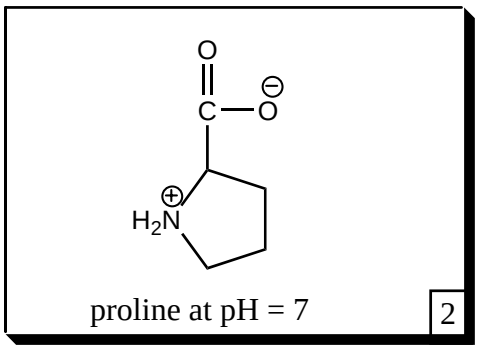
V. (18 pts.)

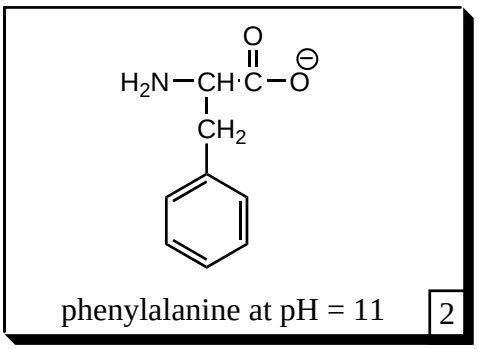
a) Which of the following are **not** naturally-occuring amino acids (circle them)?



b) Draw the following amino acids:







c) Propose a synthesis of the peptide glycine-alanine-proline-glycine from the amino acids: