CHE 232 - Organic Chemistry  
Exam 2, March 7, 2001

Name________________________ Student ID No.____________________

If you wish to have your exam score posted beside your student ID number in the glass case (behind CP-139) with the exam key, place an ‘X’ in this space _________.

If you do not mark this space, your exam score will not be posted. You can pick up your exam from my office after the next class meeting.

Before you begin this exam: First: You are allowed to have a simple model set at your seat. Please put away all other materials. 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: It is critically important that your answers be written in a clear, unambiguous manner. Answers in which your intentions are unclear will not receive credit. Fifth: READ THE INSTRUCTIONS FOR EACH PROBLEM.

You have until 6:50 to complete this exam. There will be no extensions, so budget your time carefully.

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<tr>
<th>Problem Number</th>
<th>Points possible</th>
<th>Score</th>
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1. (8 points) Name the circled functional group in each of the following molecules.

2. (12 points) Circle the *aromatic* compounds in the series below.

3. (30 points) Provide the product expected from the following reactions. Be sure to show any relevant stereochemistry.

a)  

\[
\begin{align*}
2 \text{ eq. } & \quad \text{OEt} \\
\text{1. NaOEt} \\
\text{2. H}_3\text{O}^+ & \quad \text{(to neutralize)}
\end{align*}
\]

b)  

\[
\begin{align*}
\text{1. CH}_3\text{MgBr} \\
\text{2. mild H}_3\text{O}^+
\end{align*}
\]
4. (24 points) Provide the reagents needed to accomplish the syntheses below. In each case, 2 steps are required, and the order of steps may be important to getting the desired regioisomer.

a)
5. (7 points) Treatment of the ketone below with LDA could lead to two different enolates, and therefore two different alkylation products. A 3H doublet in the $^1$H NMR spectrum proves that the one that forms has the structure shown below. In a brief sentence or two, explain why the enolate that leads to the product shown forms preferentially over the other possible enolate. DO NOT EXCEED THE SPACE PROVIDED.
6. (9 points) Show how the diol below can be made from ethyl propanoate. Show the reagents needed and the compounds formed after each step.
7. (10 points) Provide a viable mechanism for each step in the following series of reactions. Be sure that your use of arrows conforms to the accepted conventions.

\[ \text{O} \]

1. LDA
2. \[ \text{C}_{6}\text{H}_{5}\text{C}=\text{CH} \]
3. \( \text{H}_3\text{O}^+ \)