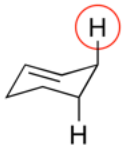
CHM 1321A
Sample Mid Term 2
(Answers in Color)

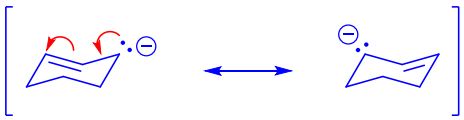
1. Compare the two hydrogens shown in this compound and circle the one that is more acidic. (**1 point**)



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

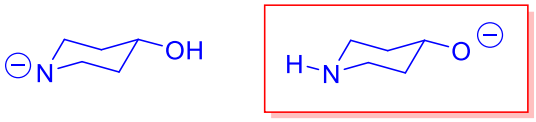
   b. For your answer above, circle which of the conjugate bases is more stable (**1 Point**) (in red)
   c. Briefly justify your answer in part b. Structures may be helpful in your explanation. (**5 points**)

Charge can be delocalized 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**)

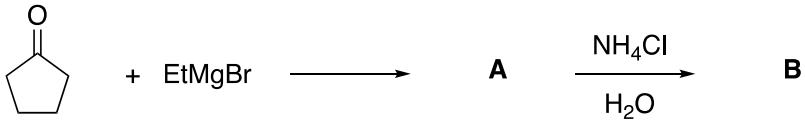
   a. Draw the two possible conjugate bases (**2 points**).



   b. For your answer above, circle which of the conjugate bases is more stable (**1 Point**) in red
   b. Briefly justify your answer in part b (more space on next page if you need it). (**4 points**)

Oxygen is right of nitrogen in the periodic table
Oxygen is more electronegative than nitrogen is
Negative charge on oxygen is more stable than the negative charge on nitrogen
Oxygen anion is the weaker base and OH is the stronger acid

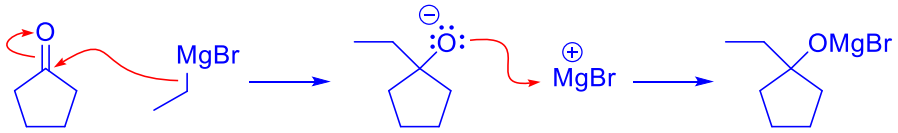
3. Consider the following reaction.



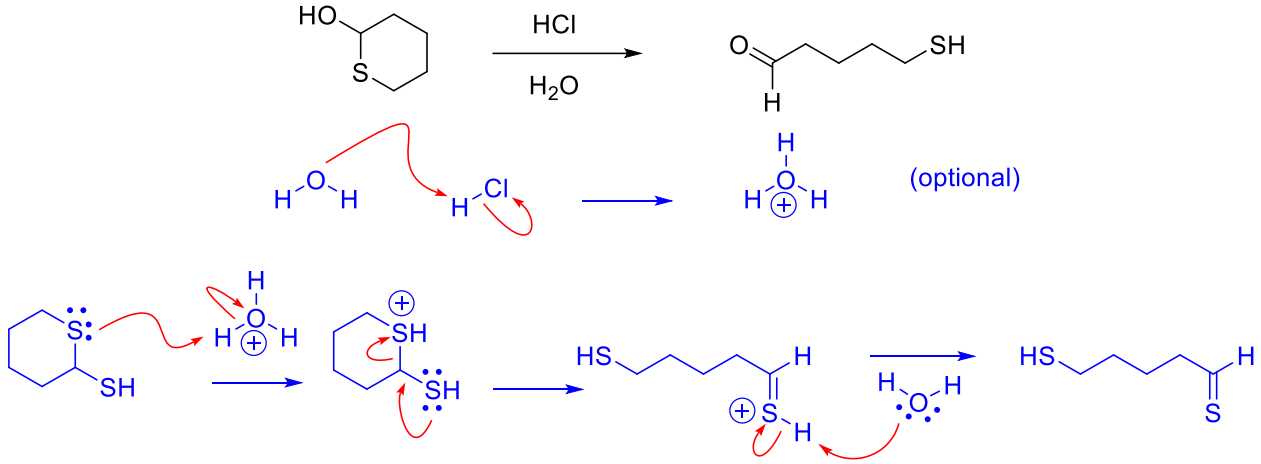
a) What is the structure of product **A** and product **B**? (**2 points**).

