

Chemistry 2522

Spring Semester 2006; Midterm 1 Exam

February 22, Wednesday, 1:00 to 1:50 pm

This exam has 8 problems (100 pts) on 6 pages. Make sure your copy is complete and correct.

Printed Name (**LAST**, First) _____

Your grades will be available Friday, February 24, morning before class.

Good Luck!

Chemistry 2522
Spring 2006; Midterm 1 Exam

This exam has 8 problems on 6 pages. Make sure your copy is complete and correct.

Printed Name (*Last*, First) _____

Scores:

1. _____

2. _____

3. _____

4. _____

5. _____

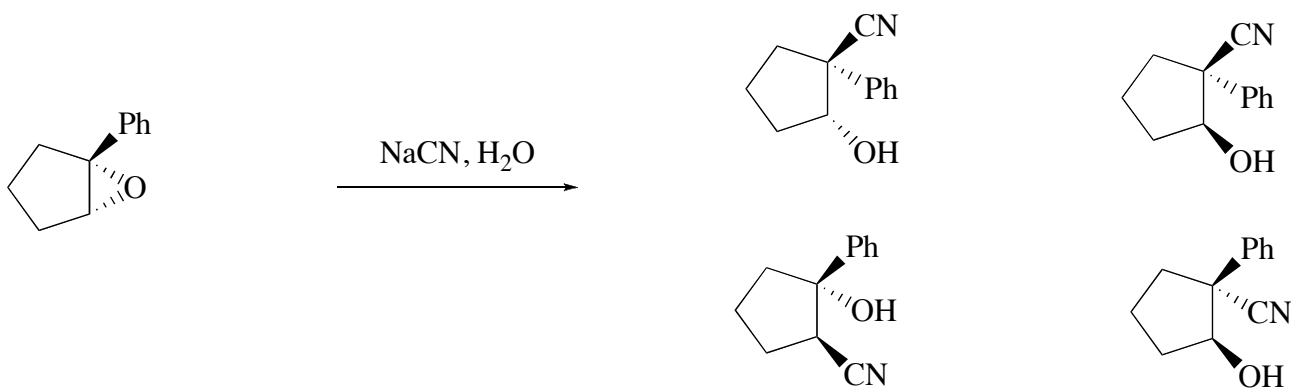
6. _____

7. _____

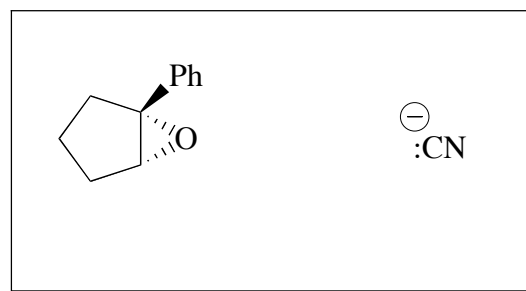
8. _____

Total: _____

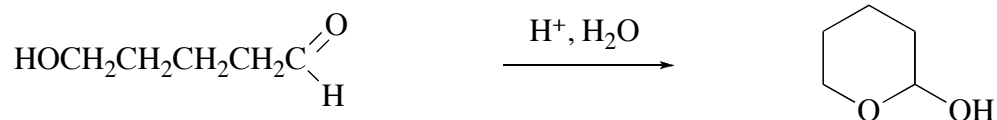
1. (8) (a) Circle the major product in the following reaction (4 pts):



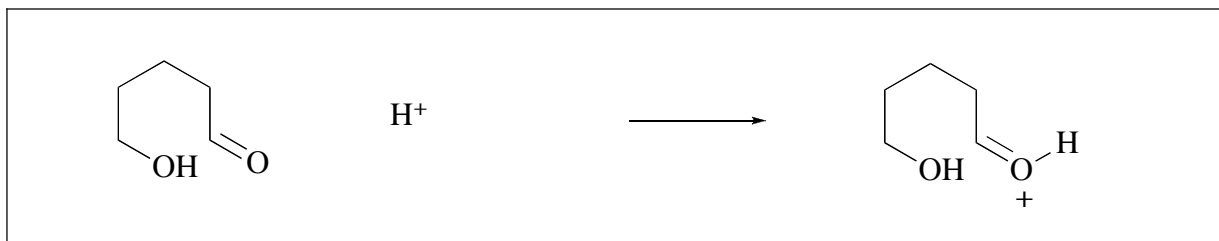
(b) In the provided box, draw **two curved arrows** explaining the initial step in the mechanism of this reaction (4 pts):



