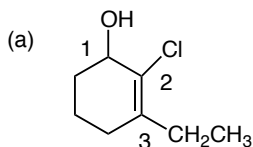


L. I. U.
ANSWER KEY

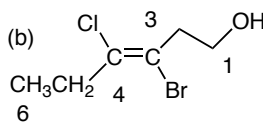
Chem. 121, Sect 009, Exam II

Fall, 2012, 150 points

1. Name the following compounds. Be sure to specify E/Z where appropriate. (20 pts)

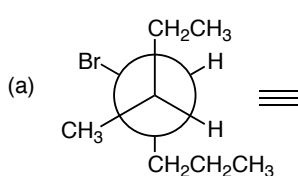


2-chloro-3-ethyl-2-cyclohexenol

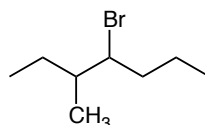
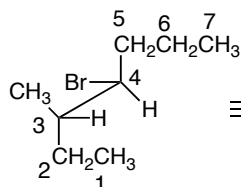


(E)-3-bromo-4-chloro-3-hexen-1-ol

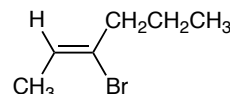
2. Draw the following molecules. (10 pts)



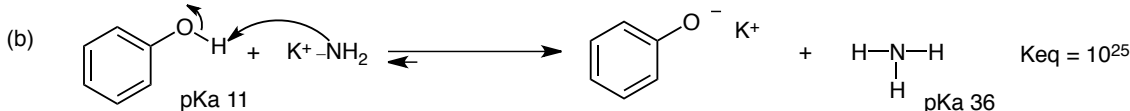
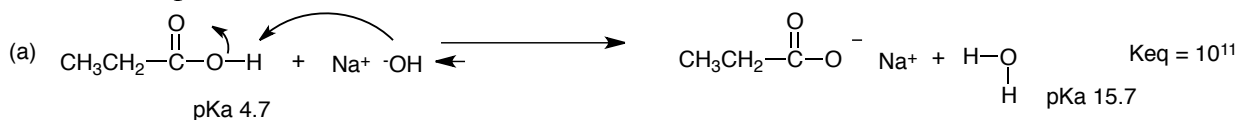
4-bromo-3-methylheptane



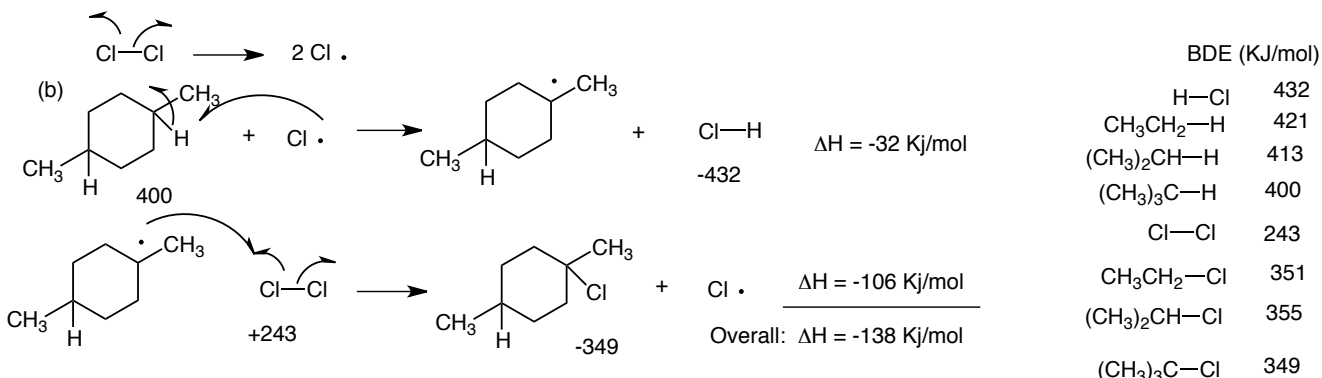
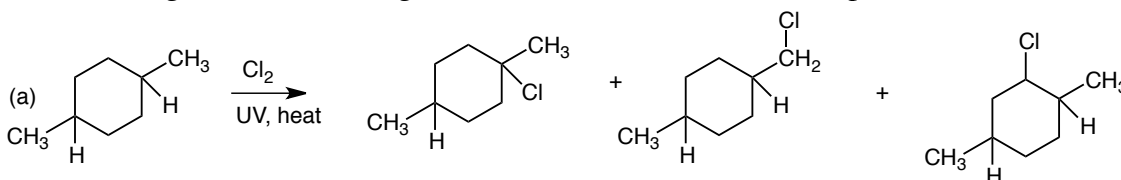
(b) (Z)-3-bromo-2-hexene



