

CHE 230 001  
Organic Chemistry 1  
Exam 4  
December 16, 2013

Name:

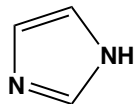
Student number:

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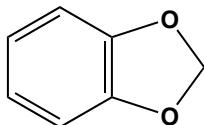
***Before you begin this exam:*** **First:** You are allowed to have a simple model set at your seat. Please put away all other materials. Calculators will not be needed. **Second:** Place your student identification on your desk. A proctor will come around to check everyone's ID. **Third:** Read through the entire exam. Your goal, as always, is to score as many points as possible. Do not waste time on problems that you can't do if there are others that look easy. **Fourth:** READ EACH QUESTION CAREFULLY. Be sure you answer the question that is asked. **Fifth:** This exam must be turned in by 8:50 AM SHARP. There will be no extensions, so budget your time carefully.

- |    |            |       |
|----|------------|-------|
| 1. | 12 points  | _____ |
| 2. | 8 points   | _____ |
| 3. | 10 points  | _____ |
| 4. | 30 points  | _____ |
| 5. | 12 points  | _____ |
| 6. | 12 points  | _____ |
| 7. | 8 points   | _____ |
| 8. | 8 points   | _____ |
|    | 100 points | _____ |

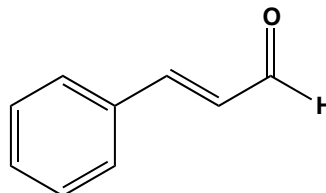
1. (12 points) For each compound below, state whether the parent ion (molecular ion) will be even or odd. Write "even" or "odd" on the line beneath each structure.



\_\_\_\_\_

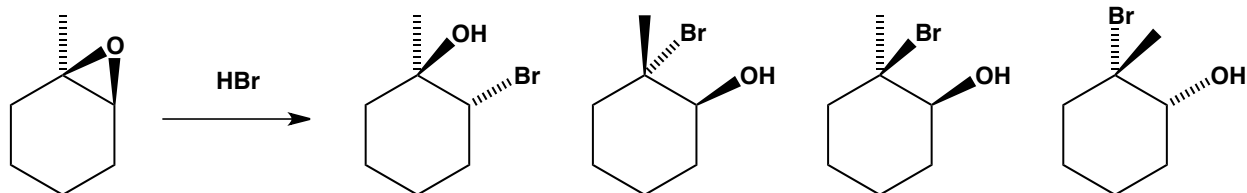


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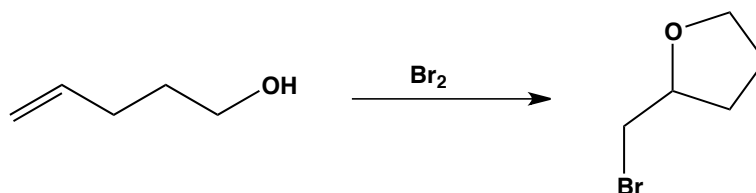


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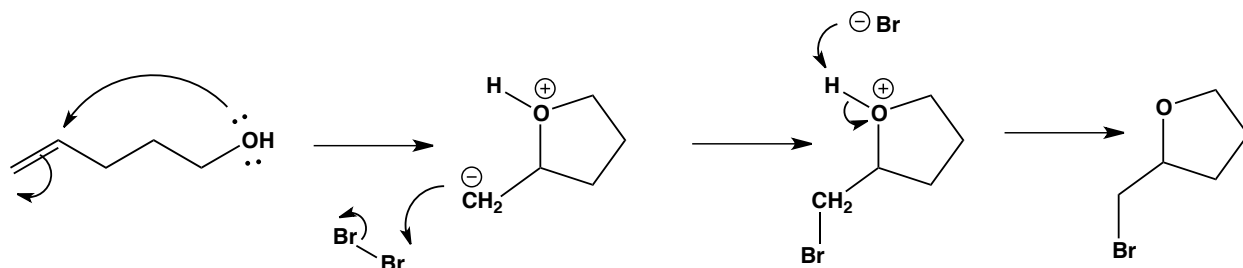
2. (8 points) Circle the correct product that is formed by the ring-opening of the epoxide shown under the conditions given.