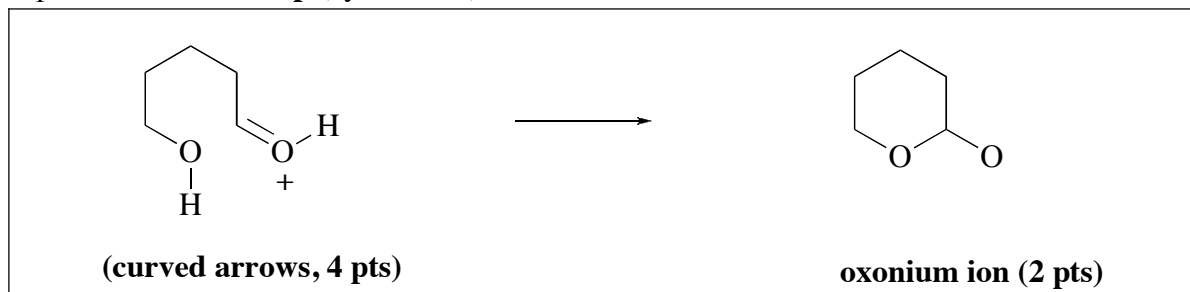
2. (8) Using provided boxes, answer the questions on the **mechanism** of the following reaction:



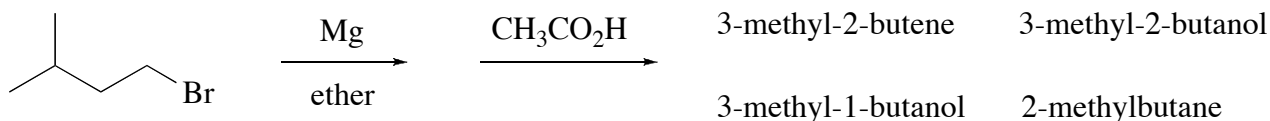
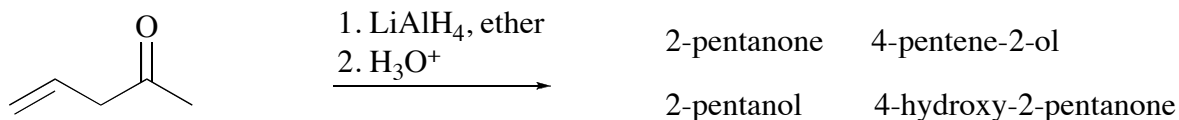
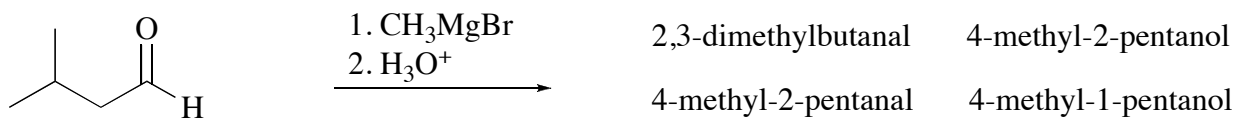
Draw **one curved arrow** to show the **first step** in the reaction mechanism (2 pts):



