Chem 332
Exam 4
May 30, 2003
Prof. Fox
180 minutes
250 points

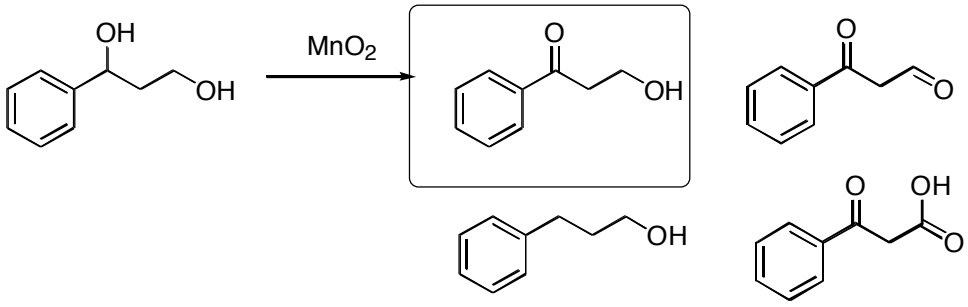
The exam is open book,
Open notes. Models are permitted
Show your work in detail

WRITE YOUR NAME ON EVERY PAGE

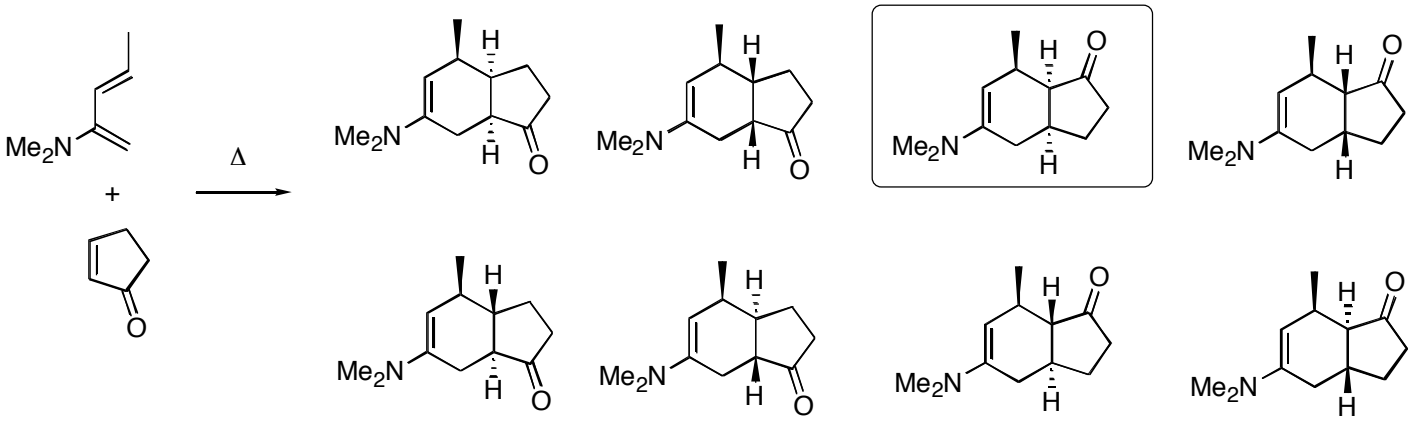
NAME _____

Chem 332, Exam 4. March 30, 2003 **NAME** _____

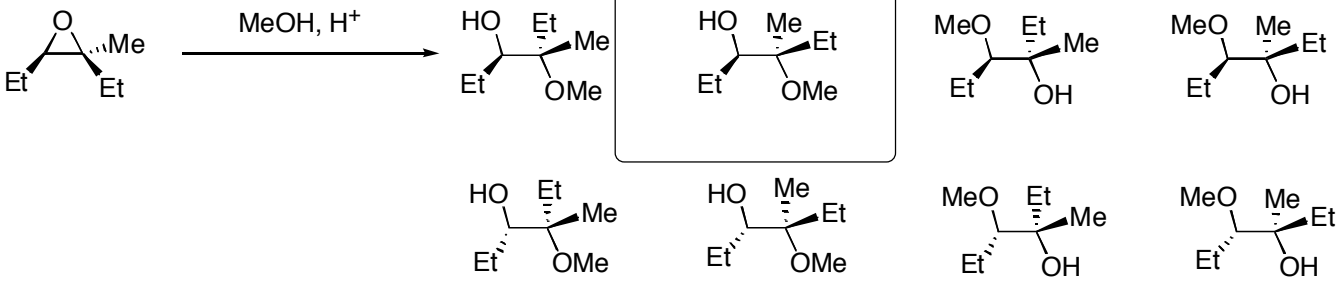
1. Circle the correct product (no mechanisms or partial credit). 8 pts



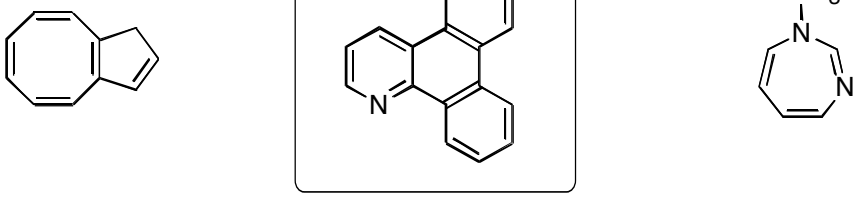
2. Circle the correct product (no mechanisms or partial credit). 10 pts



