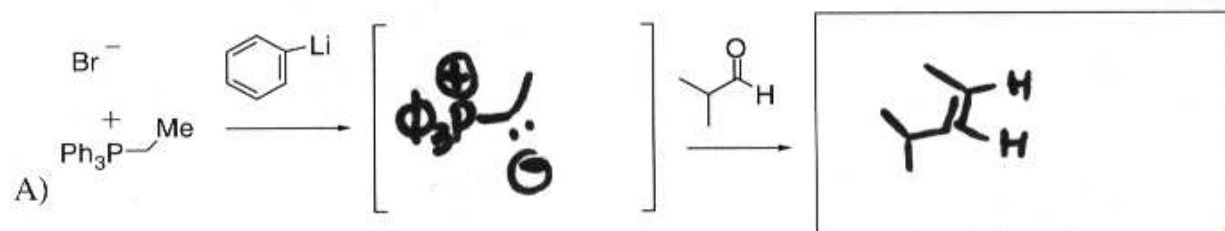
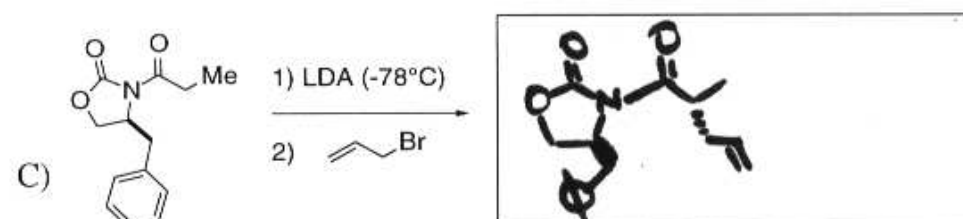
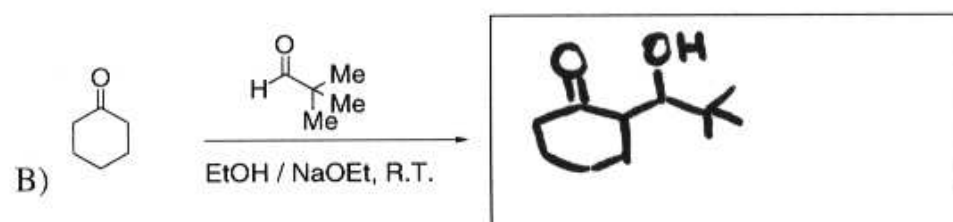


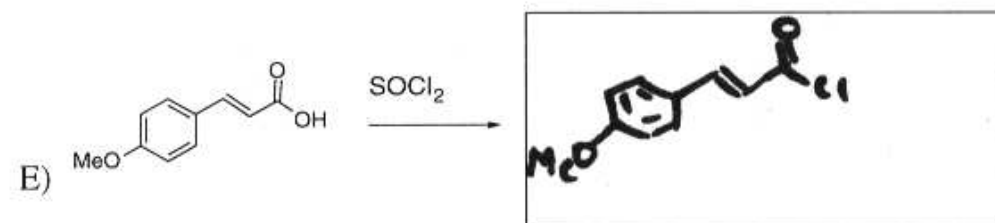
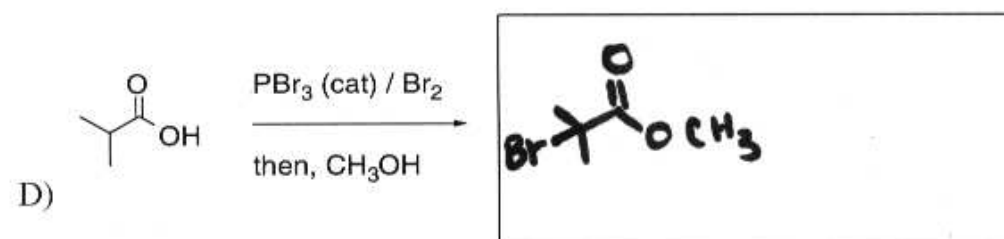
1) Provide the products of the following reactions. Each reaction has an appropriate aqueous work-up. If no reaction would occur, then write NR. You can ignore stereochemistry **except for problems A and C**. (4 points each).