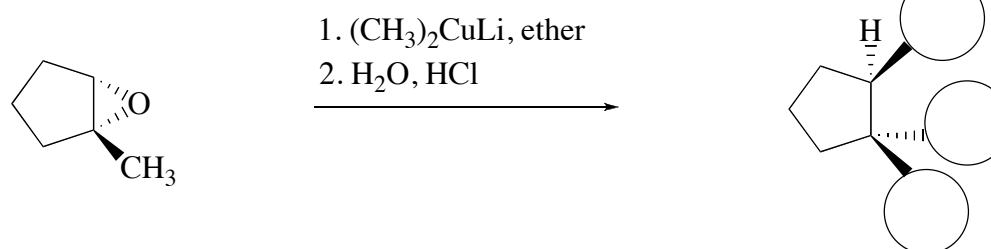
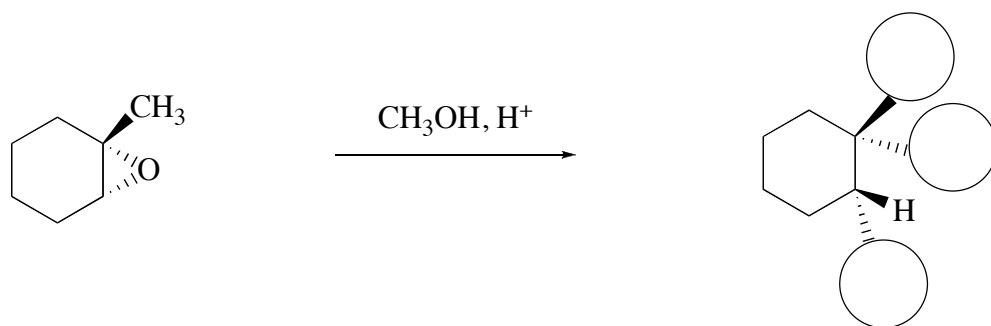
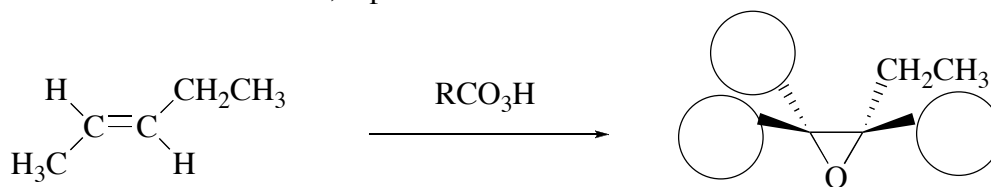
Draw **two curved arrows** (4 pts) and finish drawing of the **oxonium** intermediate (2 pts), to explain the **second step** (cyclization) in the reaction mechanism:



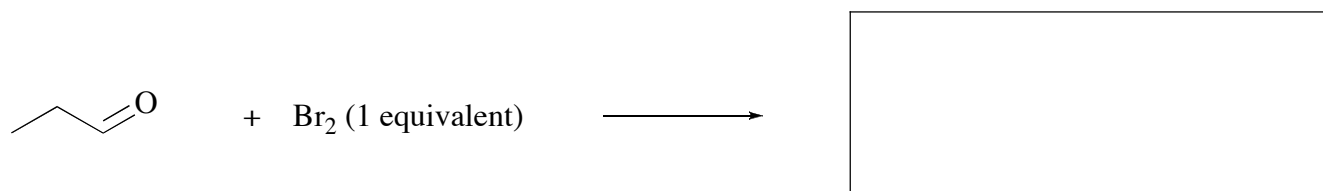
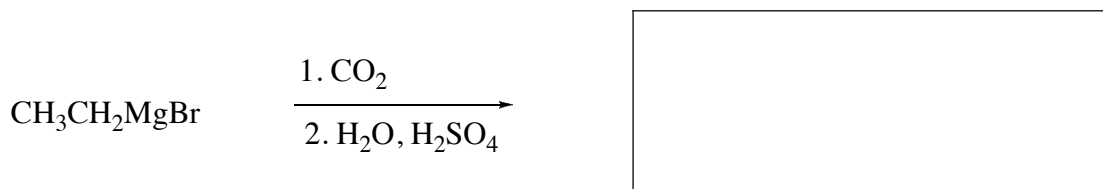
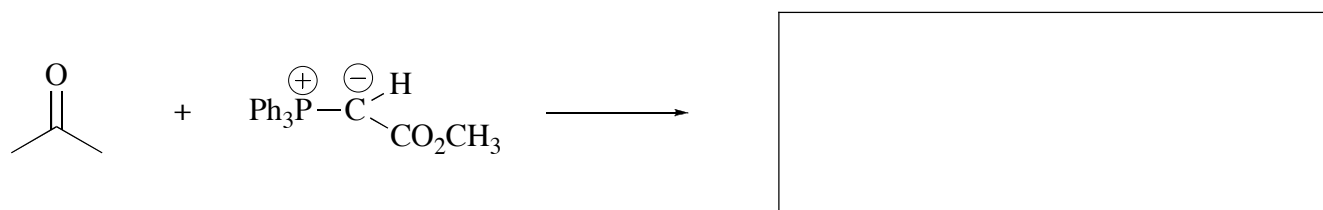
3. (12) Circle the **major organic product** obtained from each of the following of reactions (4 pt each):

