

Name \_\_\_\_\_

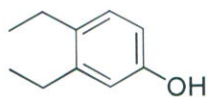
**Exam 1**  
**Chemistry 52**  
**July 9, 2012**

Do not open or begin this exam until instructed. This exam consists of 6 pages plus the cover page, a periodic table, and two blank pieces of paper for scratch work. Before starting the exam, check to make sure that you have all of the pages. The exam has a total of 101 points and includes 8 questions. Only legible answers written on the exam will be considered for grading. Work on scratch paper will not be considered. All pertinent information needed for the exam is given. Notes, textbooks, and electronic communication devices are not permitted. This exam is administered under the Dartmouth College Honor Principle.

**Use your time wisely.**

<b>Page Number</b>	<b>Value</b>	<b>Points Awarded</b>
1	20	
2	26	
3	15	
4	18	
5	10	
6	12	
Total	101	

1. a. (3 points) Provide an IUPAC accepted name for the following compound.



3,4-diethylphenol

- b. (4 points, 2 each) Provide the structure of each of the following compounds.

pyridine



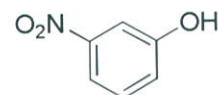
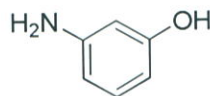
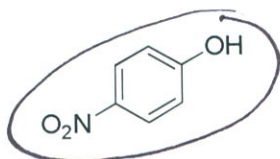
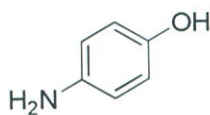
tetrahydropyran



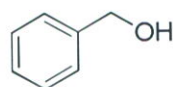
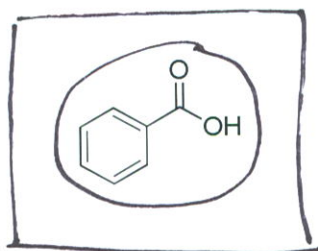
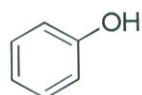
2. Circle the most acidic compound in each set. (6 points, 2 each). Place a box around the most acidic compound of all the compounds listed in this problem. (3 points)



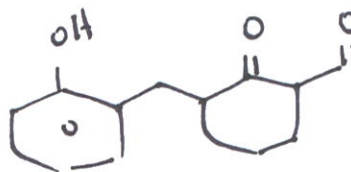
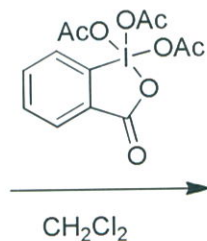
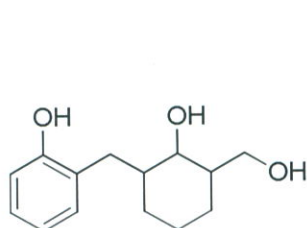
b.

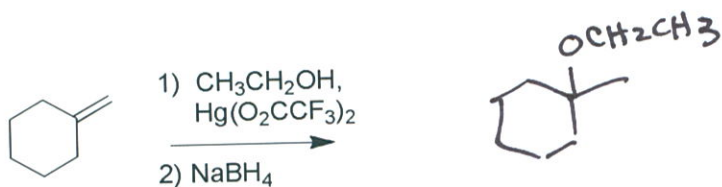
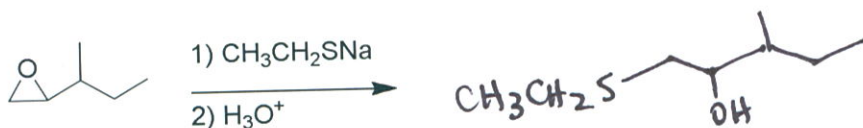
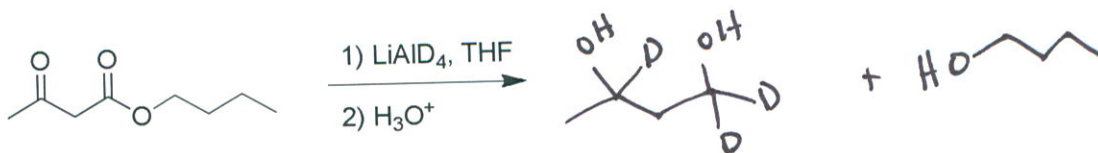
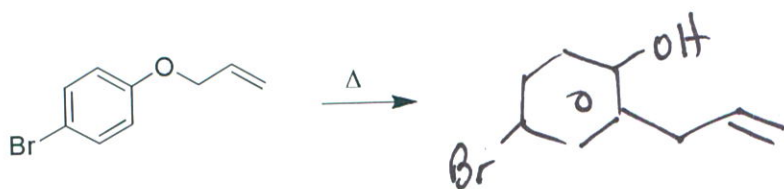