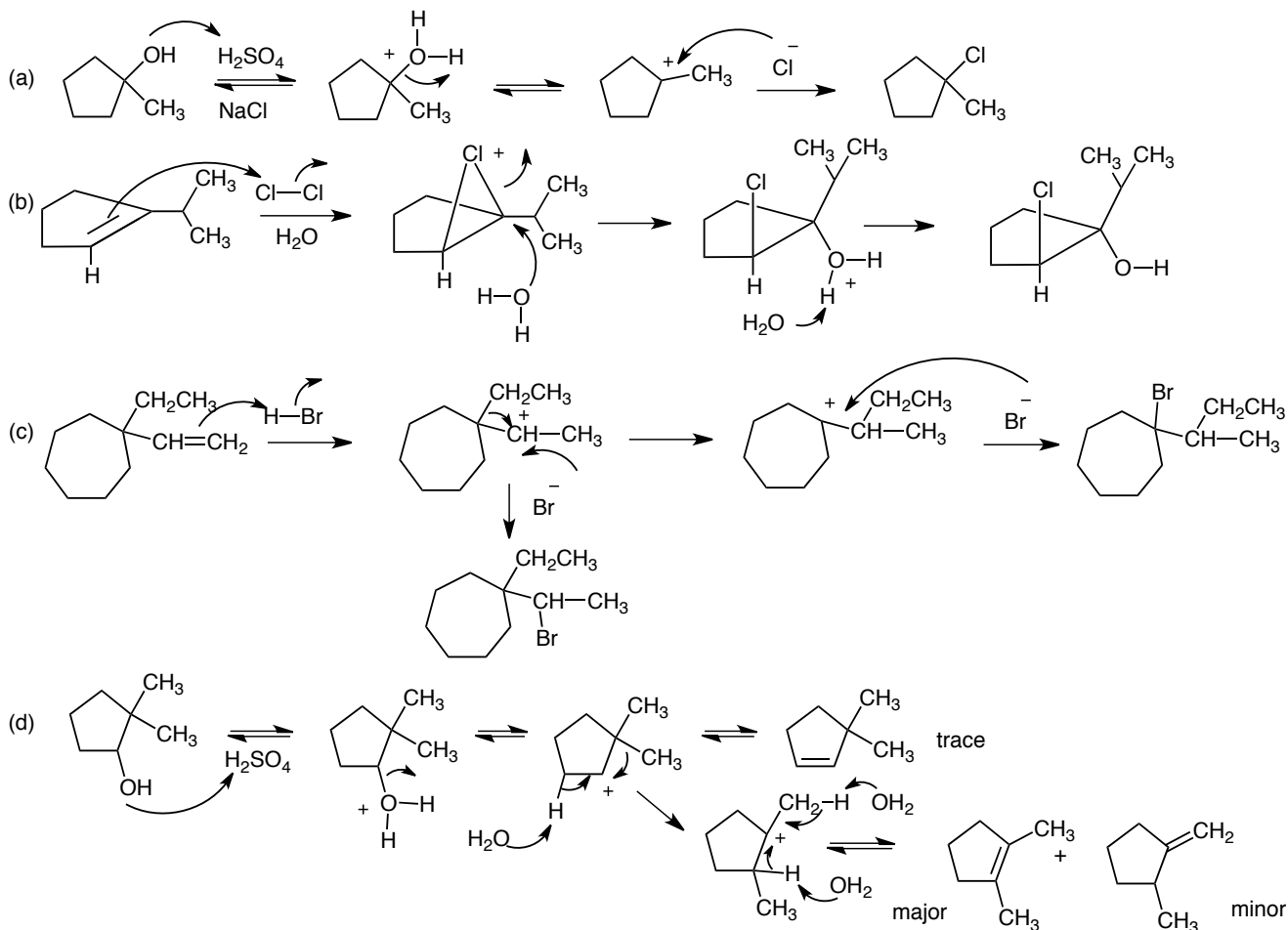
3. Give the products of the following acid-base reactions and in each case calculate the equilibrium constant. (20 pts)



4. For the following reaction (a) show all possible mono-chlorination products. (b) For reaction at the **TERTIARY** hydrogen, show the complete reaction mechanism and calculate the overall ΔH for the reaction using the BDE values given. Choose the best match. (20 pts)



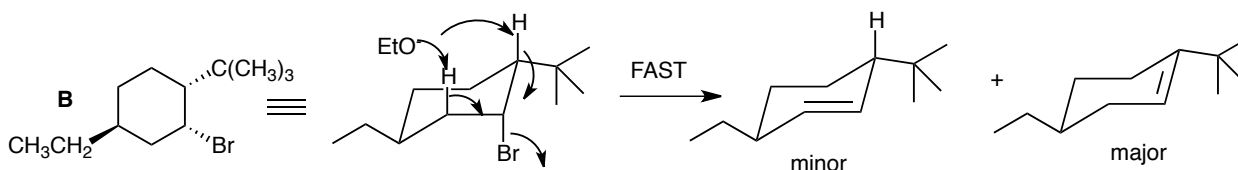
5. Give the product of each of the following reactions and show the **complete** reaction mechanism. If there is a major and minor product indicate these. (60 pts)



6. One of the following molecules reacts rapidly with sodium ethoxide ($\text{NaOCH}_2\text{CH}_3$) in ethanol, while the other reacts slowly. Show the reaction that occurs for **BOTH** molecules and indicate which reacts faster and briefly explain why. You must make good chair drawings of each molecule. (30 pts)



The low energy, diequatorial conformation cannot undergo elimination because the Br is not axial; it must first undergo a ring flip. This process is very slow because the resulting conformation is very high in energy since all of the substituents will be axial. There will be a very, very small concentration of this reactive conformation present at equilibrium. Therefore **A** will react much more slowly than **B**.



B will react much more rapidly because it does not have to undergo a ring flip in order for the elimination to occur. The Br is axial in the low energy conformation. Two products will be formed.

BONUS: Show how the following transformation occurs. (10 pts)