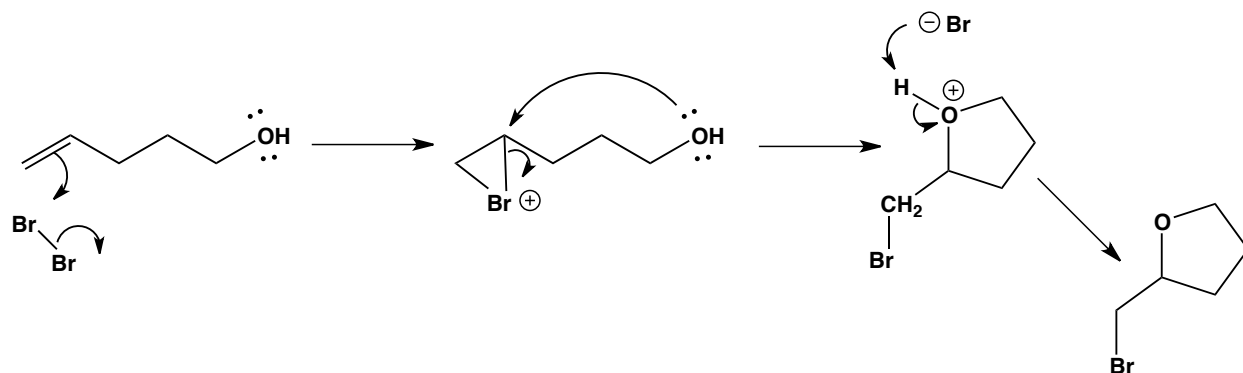
3. (10 points) Treatment of 5-hexenol with  $\text{Br}_2$  produces the bromide shown. Circle the most viable mechanism for this reaction.



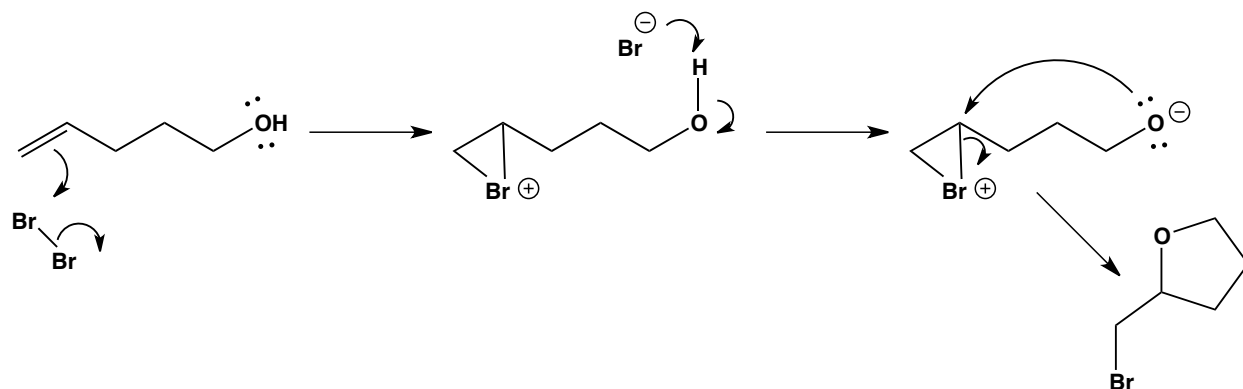
a)



b)

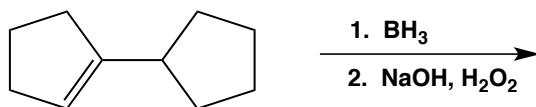


c)



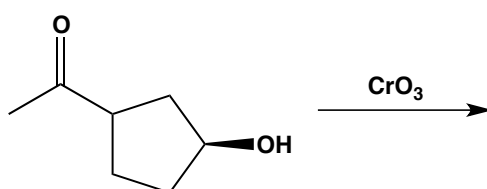
4. (30 points) Each of the reactions below will produce one *major* organic product. Draw that (major) product **FOR ANY 6 OF THE REACTIONS BELOW**. Show stereochemistry in cases where the reaction is stereospecific (cases of syn addition, trans addition, etc.) Indicate which problems you want graded.

a)



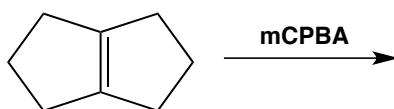
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b)



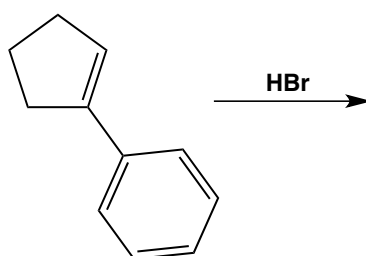
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c)



