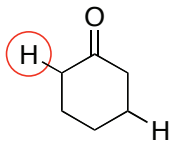
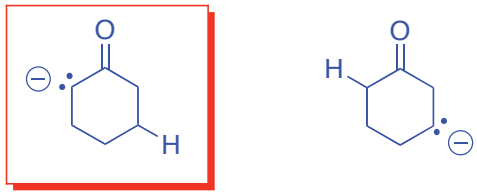
CHM 1321A

Mid Term 2 Answers (March 8, 2013)

1. Compare the two hydrogens shown in this compound and circle the one that is more acidic. (**1 point**)



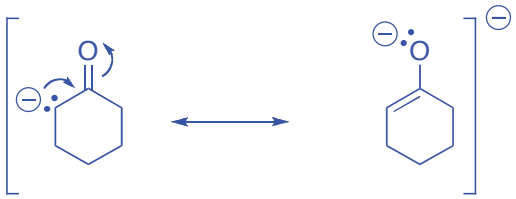
   a. Draw the two possible conjugate bases (**2 points**).



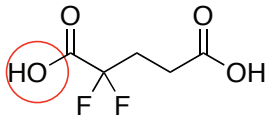
   b. Circle the conjugate base in part a that is more stable (**1 Point**)

   c. Briefly justify your answer in part b. Structures may be helpful in your explanation. (**5 points**)

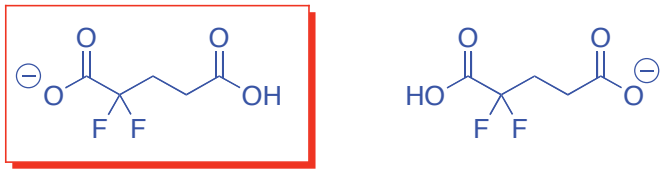
Resonance is possible in the molecule on the left. This spreads out the negative charge and stabilizes this conjugate base relative to the other



2. Compare the two hydrogens shown in this compound and circle the one that is more acidic. (**1 point**)



   a. Draw the two possible conjugate bases (**2 points**).

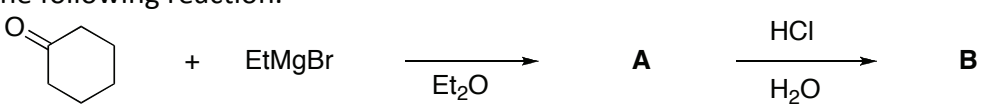


   b. Circle the conjugate base in part a that is more stable (**1 Point**)

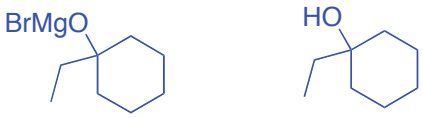
   b. Briefly justify your answer in part b (more space on next page if you need it). (**4 points**)

   compound on the left has 2 fluorines next to the C=O that are electronegative
   the fluorines are electron withdrawing.
   They will reduce the negative charge on the nearby oxygen pulling electrons away from this oxygen (inductive effect)
   reducing the negative charge on oxygen stabilizes this conjugate base and makes it a weak base, this means that the original compound is the stronger acid

3. Consider the following reaction.

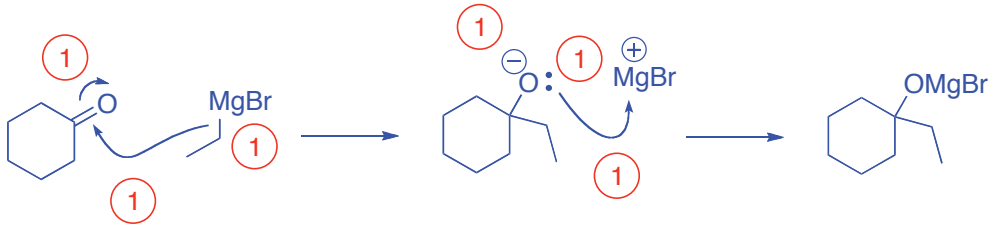


a) What is the structure of product **A** and product **B**? (**2 points**).