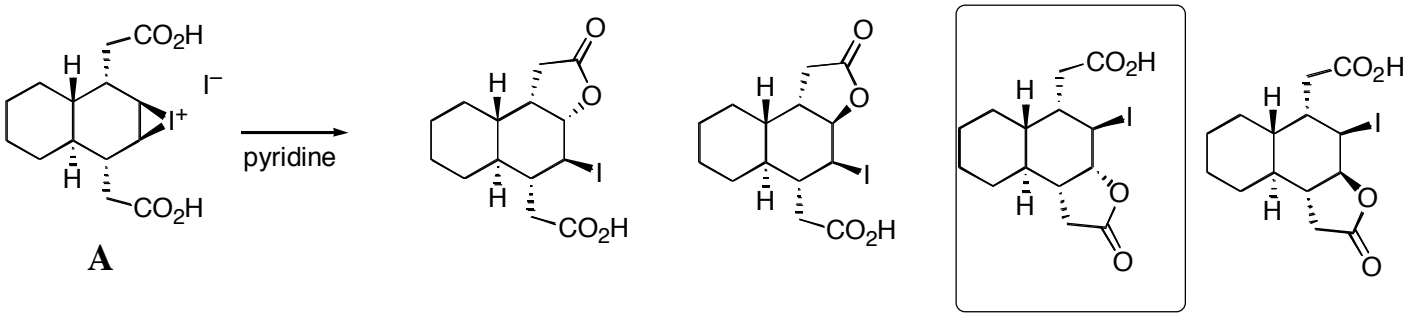
3. Circle the correct product (no mechanisms or partial credit). 10 pts



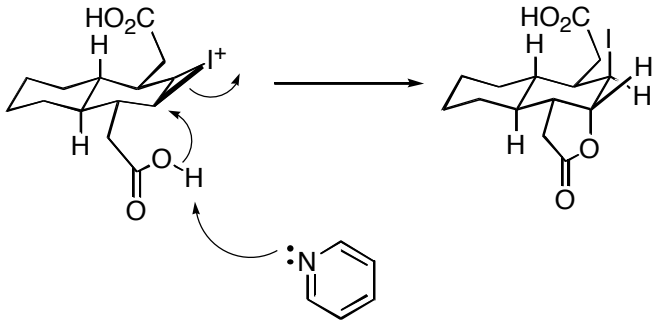
4. Circle the aromatic molecules. No partial credit. 12 pts



5. It is expected that the treatment of iodonium salt **A** with pyridine would give a single product. Circle the correct product, and provide a detailed explanation for the stereochemical outcome. Your answer should include well drawn 3-dimensional representation of the trans-decalin framework.



