

**Exam Final**  
December 4, 2012  
Organic Chemistry 334



**Please Sit Every Other Seat**

This exam is 110 minutes long (8-9:50) There will be no make-up Final exams. Please be considerate of your fellow classmates when leaving. Don't stand by the doors and discuss the exam.

All cell phones and personal audio devices must be turned off and put away. The use of calculators, notes, the textbook, or **your neighbors test** is not permitted during the exam. You may use molecular models, but they cannot be shared during the exam.

Please put your in-class number and your name on the second page **and back of the exam.**

You may tear off this page off and use the back for scratch paper.

**If your test becomes unstapled, please let me know**



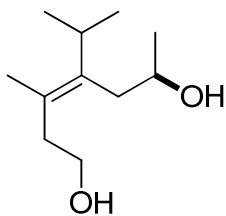
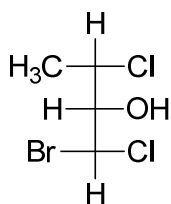
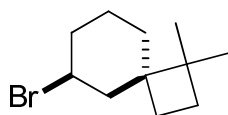
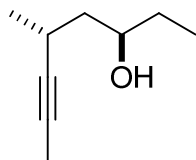
Organic Chemistry 334  
Final Exam

In-class # \_\_\_\_\_

December 4, 2012

Name \_\_\_\_\_  
(Last, First)

1. Name the following compounds. **Do not forget stereochemistry.** (23 pts)



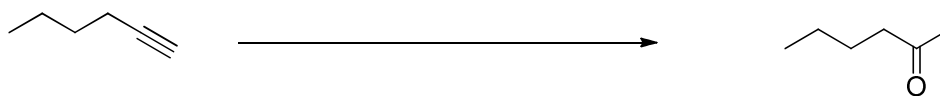
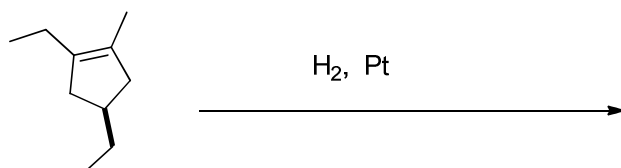
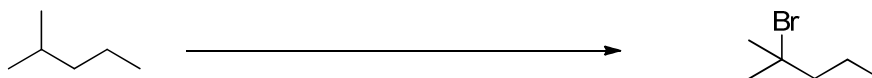
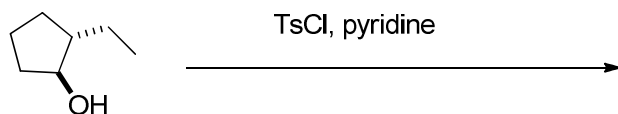
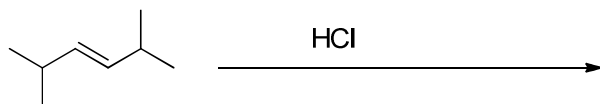
2. Draw (1R,2R,4S)-1-allyl-4-isopropyl-2-methylcyclohexane in its most stable chair conformation. (5 pts)

3. Draw a meso compound with the molecular formula  $C_9H_{20}$ . (3 pts)

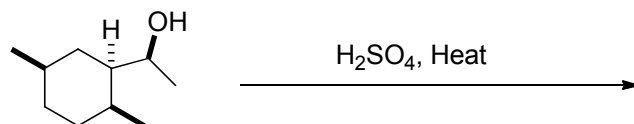
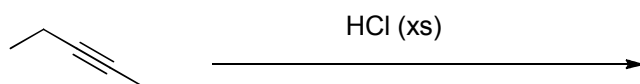
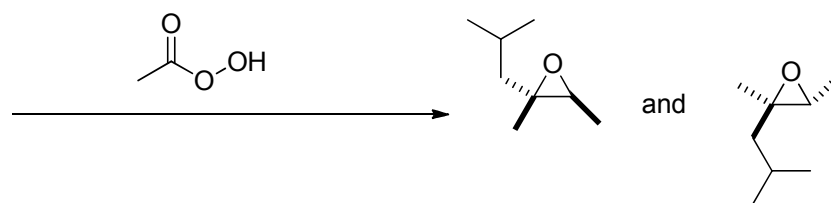
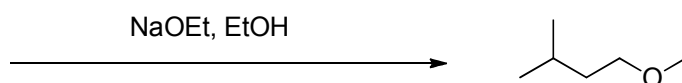
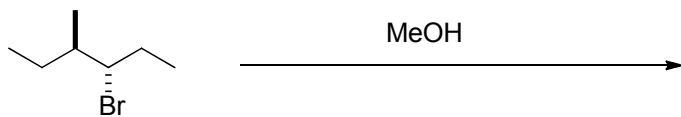
4. Draw a structural isomer of  $C_9H_{20}$  in which only three different monochlorinated products could be formed in a radical chlorination reaction. (3 pts)

