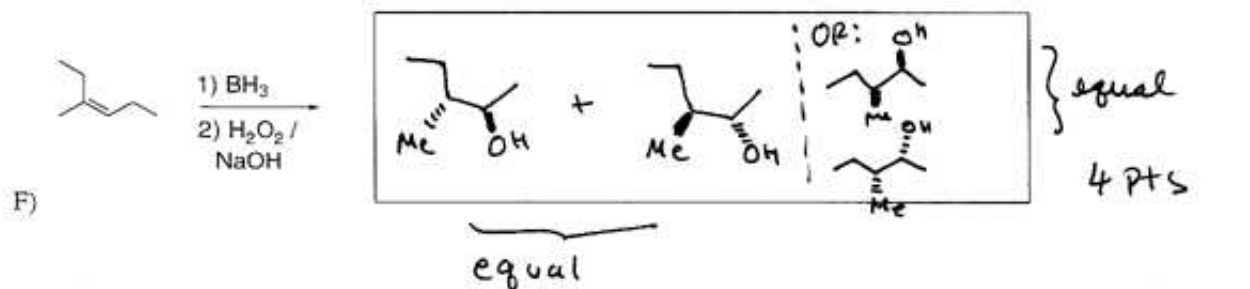
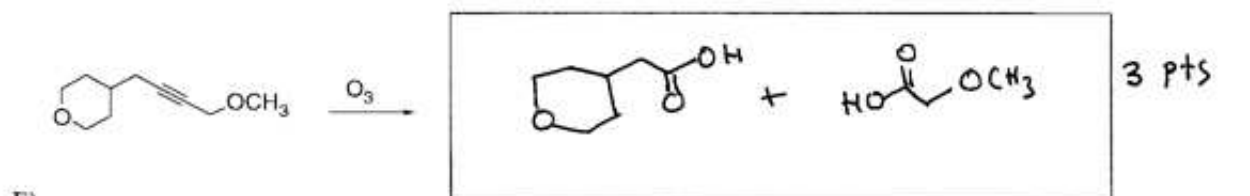
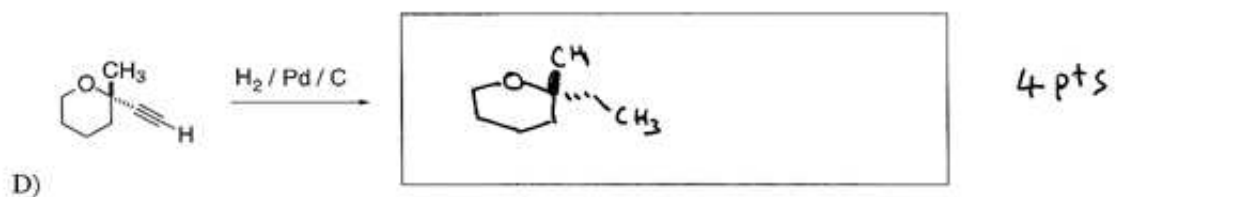
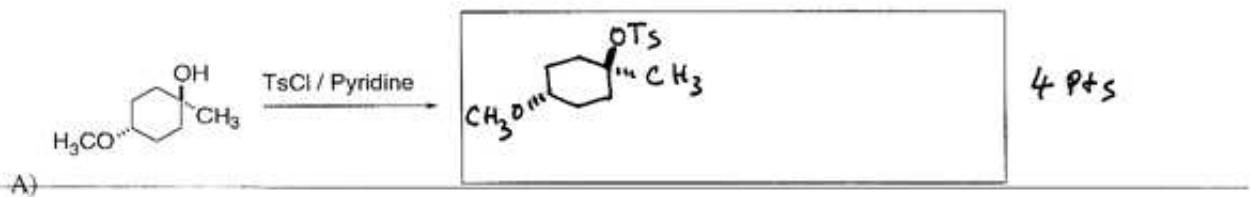
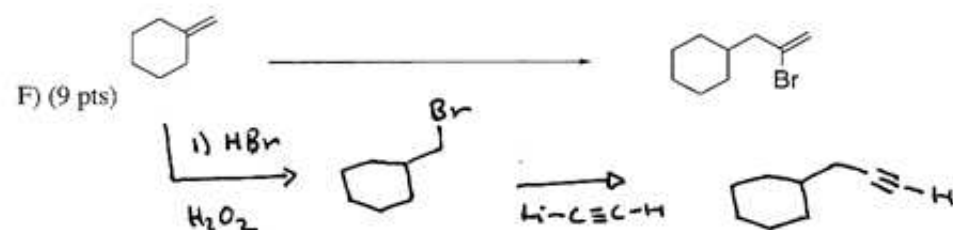
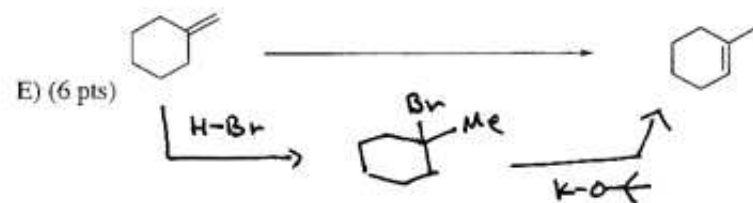
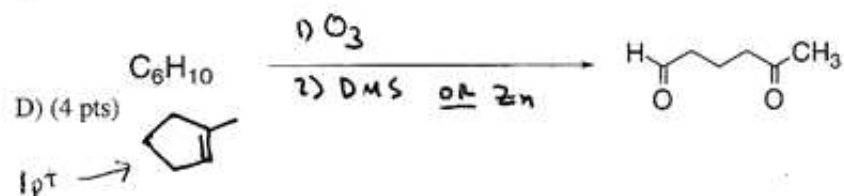
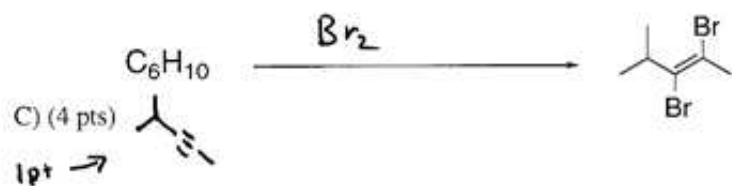
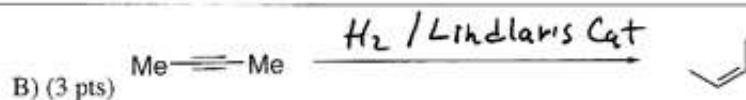
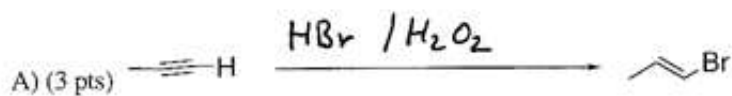