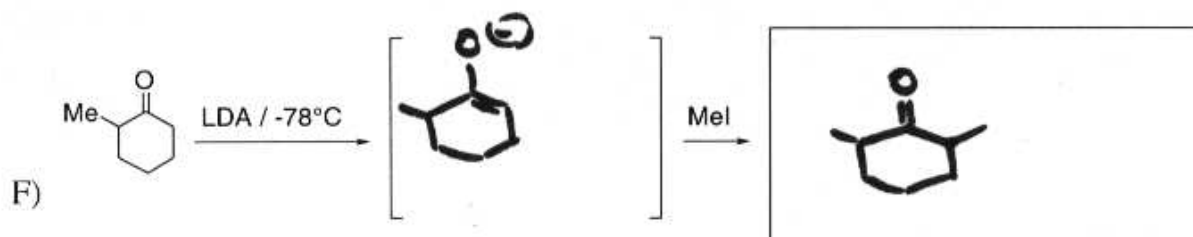


Provide the major stereoisomer of the final product

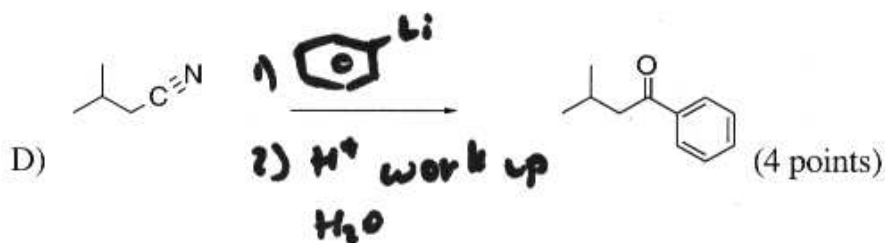
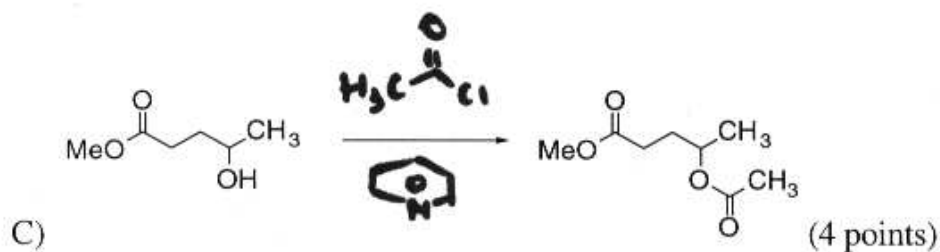
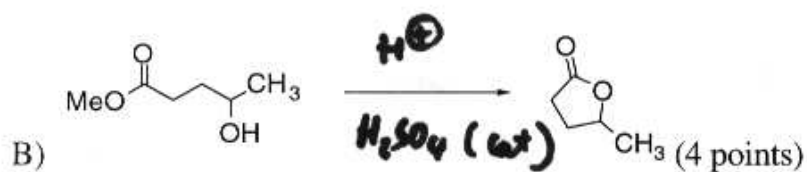