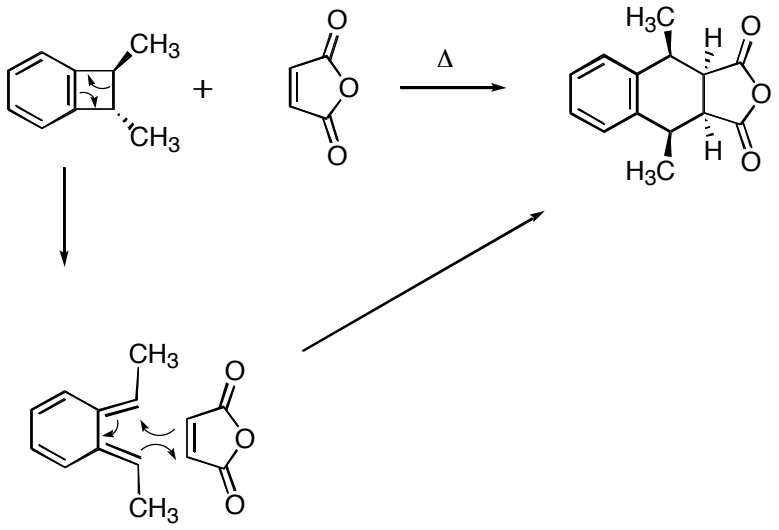
A



30 pts

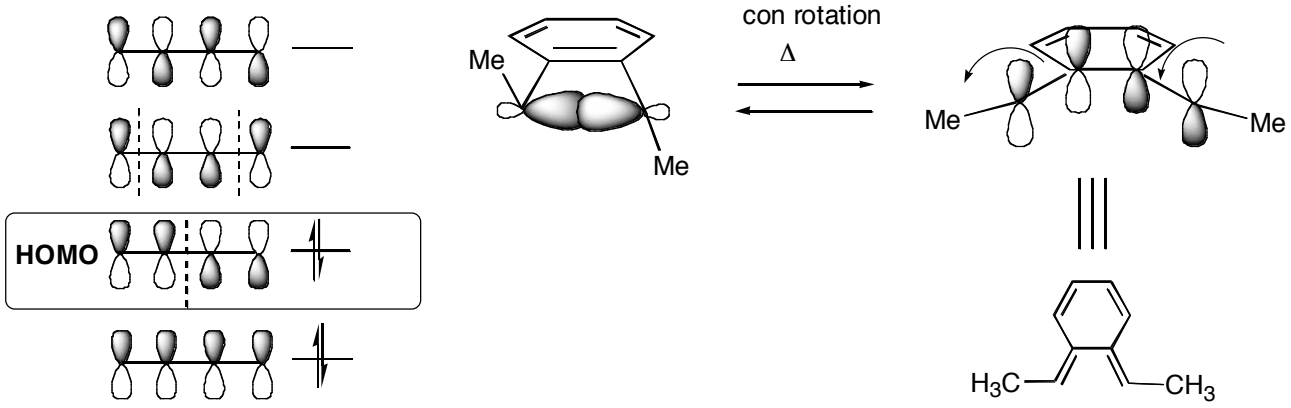
The iodonium ion is expected to open to give the diaxial product

6. Provide a detailed mechanism for the thermal reaction shown below. Use your knowledge of molecular orbital theory to explain the stereochemical outcome.

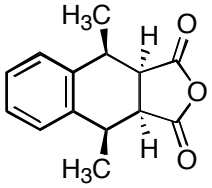


30 pts

For the electrocyclic ring opening, four electrons are involved:
the reaction involves the HOMO of the diene. the HOMO has 'unlike' symmetry, and therefore requires a conrotation in the opening. the analysis below shows that the ring opening will produce the diene below.