A **B**

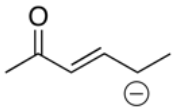
b) Provide a detailed mechanism showing the formation of **product A**. (**6 points**).



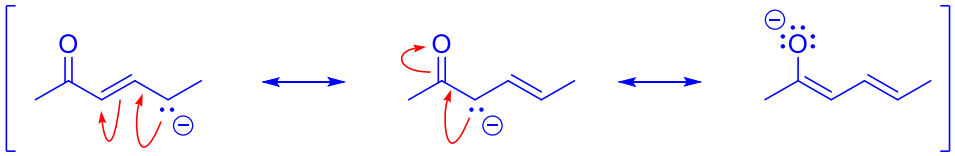
4. Write a <u>detailed</u> mechanism for this transformation (**11 points**).



5. Consider the following structure

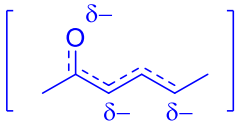


a) Use mechanistic arrows to construct the significant resonance forms for this molecule. (**7 points**).



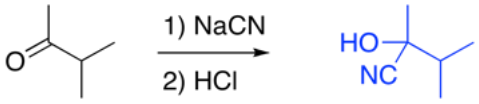
b) Label the major and minor resonance contributors in part a. (**3 points**).

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

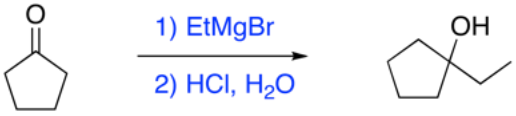


6. Supply the missing products, reagents or starting materials as necessary. (**9 points**)

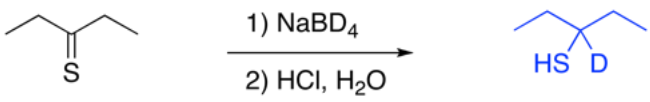
a.

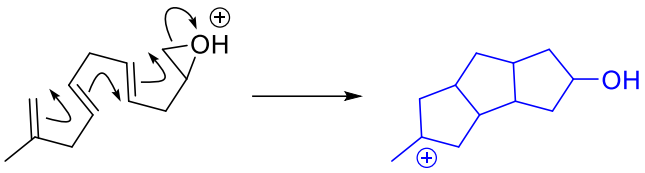


b.

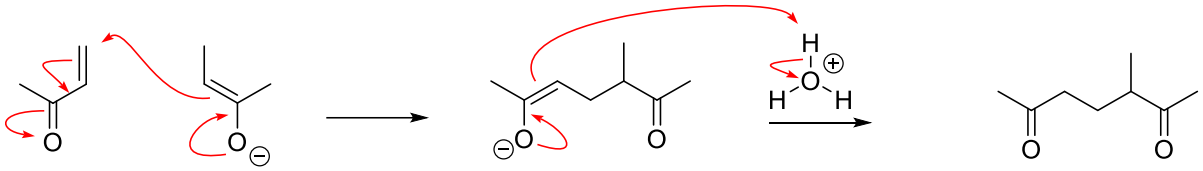


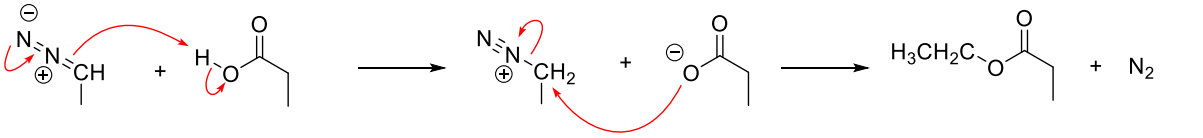
c.



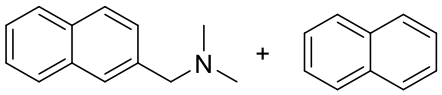
d. 

