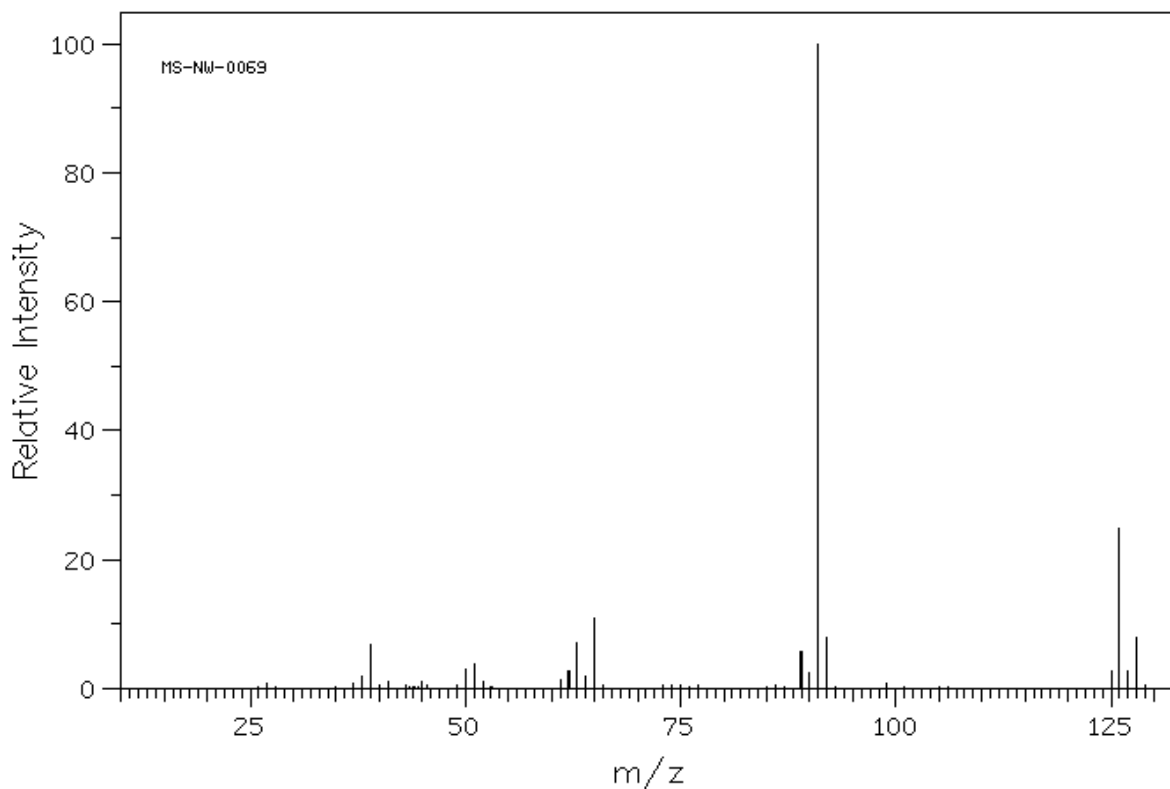
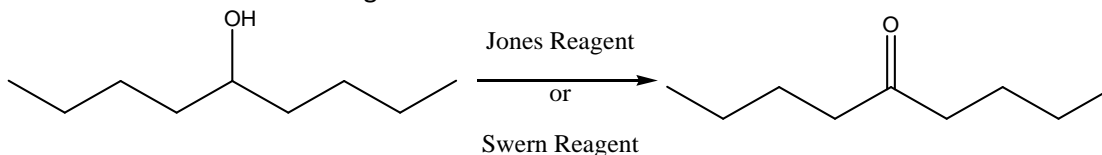