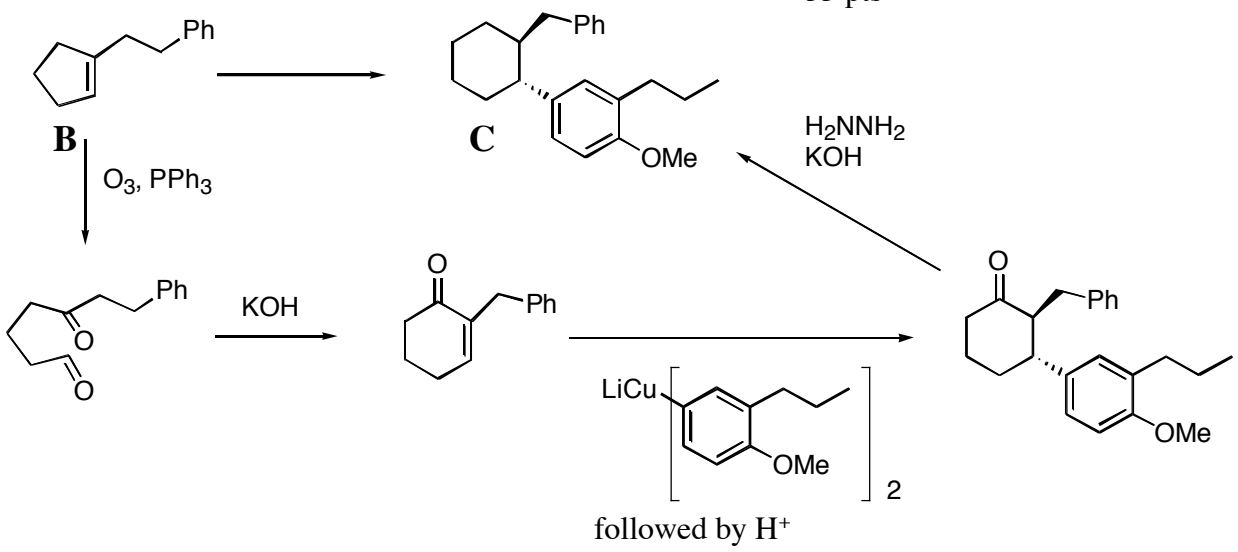


The Diels Alder reaction proceeds to provide the 'endo' product

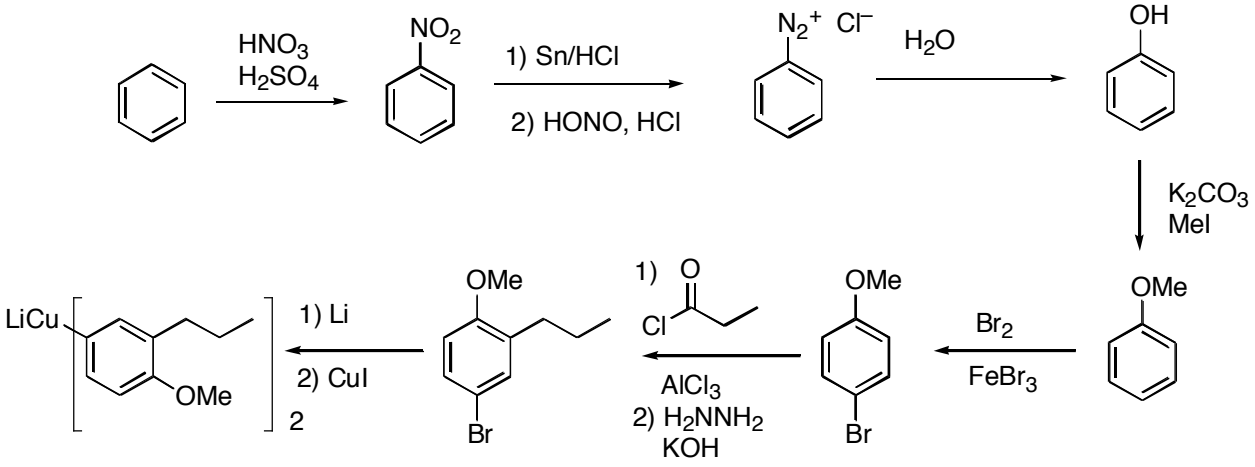


7. Provide a synthesis of **C**, using **B** as a starting material. Additionally, you may use benzene and any other materials that contain four carbons or less.