c.

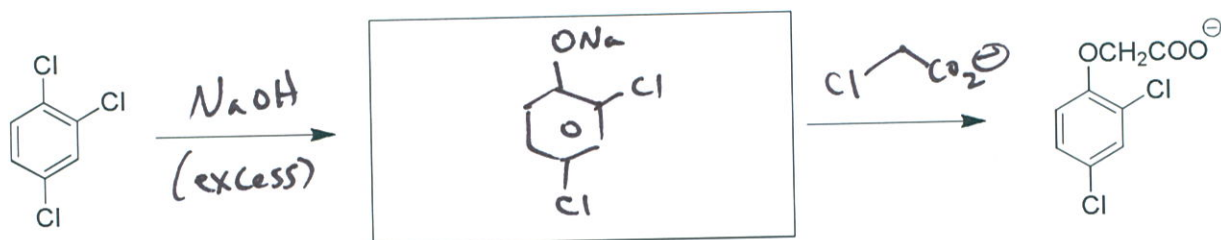
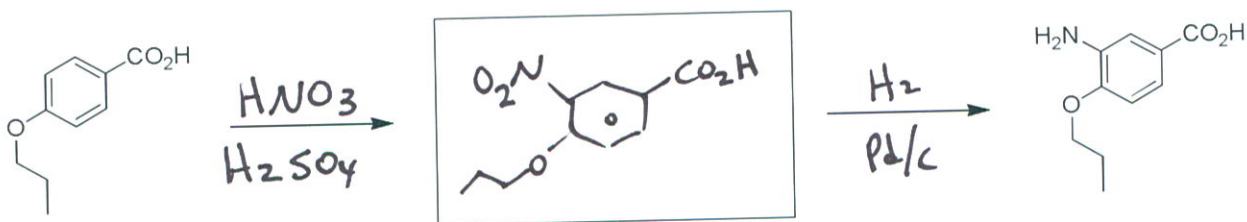


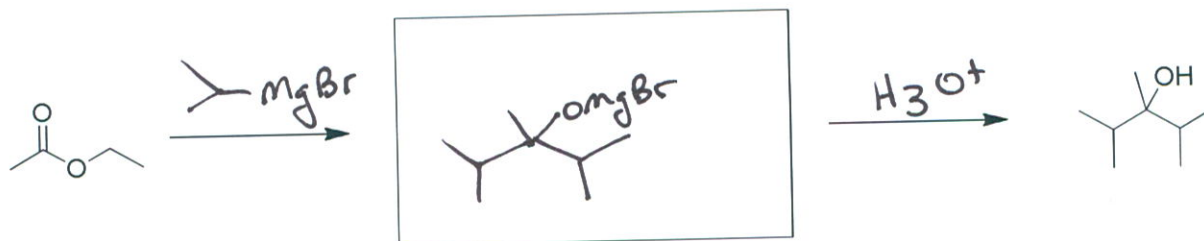
3. (20 points, 4 each) Provide the major organic product for each of the following reactions.