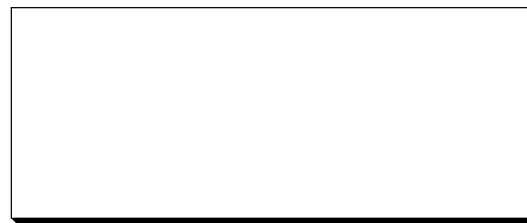
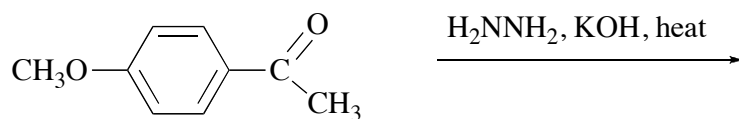


4. (18) Finish drawing of the main product(s) for each the following reactions by placing appropriate substituents in the circles; 2 pts each substituent.

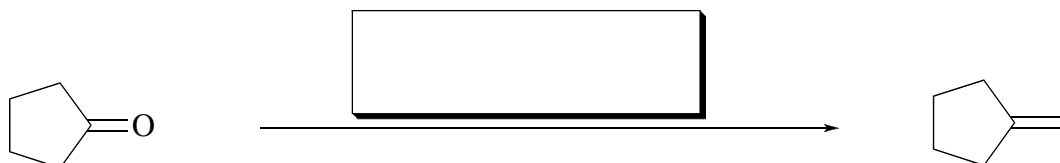
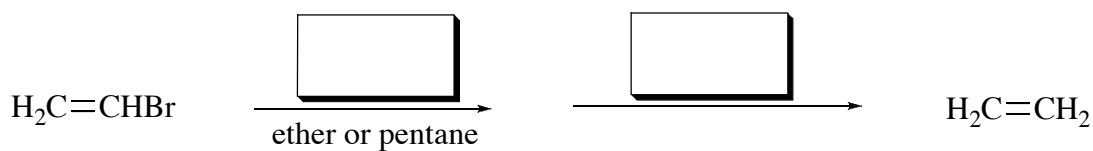
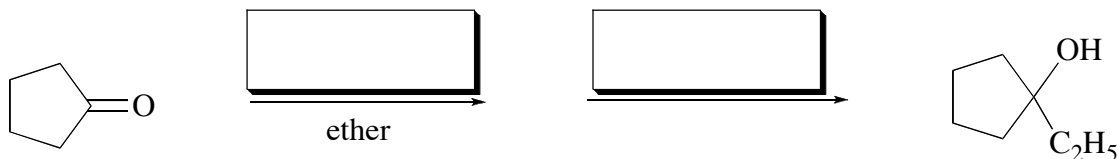


5. (16) Draw the structure of the main product for each the following reactions (4 pts each):

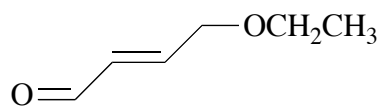




6. (10, 2 pts each box) Write the molecule of a reagent that is required to perform each of the following reactions in the box above the arrow:



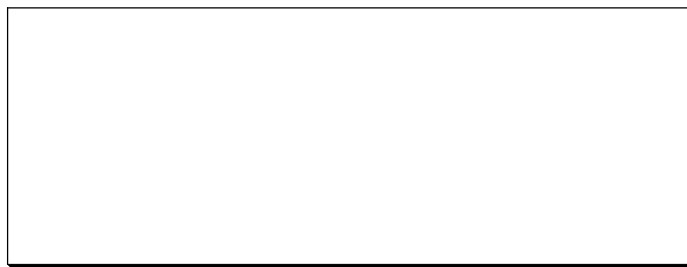
7. (8) Give either the **IUPAC name** or the **correct structure** for each of the following compounds:



(3 pts)