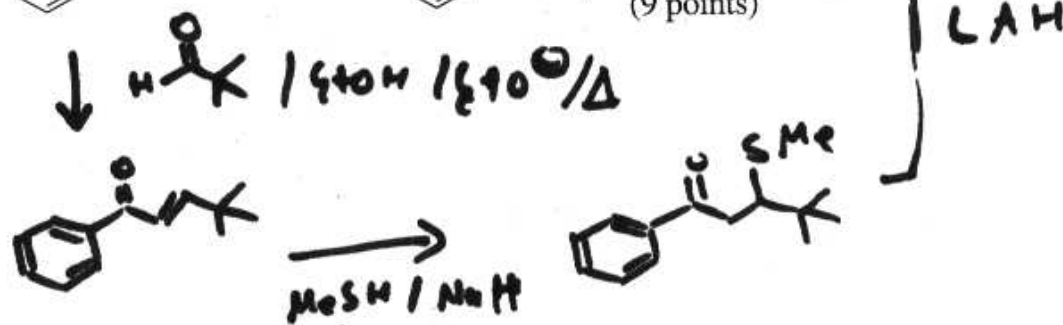
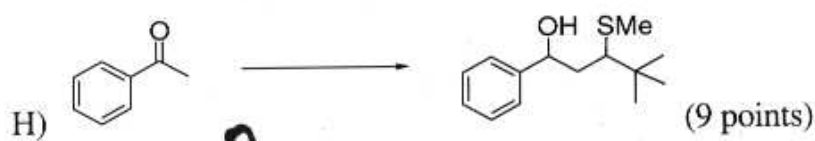
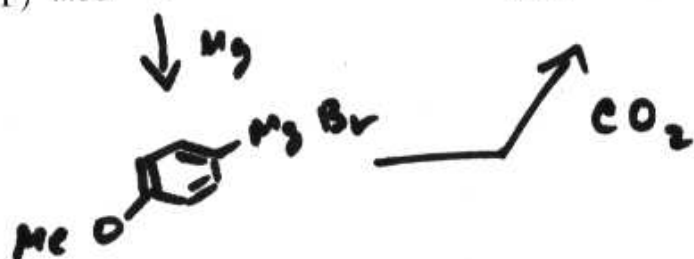
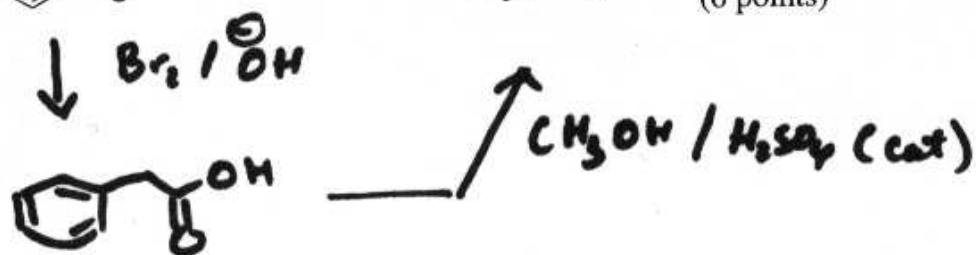
Provide the major stereoisomer of the product

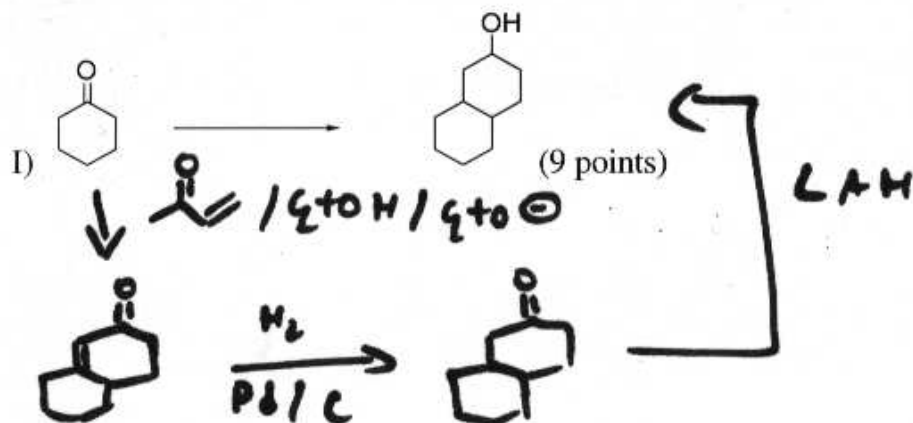




2) Complete the syntheses shown below using organic reagents of 25 carbons or less and any inorganic reagents you wish. If your synthesis requires more than one step, you must write the product of each step. Note that all chiral compounds are racemic mixtures.







3) Provide mechanisms for the reactions shown below. Be sure to show all the intermediates and all the arrows required for each step of the reaction (8 points each)