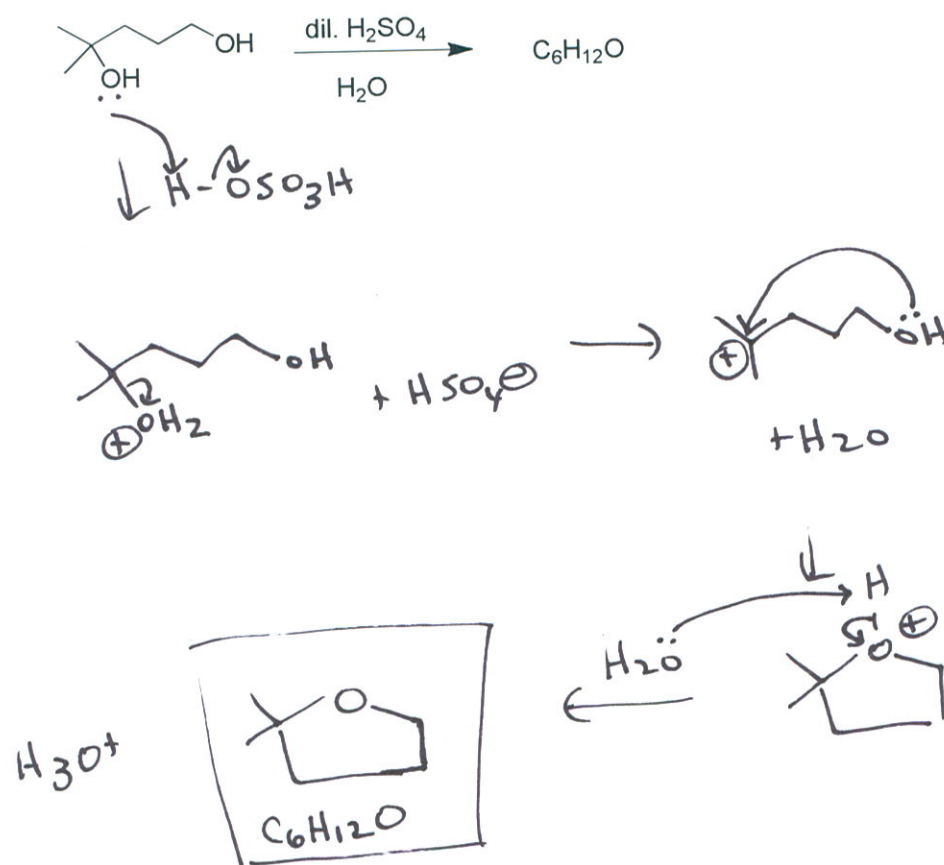


4. (15 points, 5 each) Provide the necessary reagents over the reaction arrows and the intermediate that is formed in the box for each of the following two step reactions.

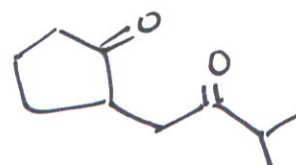
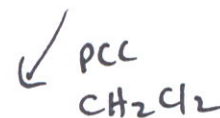
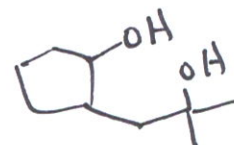
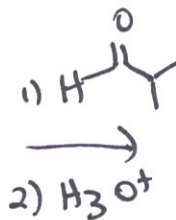
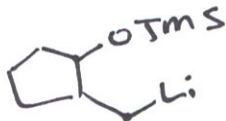
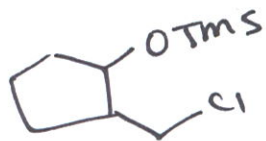
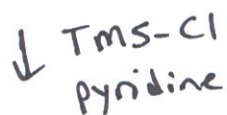
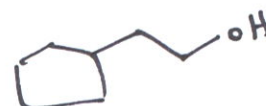
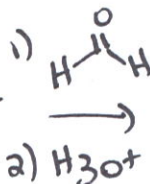
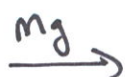
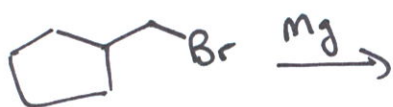
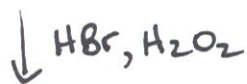




