**Practice Exam 3A**

Last Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ First Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Instructions:** Time, 120 minutes. Write your answers on the front of each sheet. The back will not be graded and can be used for scratch paper. Put your name at the top of each individual page.

Score: **Regrade Policy:**

1.\_\_\_\_\_\_/10 1. Your exam must be turned in for a regrade within

 48 hours of its being returned. It may be given

2. \_\_\_\_\_/20 to your AI, the instructor, or dropped off at the Chemistry Undergraduate Office.

3. \_\_\_\_\_/20 2. The entire exam will be regraded, which might

 lead to either a higher or lower score than

4. \_\_\_\_\_/10 the original score.

 3. The instructor reserves the right to not change the

5. \_\_\_\_\_/4 score of a question that has apparent eraser marks

 or which has the appearance of being altered.

6. \_\_\_\_\_/4 4. You should ask for a regrade if the question was

 incorrectly marked wrong, if the point deduction

7. \_\_\_\_\_/12 does not match the key, or there is a numerical

 error.

8. \_\_\_\_\_/10

9. \_\_\_\_\_/10

1. (10pts) Fill in the boxes next to the reactions with the **letters** of all products that form from this list below:





2. (20pts) Provide reagents or starting materials necessary for 5 of the following 6 transformations. CLEARLY MARK the one you do not want graded or else the first five will be graded. More than one step may be necessary.



3. (20pts) Predict the MAJOR product(s) of 5 of the following 6 reactions. CLEARLY MARK the one you do not want graded or else the first five will be graded. Include proper stereochemistry, and indicate if the enantiomer also forms.



4. (10pts) Provide arrow mechanisms, including all intermediates, for the formation of this product:



Under these same conditions, a second product also forms. Provide a mechanism.



5. (4pts) Treating 4-methylcyclopentene with OsO4/NMO forms two optically inactive products, while treating 4-methylcyclohexene with mCPBA followed by hydronium leads to two optically active products. Draw their structures.



6. (4pts) Compound A is an alkyne that reacts with two equivalents of H2 in the presence of Pd to give 2, 4, 6-trimethyloctane. Draw the structure of Compound A, and name it using systematic nomenclature.



7. (12pts) Provide all necessary reagents for the following multistep syntheses, starting from the given material. You may use any additional organic or inorganic reagents you need. Although grading will be based on reagents used, showing intermediates can lead to partial credit.



8. (10pts) Starting with this chiral epoxide, only one product is produced. Provide an arrow mechanism, including intermediates, to account for this reaction.



In ONE SENTENCE, how does your mechanism explain the STEREOCHEMISTY of the reaction?

In ONE SENTENCE, how does your mechanism explain the REGIOCHEMISTRY of the reaction?

9. (10pts) Provide all reagents necessary for this multistep synthesis. You may use acetylene as your only source of carbon, but you may use any other reagents of your choice.