5. Draw a **tetra substituted** alkene with the molecular formula  $C_9H_{18}$  that has no stereochemistry (No R, S, E or Z). (2 pts)

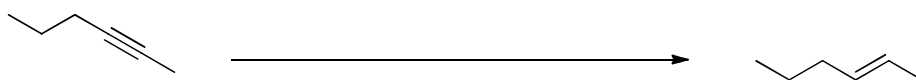
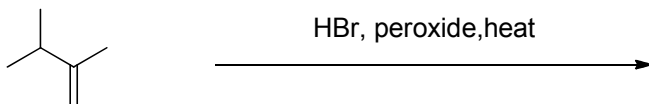
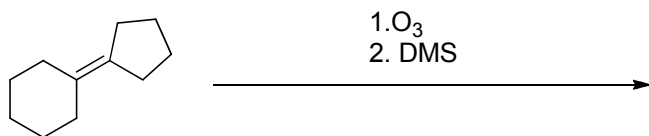
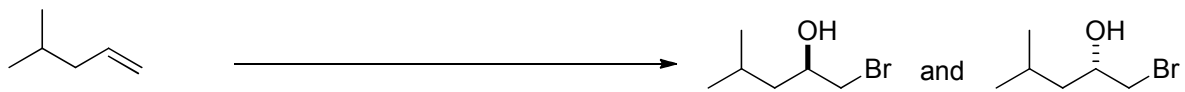
6. Draw the necessary reagents, starting material, or major product/s for the following chemical transformations. If there is no reaction, write no reaction. (61 points)



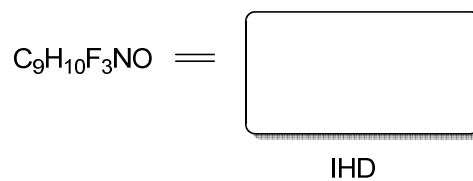
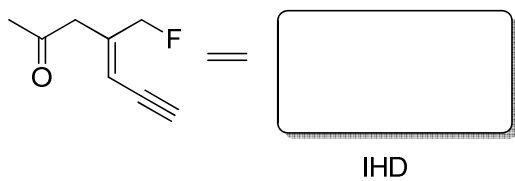
6. continued



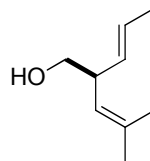
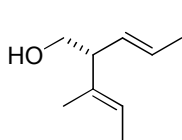
6. Continued.



7. What is the IHD or degrees of unsaturation for the following compounds? (6 pts)

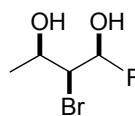
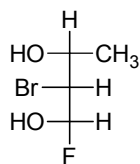


8. How are the following molecules related? Circle your answer. (9 pts)



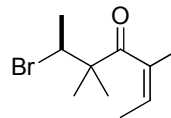
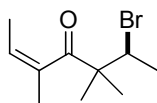
Enantiomers      Diastereomers      Structural isomers      Identical

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Enantiomers      Diastereomers      Structural isomers      Identical

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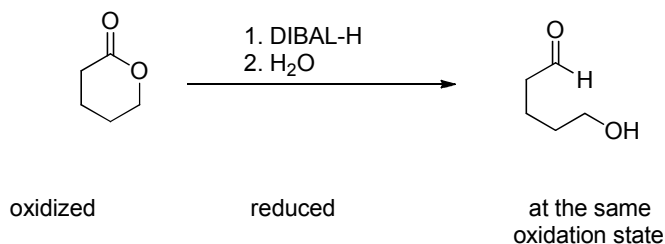
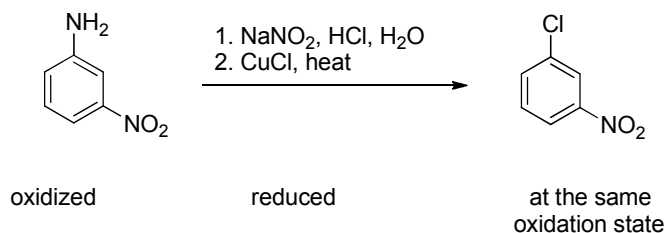
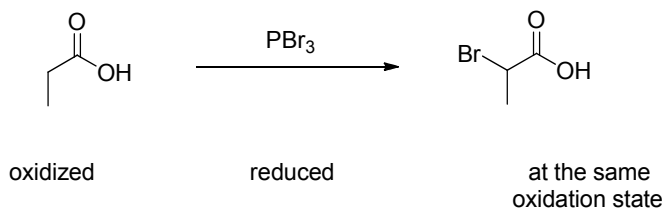
Enantiomers      Diastereomers      Structural isomers      Identical