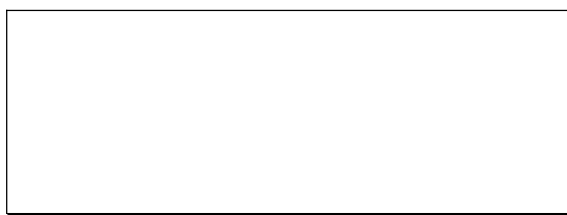
cis-2-hydroxycyclopentanecarbaldehyde

(3 pts)



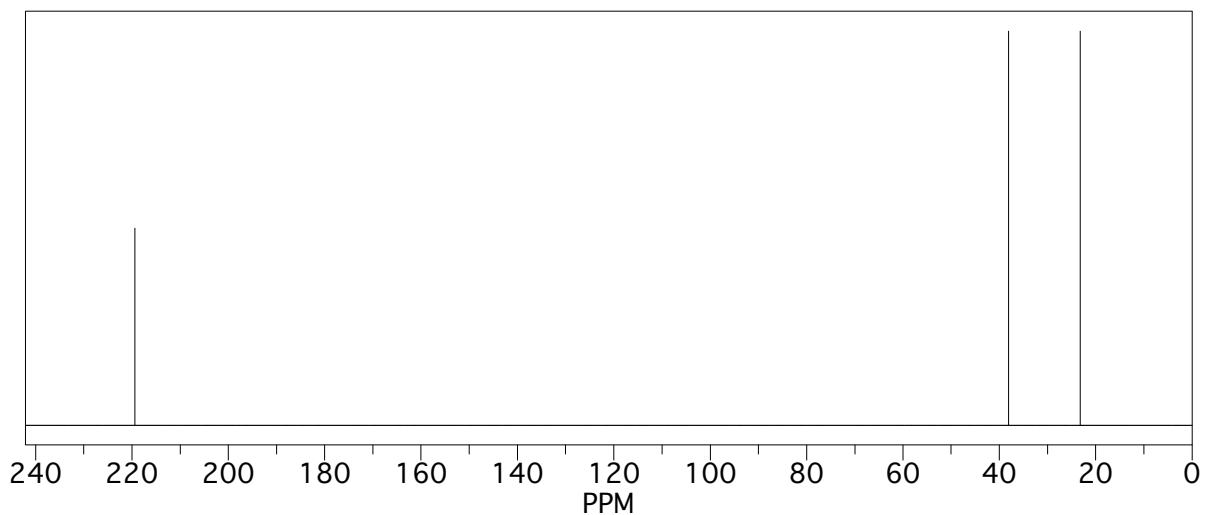
acetaldehyde

(2 pts)



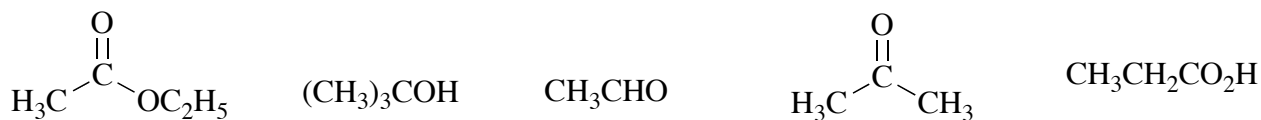
8. (20, 5 pts each) For each of the following questions (a)-(e) **circle** the item that is the correct answer.

(a) Which of the listed compounds is in agreement with the following ^{13}C NMR spectrum?

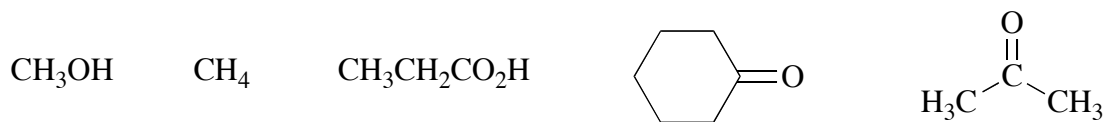


cyclopentanone cyclopropanone cyclohexanone cyclopentanol cyclopentane

(b) Which of the following compounds will have the *characteristic IR* peak at about 1700 cm^{-1} and two signals in the ^1H NMR spectrum?



(c) Which one of the following compounds has the molecular peak M^+ $m/z = 16$ in the mass spectrum? (**atomic weight of C is 12, O 16, H 1**)



(d) Which of the following compounds is the **enol** form of **3-methyl-2-butanone**?