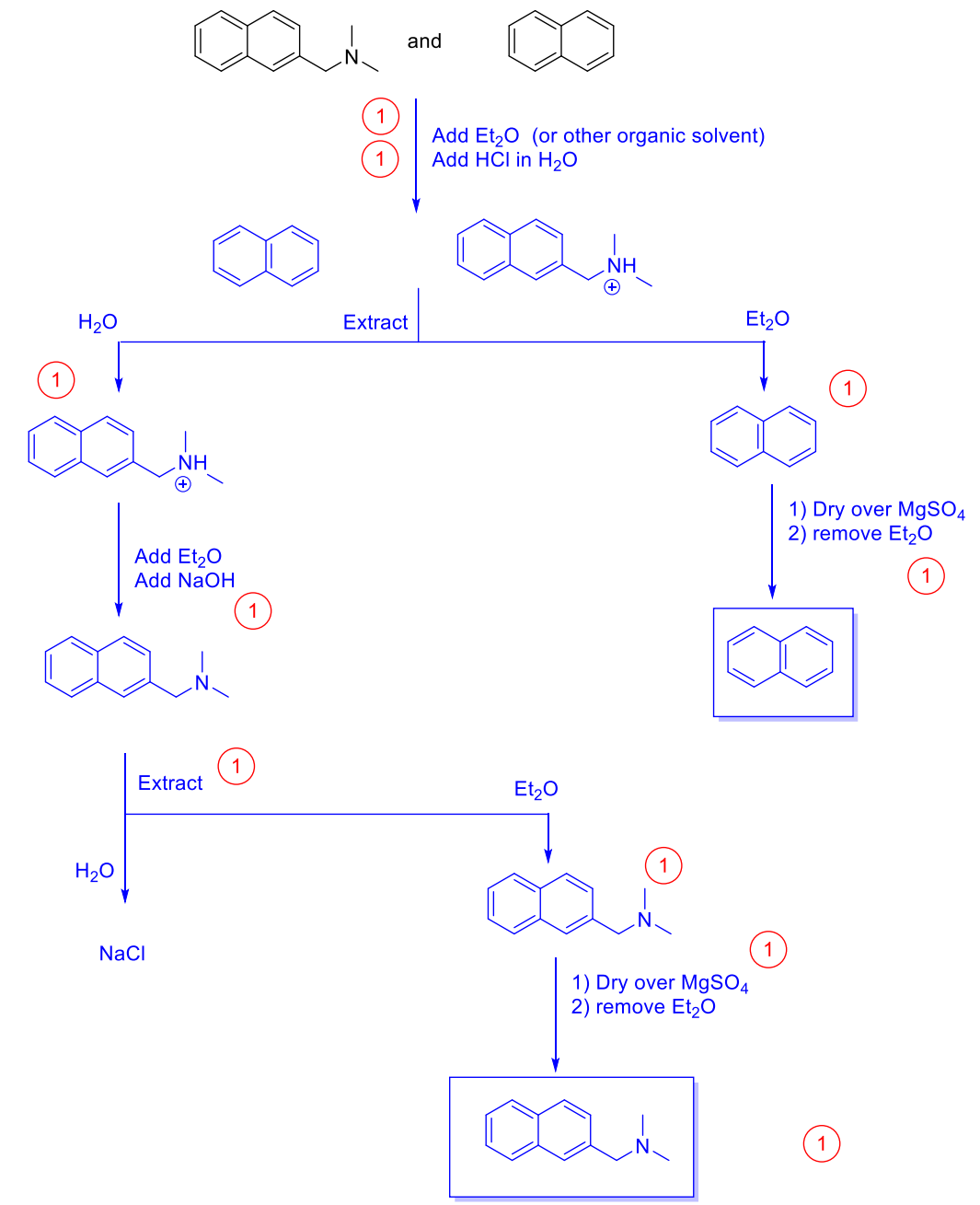
7. Add mechanistic arrows to the following to show how the reactant is converted into products. (**6 Points**).

a. 

b. 

8. Use a flow chart to show how you could separate a mixture of the following compounds using an extraction. Be sure to include all steps to get pure materials. (**9 Points**)





9. Bonus! Give a mechanism that is the *reverse* of the following reaction: (**3 points**)