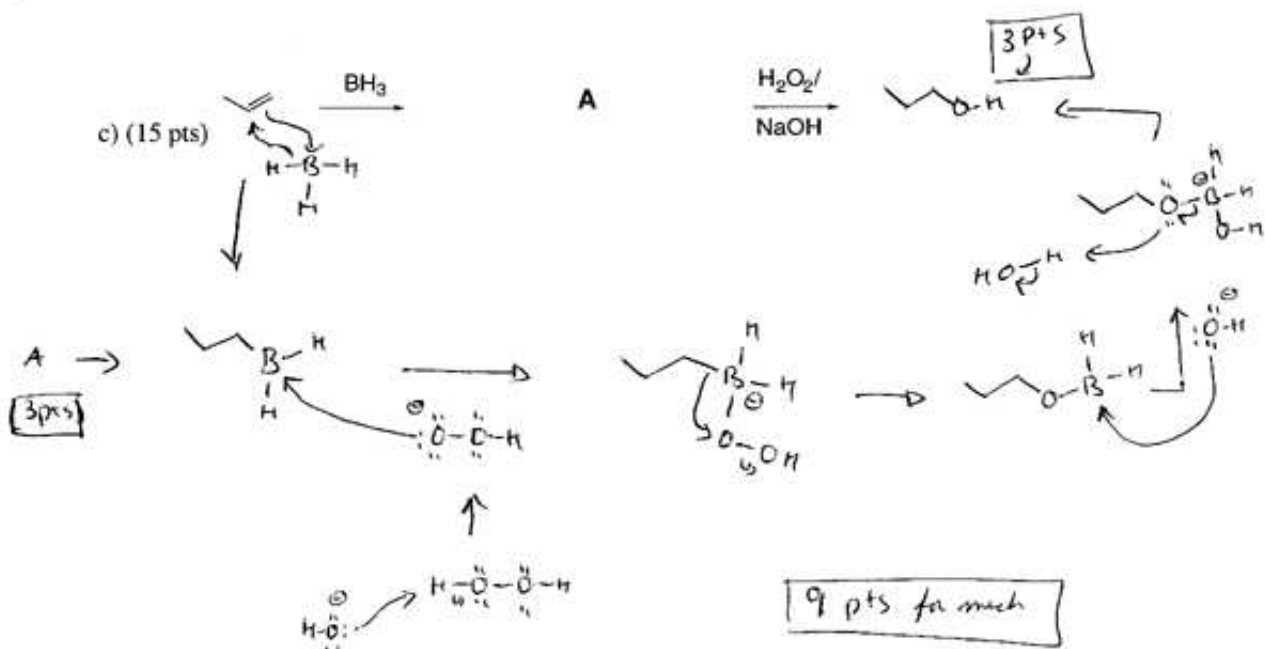
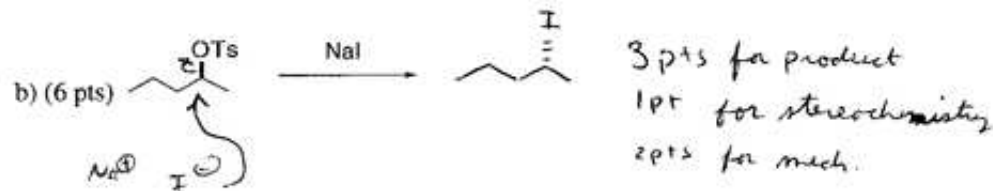
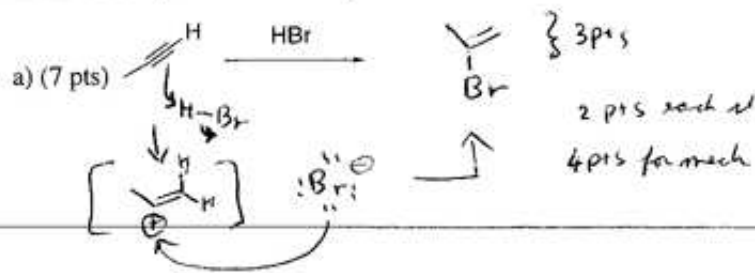
1) Provide the products of the following reactions (each reaction has an appropriate aqueous work-up). If no reaction would occur, then write NR. For reactions that provide stereoisomers, draw all possible stereoisomers and indicate if they would be produced in equal or unequal amounts (3 or 4 points each).



2) Complete the syntheses shown below using organic reagents of 5 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.



3) Provide the products and mechanisms for the following reactions. Please show every intermediate and all the arrows required for each step of the reaction.



4) You have bottles labeled with the molecules shown below. Circle the words that accurately each molecule. You may circle more than one word for each molecule if more than one applies. (6 point total)