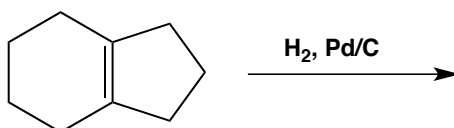
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d)



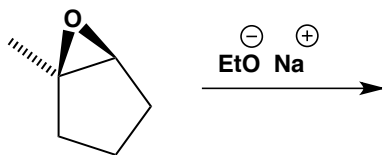
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e)



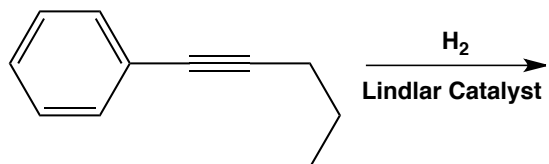
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f)



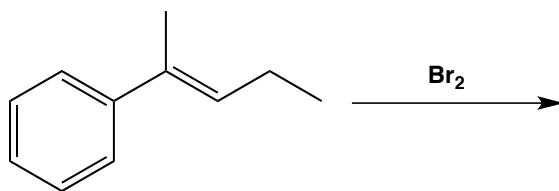
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g)



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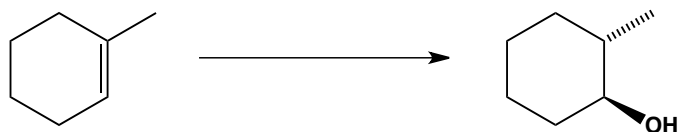
h)



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5. (12 points) Provide the reagents that would be needed to accomplish the transformations shown. If two steps are needed, be sure that you state "1) reagent A; 2) reagent B."

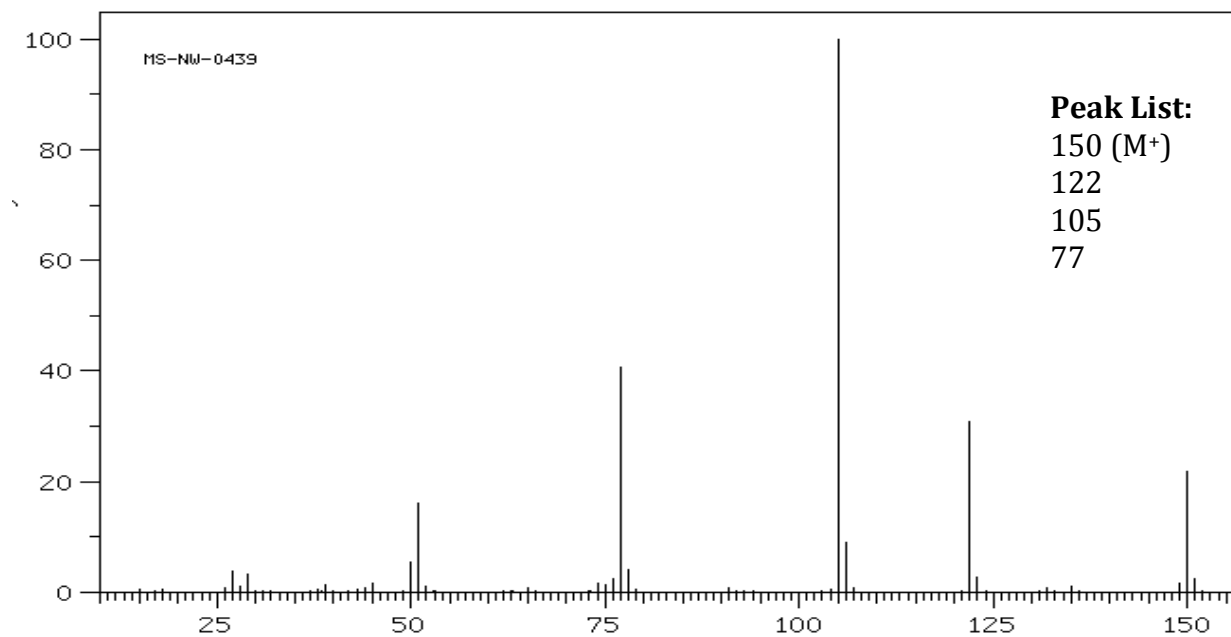
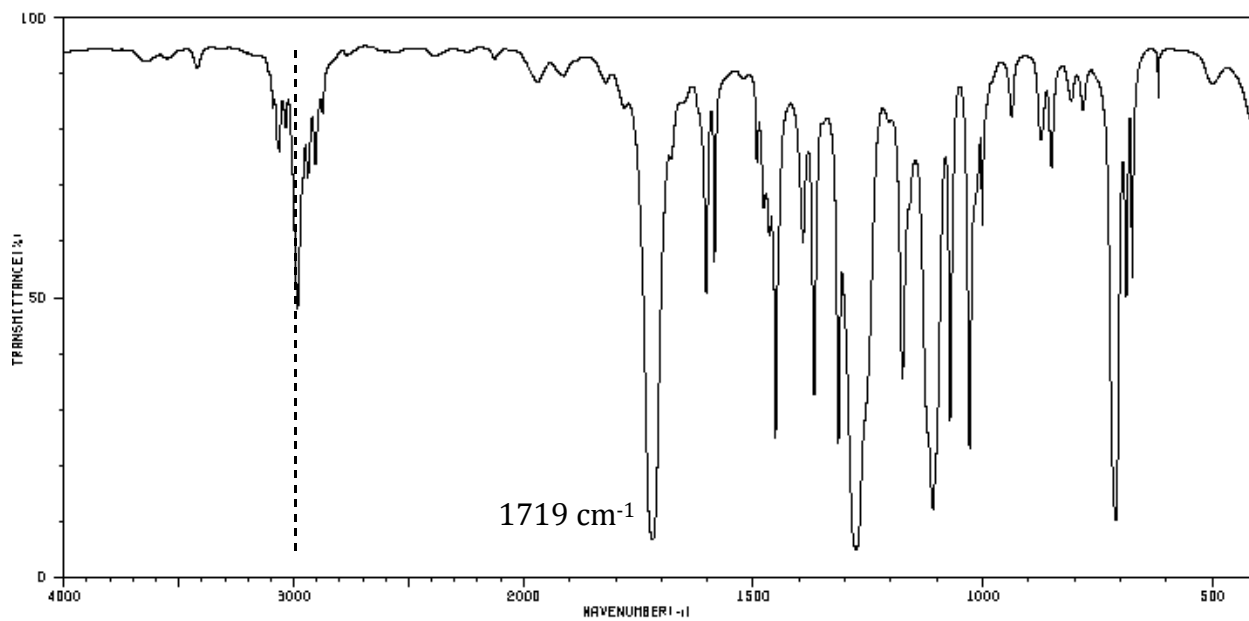
a)



