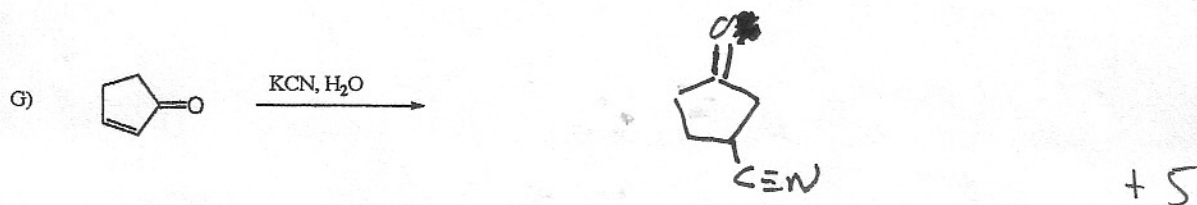
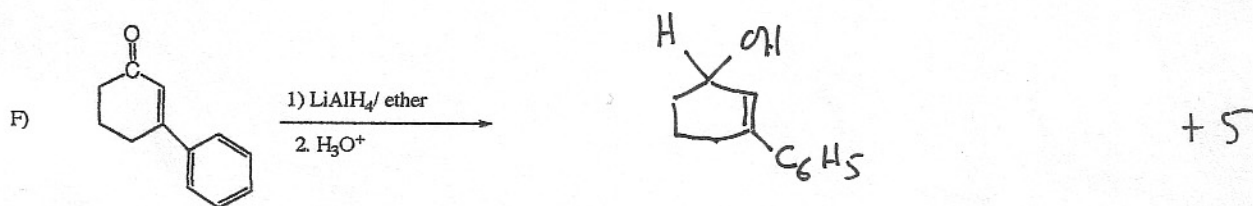
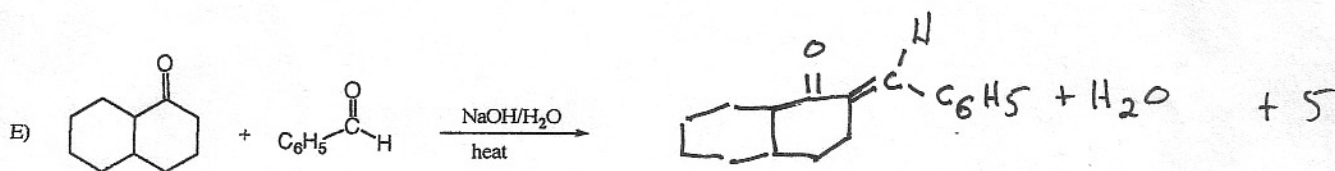
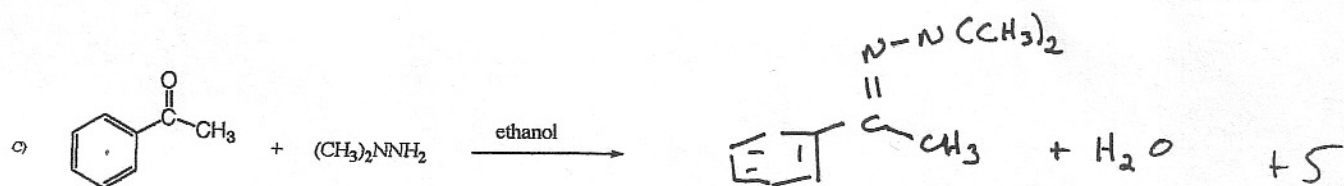
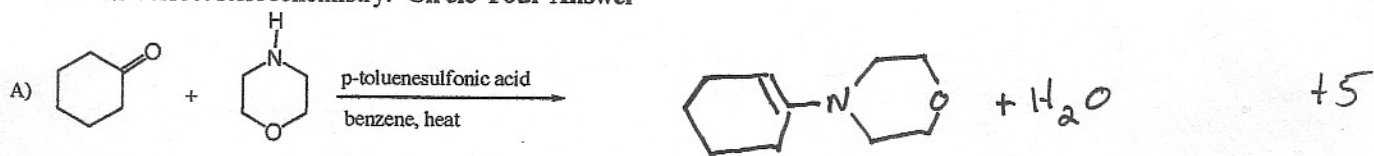
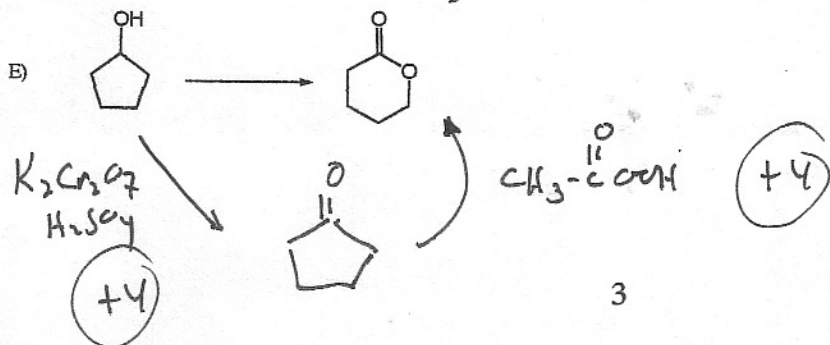
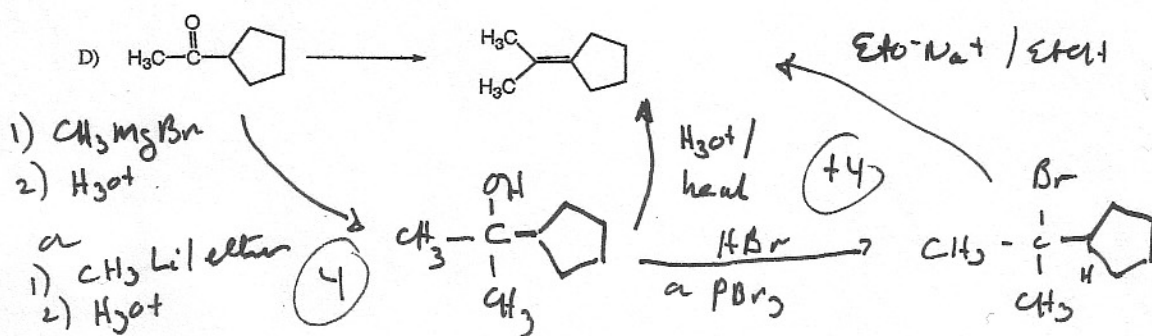
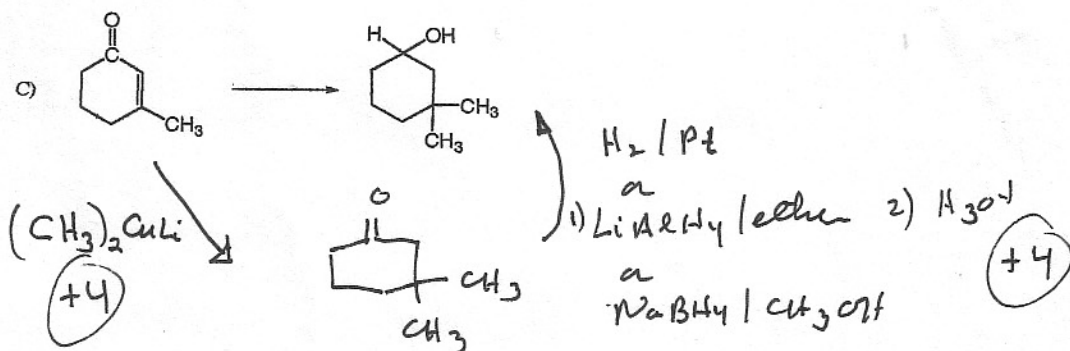
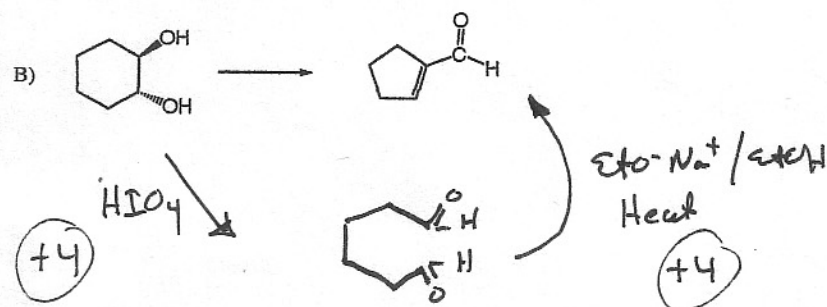
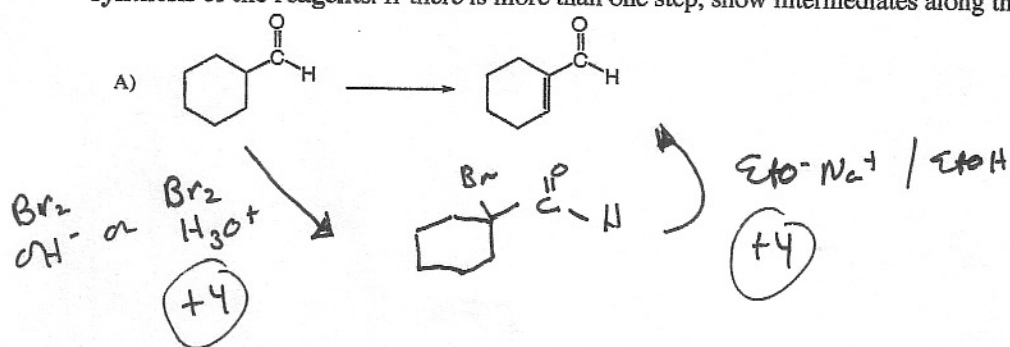


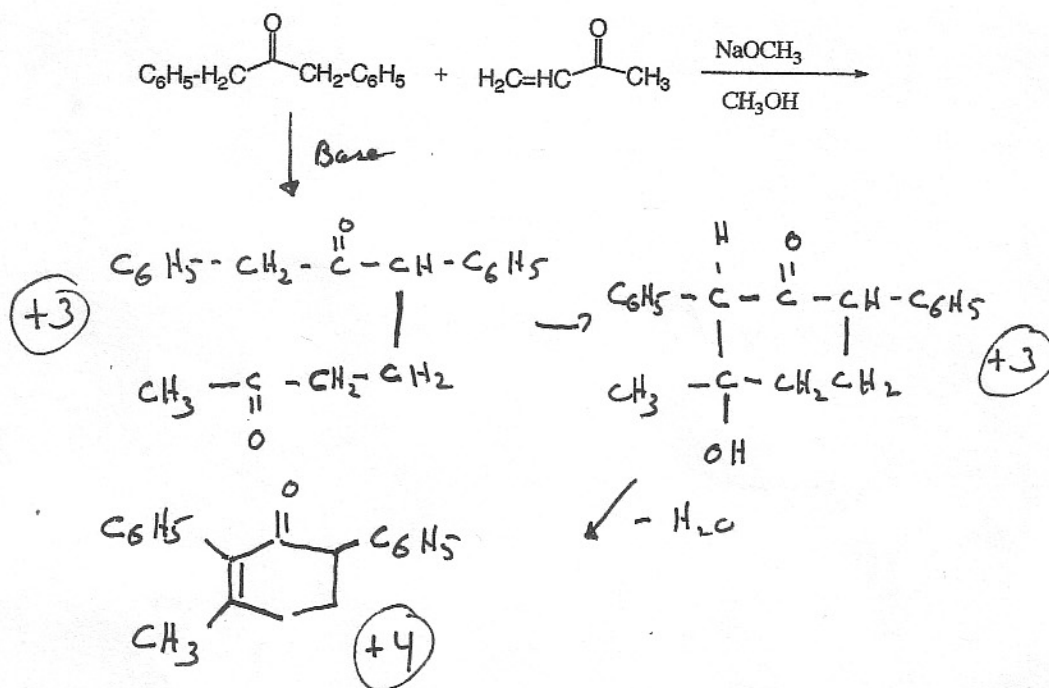
Problem 1. (35 points) Give the final products for the following reactions. If no reaction occurs, state so. Be sure to show the correct stereochemistry. **Circle Your Answer**



Problem 2. (40 points) Give the reagents that you would use to carry out the following reactions. Do not give the synthesis of the reagents. If there is more than one step, show intermediates along the reaction path.



Problem 3. (10 points) The product of the following reaction is the result of a Robinson annulation. What is the final product? Circle your answer. Also, write the structural formulas for the intermediates along the reaction path.



Problem 4. (15 points) Show how you would carry out the following transformation with the given starting material and any inorganic reagents. All of the carbons in the product must come from the reactant. Do not use dehydration or elimination reactions as the final step for the formation of the alkene.