9. Draw, in a Newman projection looking down the C3-C4 bond, the most stable staggered conformation of (3R,4S)-3-fluoro-2,4,6-trimethylheptane. (7 pts)

(3R,4S)-3-fluoro-2,4,6-trimethylheptane

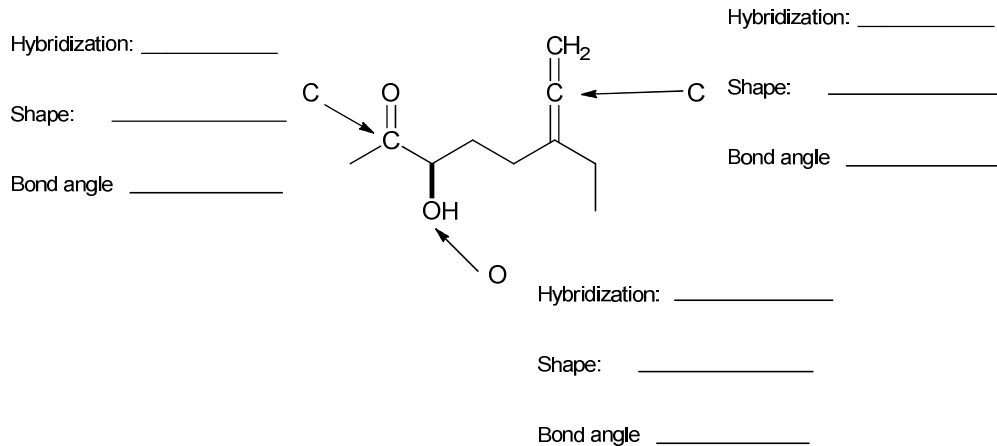


10. In the following reactions, has the product been oxidized, reduced, or are there the starting material and the products at the same oxidation state. (9 pts)

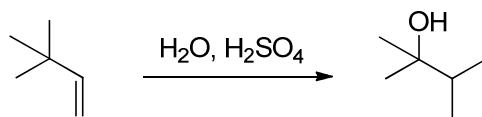


11. What is the hybridizations, shape, and bond angle at the indicated atom. (9 pts)

You may use the abbreviations: Tet = tetrahedral: TP = trigonal planar: L = linear



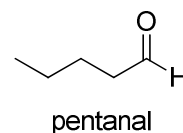
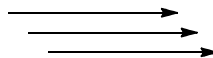
12. Draw the mechanism for the following hydration reaction. (16 pts)



13. Provide a synthesis of pentanal. All carbons in the product must start from an alkane, alkene, or alkyne that has THREE carbons or less. You may use any reagents or conditions you have learned in CH 334. The major product of each step is then carried on to the following reaction. (12 points)

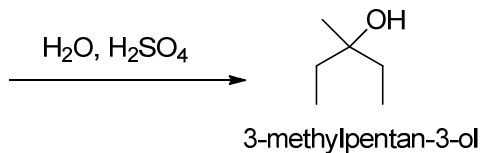
**No starting with an alkane, alkene, or alkyne that has a halogenated or an alcohol on it.**

All carbons in the product **must start** from an alkane, alkene, or alkyne that has THREE carbons or less

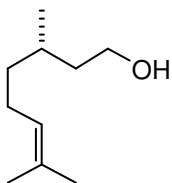


You may use any reagents or conditions you have learned in CH 334

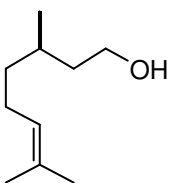
14. Draw all the potential starting alkenes that could have been in an acid catalyzed hydration reaction which would yield 3-methylpentan-3-ol. (15 pts)



\*\*\*\*\*Insurance Question 8 pts\*\*\*\*\*



(*S*)-Citronellol has an optical rotation of  $[\alpha]_D = -5.3$



(*R*)-Citronellol has an optical rotation of  $[\alpha]_D = +5.3$

1. What is the optical rotation of a 1:1 mixture of (*S*)-Citronellol and (*R*)-Citronellol (1 pts)
2. What is the term used for a 1:1 mixture of enantiomers? (2 pts)
3. If we had an enantiomeric excess of 64% in favor of (*S*)- Citronellol, what percent of the mixture is S and R? (4 pts)
 

% (*S*)- Citronellol =

% (*R*)- Citronellol =
4. (*R*)- Citronellol is .... (1 pt) Circle your answer

dextrorotatory

levorotatory