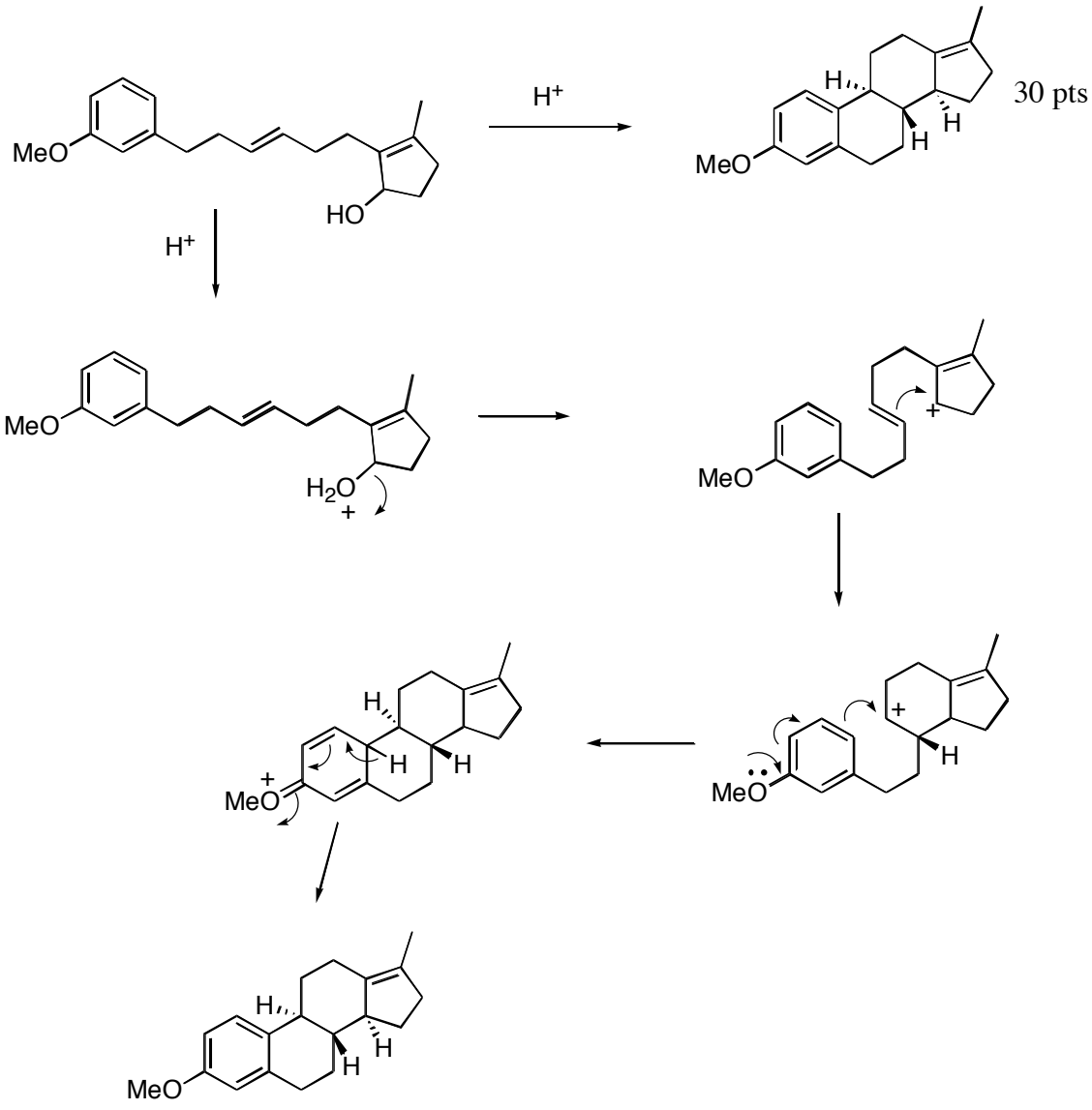
35 pts



cuprate synthesis



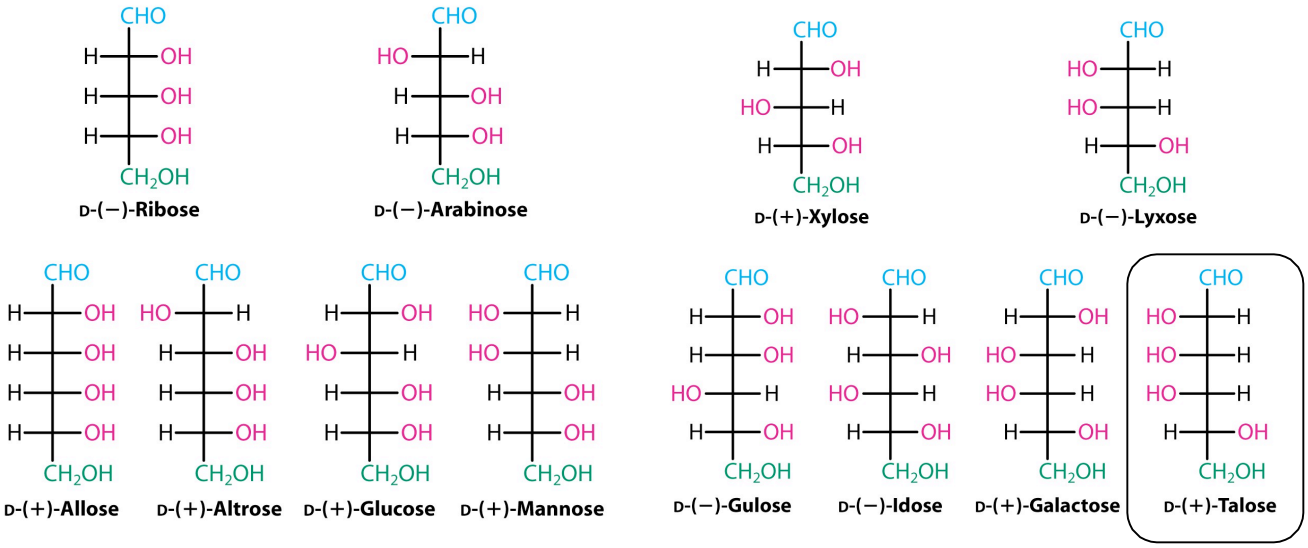
8. Provide a detailed arrow pushing mechanism.



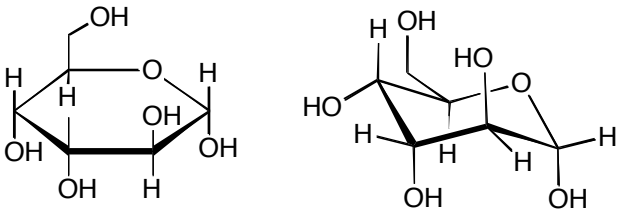
30 pts

9. D-(+)-altrose is oxidized by HNO3 to give an optically active diacid.
Circle the naturally occuring D-aldohexose that would give that same diacid upon HNO3 oxidation.

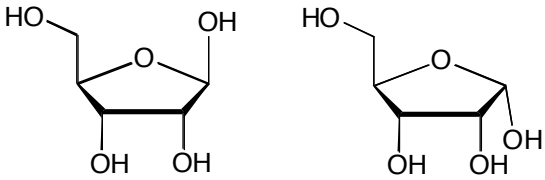
25 pts



10. Identify the following pairs as identical, anomers, enantiomers, or (non-anomeric) diastereomers. Write your answers on the line below the structures.

