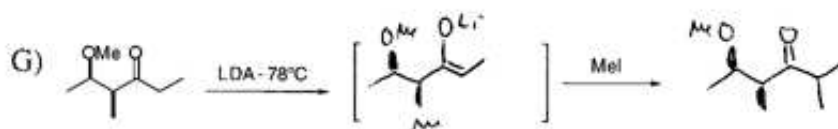
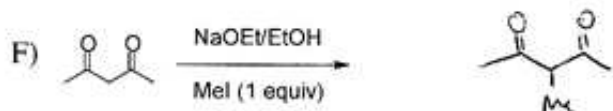
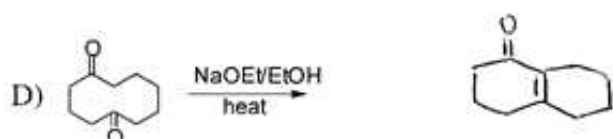
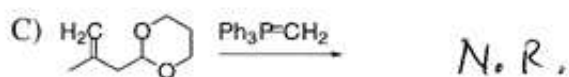
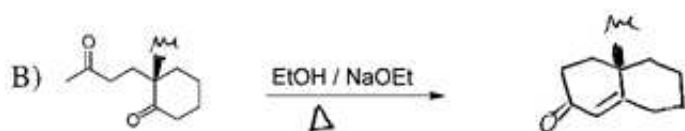
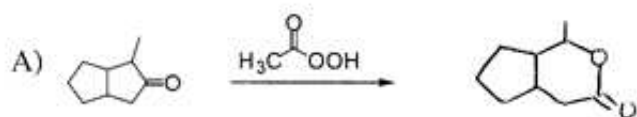
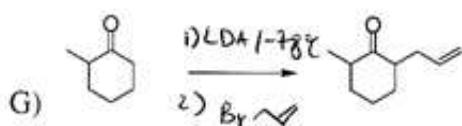
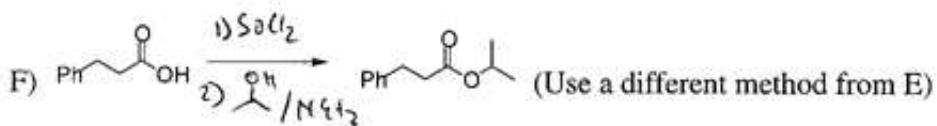
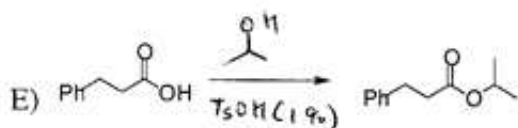
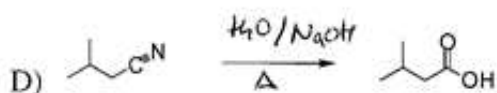
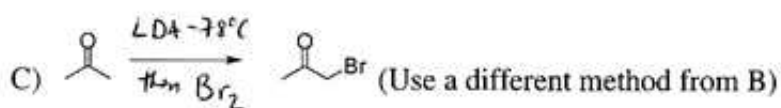
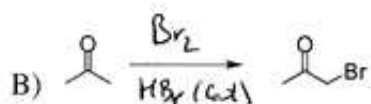
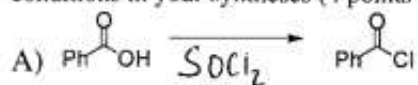


1) Provide the products of the following reactions. If no reaction would occur, then write NR. Draw all possible stereoisomers (i.e., draw dashed and bold lines as needed) and indicate if they would be produced in equal or unequal amounts. There is an appropriate aqueous work up for each reaction (3 points each).

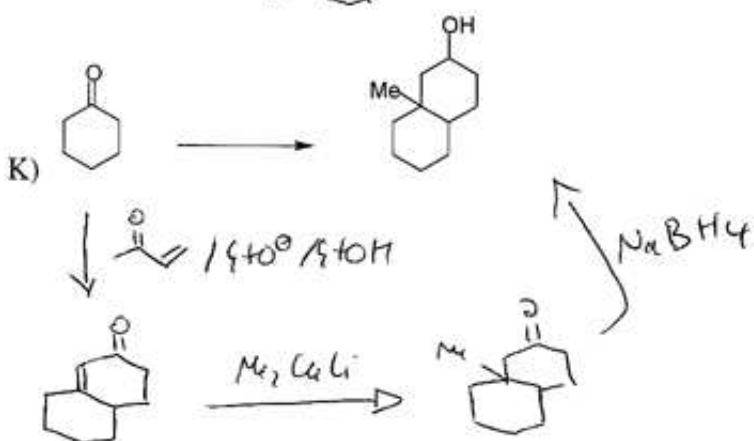
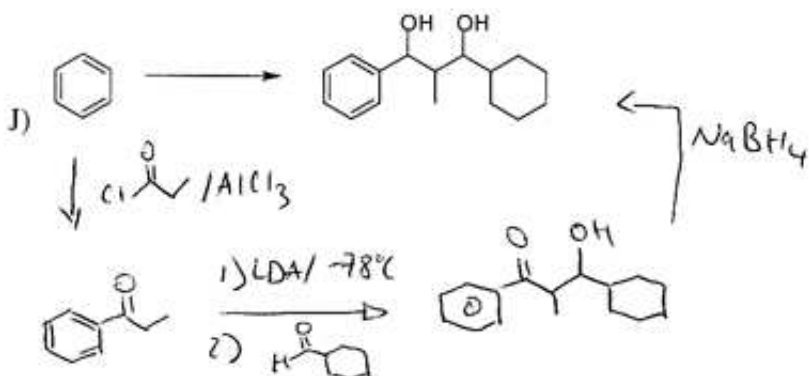
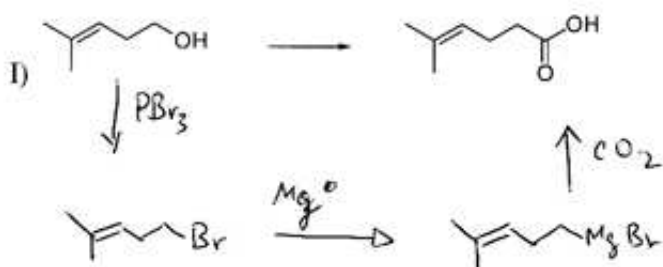
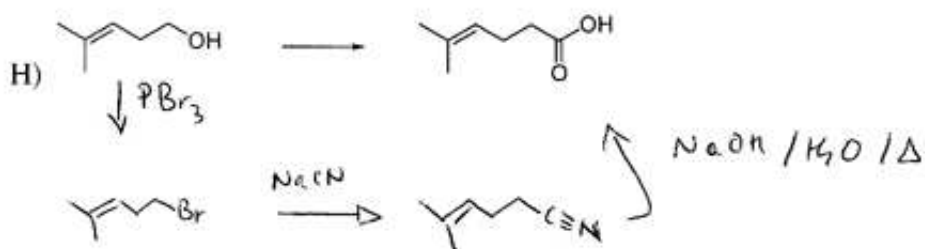