b)



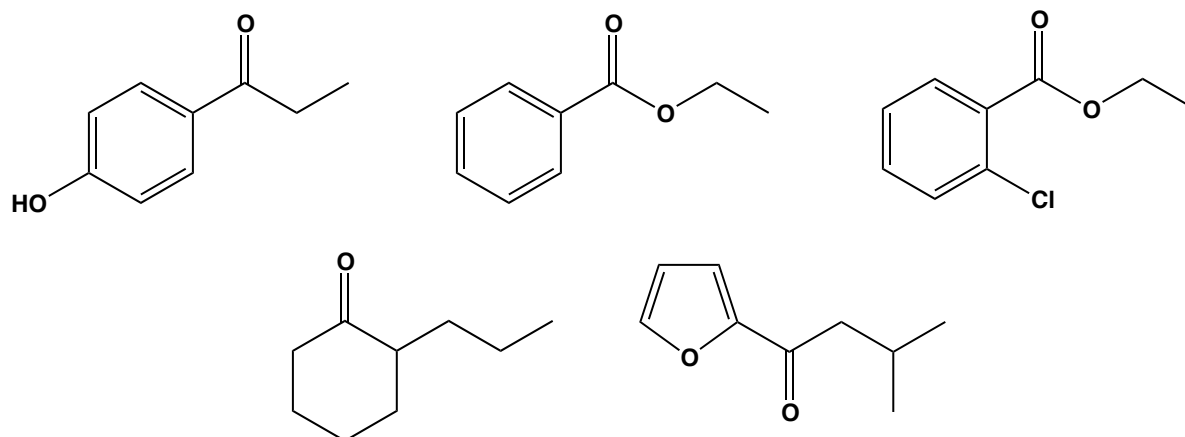
6. (12 points) Infrared and mass spectra for a particular compound are given below. After looking at the spectra, answer the questions that follow.



a) Give two viable molecular formulae for this compound.

b) What functional group is responsible for the strong IR band at 1719 cm<sup>-1</sup>?

c) Which of the following compounds most likely produced these spectra? (Circle one)



7. (8 points) How many different  $^1\text{H}$  NMR signals does each compound give?



8. (8 points) Which compound (below) is most likely responsible for the  $^1\text{H}$  NMR spectrum shown? (circle one)