Organic Chemistry II
Spring 2010
PS #1
Due: January 20, 2010

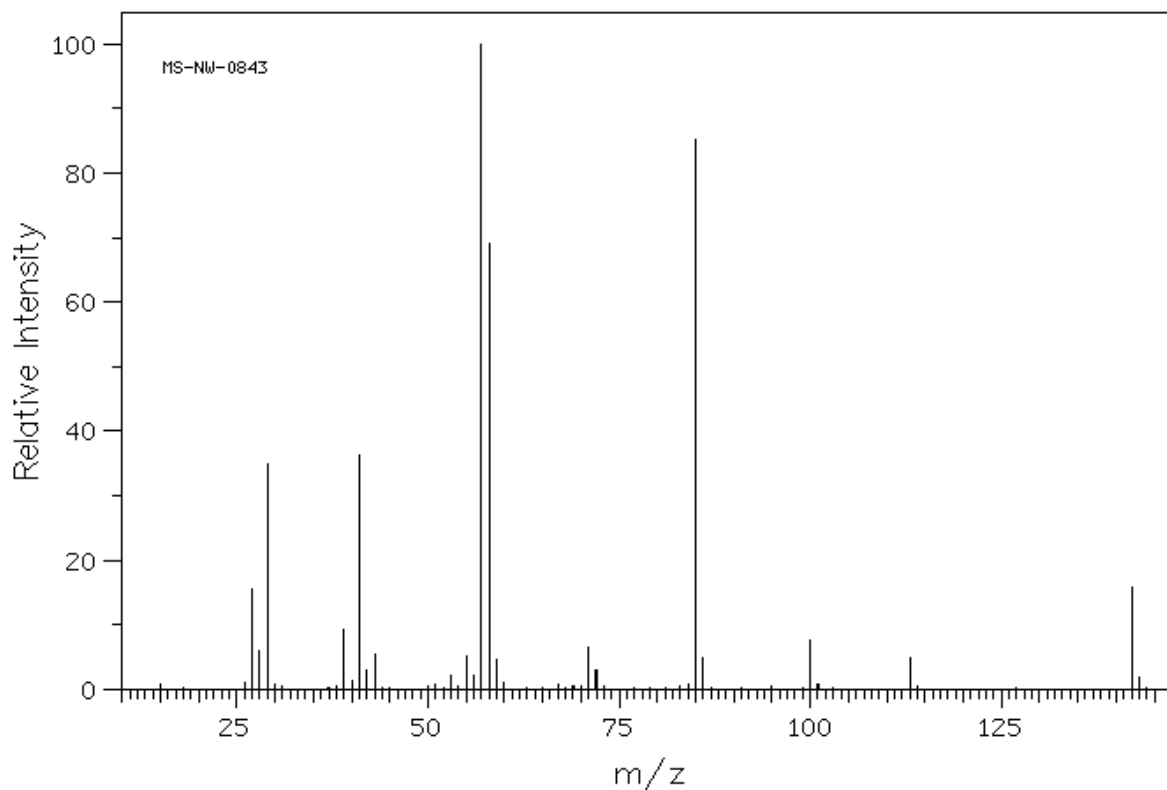
1.
 - i. Clearly draw the structure of the Lopinavir. (You can find the structure using any internet search engine.)
 - ii. What is the use of Lopinavir? (maximum: two sentences)
 - iii. On the structure that you have drawn label the following groups, if present: one phenyl ring, one benzyl ring, one amide, one aldehyde, one ketone, one ester, one alkyne, one alkene, one 1° alcohol, one 2° alcohol, one 3° alcohol, one 1° amine, one 2° amine, one 3° amine and one ether.
2. The mass spectrum below corresponds to C_7H_7X : benzyl iodide, benzyl bromide, benzyl chloride or benzyl fluoride.
 - i. Calculate the degree of unsaturation for these compounds.
 - ii. Based on your analysis of the mass spectrum, what is the molecular formula and structure of the compound? Give the reason for your answer using data from the spectrum below. In addition, in your answer state why you were able to determine that the other halogens were not present. You are **not** required to analyze the peaks below m/z 75. (maximum: 4 sentences)
 - iii. What is the m/z -value of the base peak?
 - iv. How is the ion for the base peak formed? In your answer, show the mechanism for formation of this ion.



3. The reaction below is categorized as an oxidation reaction:



- What are the chemicals in the 'Jones Reagent' and the 'Swern Reagent'? (You can use your text.)
- Identify the functional group in the reactant (1° , 2° or 3°) and the functional group in the product.
- What are the IUPAC names of the reactant and the product (ketones: the name ends in 'one', eg. 2-propanone is the IUPAC name for acetone)?
- What is the degree of unsaturation of the product and the degree of unsaturation of the reactant?
- What is the base peak in the spectrum?
- How does the spectrum below confirm that the product was made? In your answer, identify both the molecular ion and the fragment ion from the McLafferty rearrangement on the spectrum. In addition, give the mechanisms for the formation of the fragments corresponding to m/z 100. You are **not** required to analyze the peaks below m/z 75.



4. Below is the MS spectrum for 3,3-dimethylpentane or 2,2-dimethylpropane.
- Draw the structure of 3,3-dimethylpentane and 2,2-dimethylpropane.
 - What is the base peak in the spectrum?
 - Identify the compound to which the MS spectrum corresponds. Give the mechanism for the formation of the fragments that support your conclusion. You are **not** required to analyze the peaks below m/z 70.

