Homework Set #6
Chemistry 1315
Spring 2004

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Name

Handed Out:  3-4-04
Due:   3-18-04 at 9:30 am in class

Late Policy:  One day late (3-19-04 10am):  50% off
Two days later (3-20-04 10 am):  75% off
After 10 am 3-21-04:   no credit

You may work in groups up to 3 students. However, each student must make contributions to the answers.

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1. *Brevotoxin B is a marine neurotoxin associated with the “red tide” catastrophes that periodically occur along costal areas around the world and are responsible for massive killings of fish and other marine life, as well as human poisoning.*

Carefully examine the structure of Brevotoxin and circle all alcohol, ether, epoxide, aldehyde and ketone functional groups and correctly identify the functional group by writing the name beside the circled groups.
2. A key component to the structure of Brevotoxin B is the 2-methyl propenal moiety. Synthetically this portion of the structure may easily be altered using a basic understanding of synthetic organic chemistry.

To demonstrate your understanding of basic functional group transformations, fill in the boxes below with the appropriate reagents or structures as needed.

- **Reagents:** PCC  
  **Structure:**  
  2-Methyl-propenal  
  **Reagents:** Na₂Cr₂O₇, H⁺  
  **Structure:**
3. You may have noticed that the structure of brevotoxin contains a large number of cyclic ethers. In analogy to the 8-membered cyclic ether located in the center of Brevotoxin B, 3-methyl-3,4,7,8-tetrahydro-2H-oxocine can be synthesized using fundamental organic chemistry.

A. Outline a one step synthesis of 3-methyl-3,4,7,8-tetrahydro-2H-oxocine (Give starting structures and reagents. NO MECHANISMS PLEASE)

B. Outline a two step synthesis of the following compound starting with 3-methyl-3,4,7,8-tetrahydro-2H-oxocine and explain the observed stereochemistry of the diol in one sentence. (Give starting structures, intermediate structures, and reagents. NO MECHANISMS PLEASE)
4. Correctly name the following compounds using IUPAC nomenclature.

A.

B.

C.
5. Classify the following alcohols as primary, secondary, or tertiary. Show the consequence of subjecting each of these alcohols to STRONGLY oxidizing conditions.

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\begin{array}{ccc}
\text{OH} & \text{OH} & \text{OH} \\
\text{O} & \text{O} & \text{O} \\
\text{HO} & \text{HO} & \text{HO} \\
\text{H} & \text{H} & \text{H} \\
\end{array}
\]