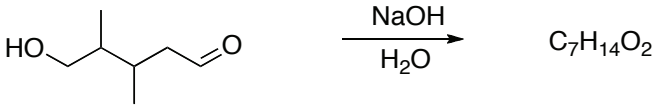


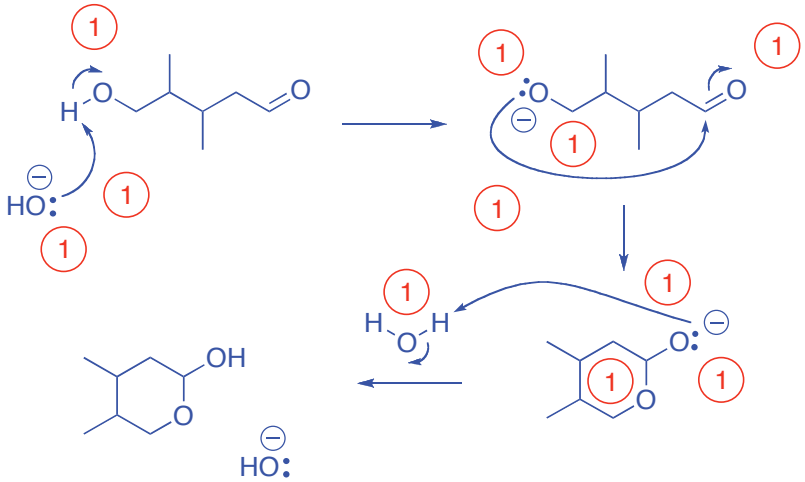
A **B**

b) Provide a detailed mechanism showing the formation of **product A**. (**6 points**).

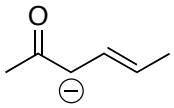


4. Write a <u>detailed</u> mechanism for this transformation (**11 points**).

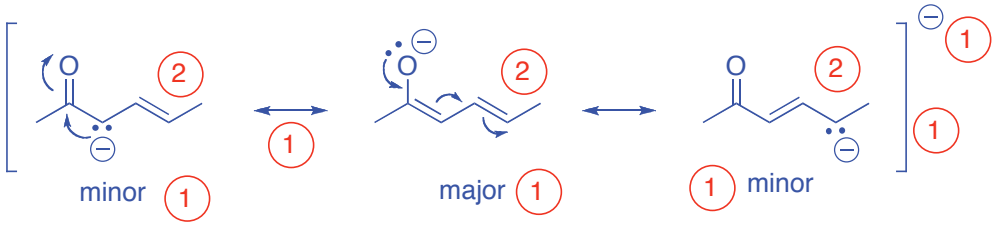




5. Consider the following structure

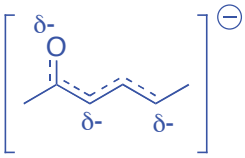


a) Use mechanistic arrows to construct the significant resonance forms for this molecule. (**9 points**).

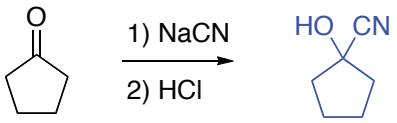


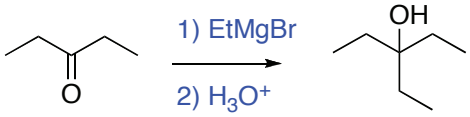
b) Label the major and minor resonance forms in part a. (**3 points**).

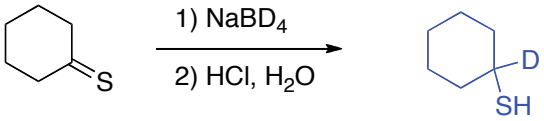
c) Draw the resonance hybrid structure for this molecule. (**4 points**).



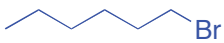
6. Supply the missing products, reagents or starting materials as necessary. (**9 points**)

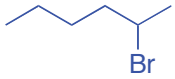
a. 

b. 

c. 

7. A student wishes to selectively prepare a certain hexylbromide from 1-hexene.
   a. Draw the structure of both possible products and identify the Markovnikov product (**3 Points**).



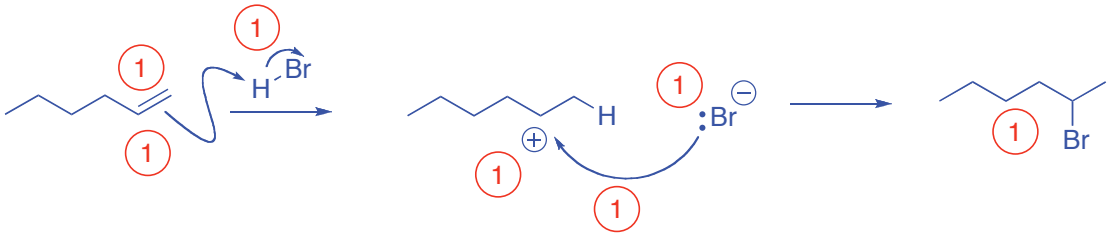


Markovnikov

   b. Show what reagent(s) the student needs to produce the Markovnikov product from 1-hexene (**2 Point**s).

HBr

   c. Give a mechanism to explain the preferential formation of the Markovnikov product from 1-hexene. (**7 Points**)



   d. What controls the selectivity in this reaction? (**3 Points**)

Carbocation is located on the most substituted carbon
Alkyl groups on this carbon donate electron density to the carbocation
This distributes the positive charge lowering the energy of the carbocation

Bonus: Give a mechanism to explain the following reaction: (**3 points**)