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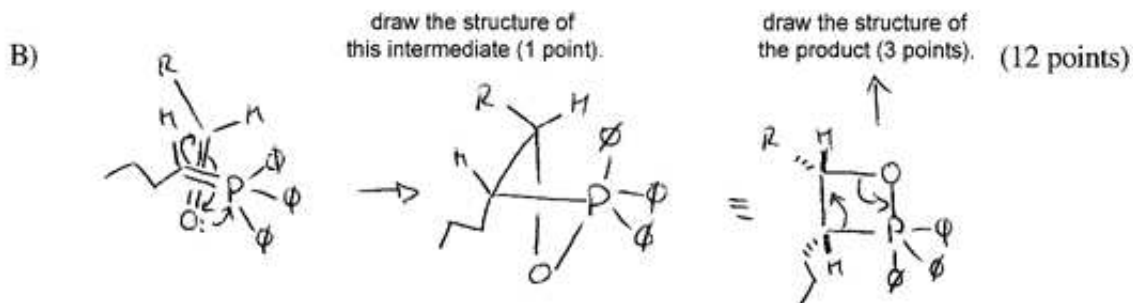
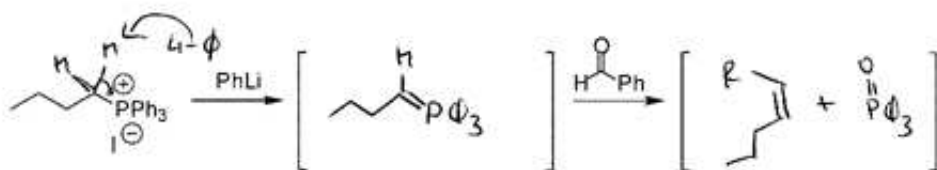
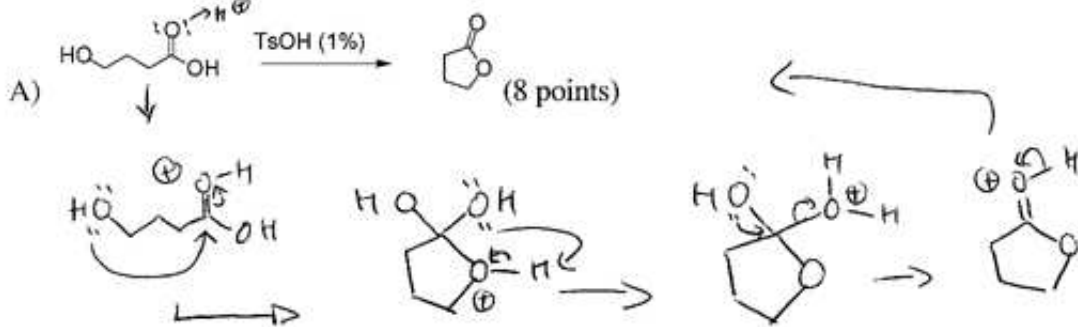
2) Complete the syntheses shown below using organic reagents of 2 carbons or less and any inorganic reagents you wish. If your synthesis requires more than one step, you must write the product of each step. Note that all chiral compounds are racemic mixtures. You do not have to include aqueous work up conditions in your syntheses (4 points each)



You only have to do THREE of the synthesis problems on this page (27 points). Indicate which problem you do not want us to grade: **Circle the problem you do not want graded: H I J K** (if you do not circle one, we will be angry and grade whichever three we feel like grading!)



3) Provide mechanisms for the following reactions. Be sure to show all intermediates, arrows, and charges, etc.



Extra credit: 10 points for up to 100 points total on the exam: Provide a mechanism for ONLY ONE of the reactions shown below. You must get the mechanism entirely right for credit! HINT: These two reactions have a similar mechanistic feature and they may look like they're hard problems, but they're not.