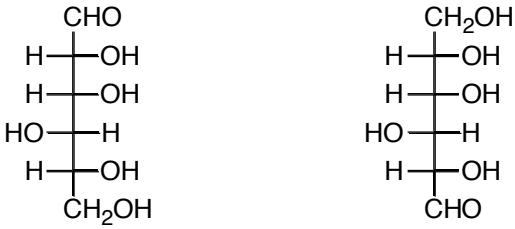


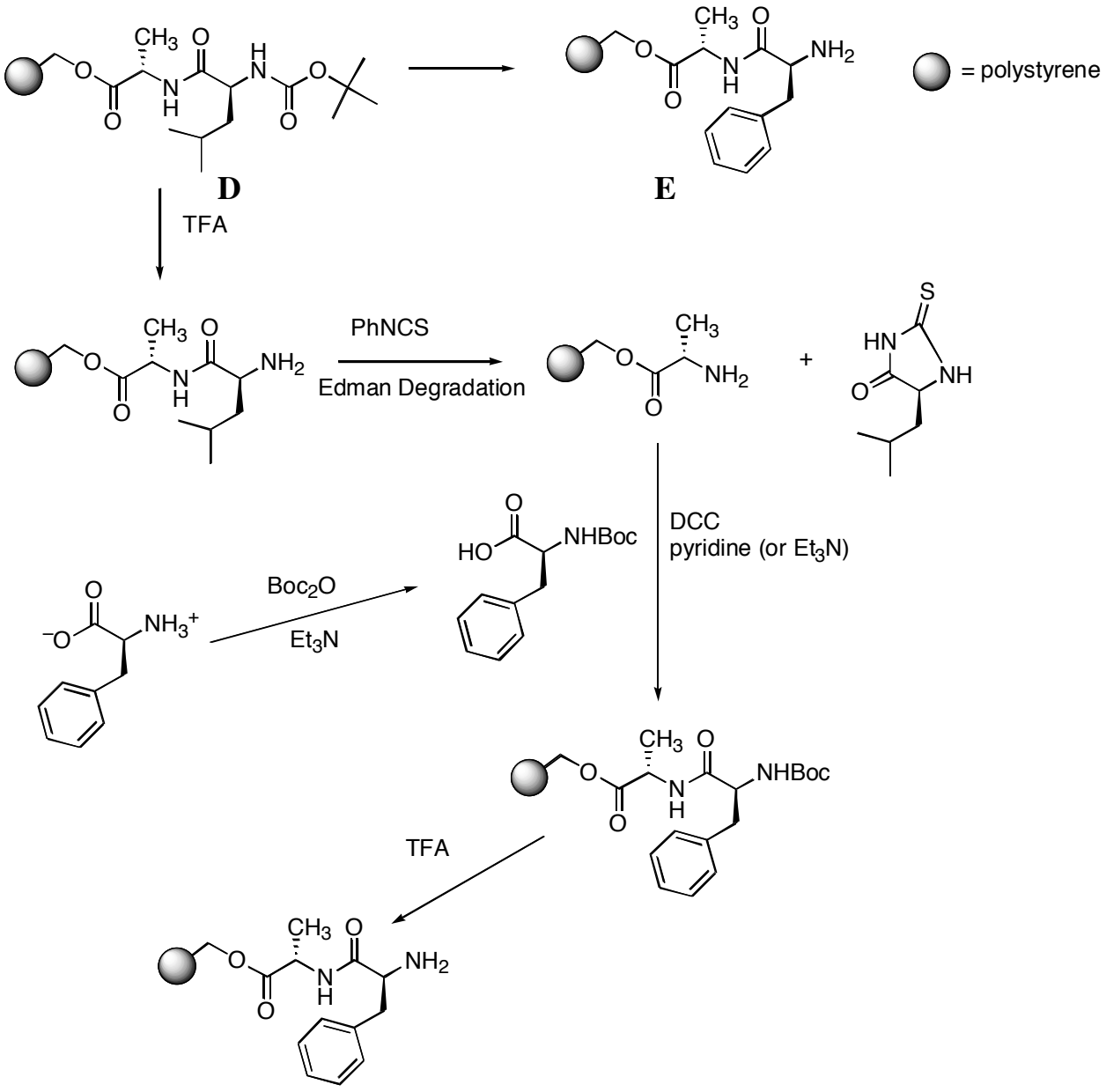
identical



anomers

10 pts for each



diastereomers

11. Provide a multistep synthesis of **E** using **D**, phenylalanine, and any other materials. (30 points)