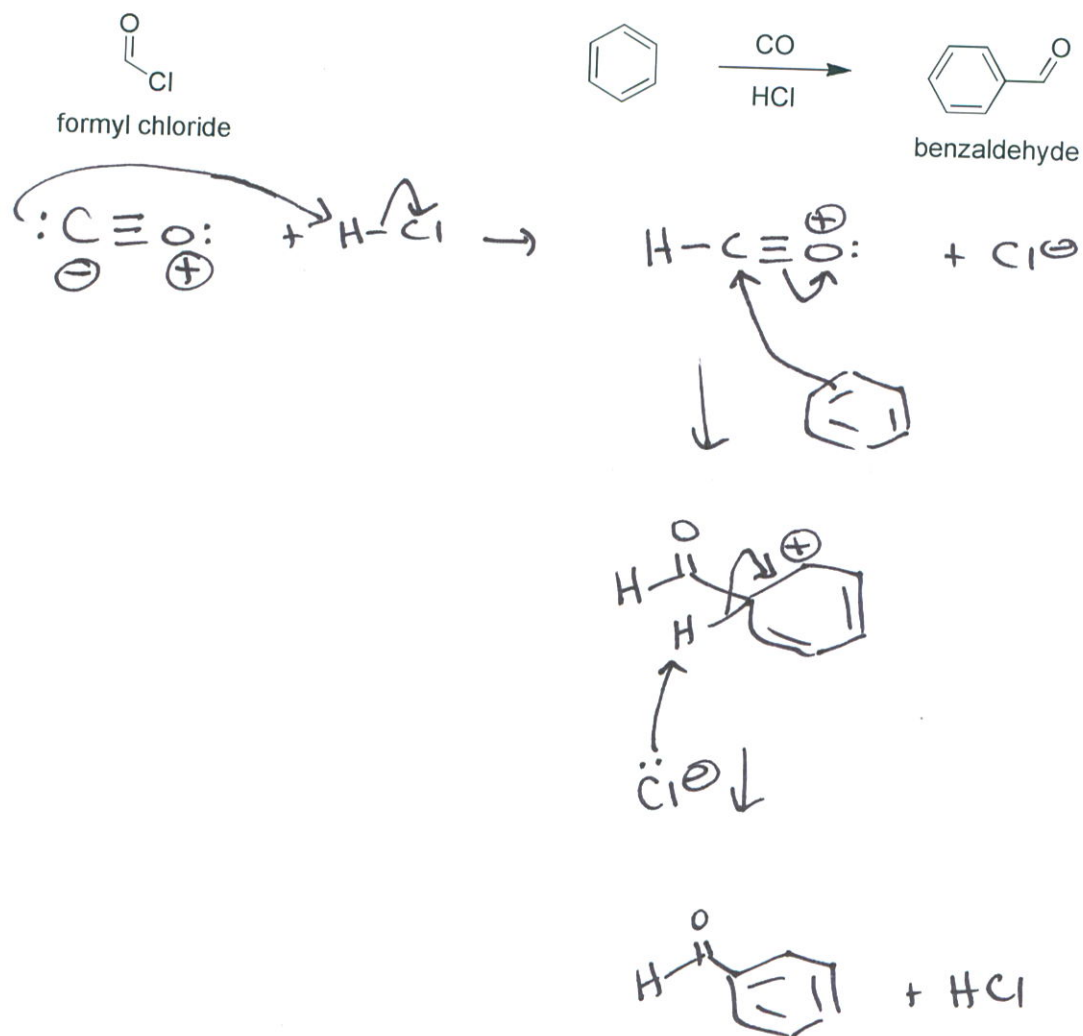
5. (10 points) Provide the product and a complete electron pushing mechanism for the following reaction. Be sure to include any by-products as they are formed and show arrows for every bond change. Watch your formal charges, too. Do not combine steps!!



6. (18 points) Provide a synthesis of each of the target compounds from the given starting material. You may use any additional reagents you need. Clearly separate the reagents used for each step of these multi-step syntheses. You may use a retrosynthetic analysis if you wish, but be sure to write your final answer in the forward direction.



7. (10 points) Since formal chloride does NOT exist, it cannot be used to synthesize benzaldehyde via a Friedel-Crafts reaction. Benzaldehyde can be prepared from benzene, carbon monoxide, and HCl in a process known as the Gatterman-Koch reaction. Propose a full electron-pushing mechanism for the reaction.



8. (12 points, 4 each) Provide missing structures for compounds A, B, and C in the following synthetic scheme.

