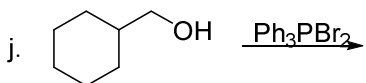
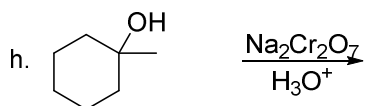
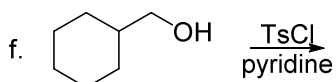
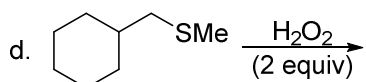
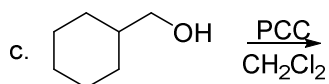
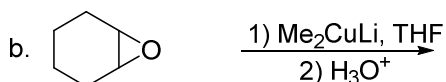
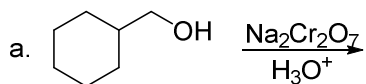
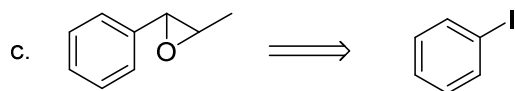
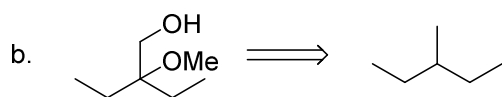
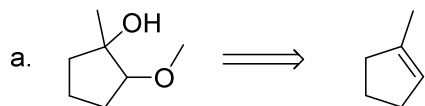




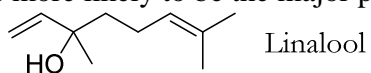
- 1) **Predict the product** of the following reactions, and **choose the appropriate descriptor** (reduction, oxidation, or neither) for what happens to the organic molecule during each reaction. If no reaction occurs, then write NR. Show stereochemistry where necessary – if a racemic mixture is formed, you can show only one product and write “racemic” or “rac”. (30 pts)



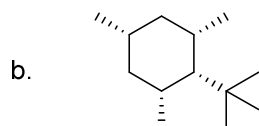
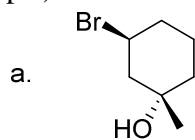
2) Find a way to synthesize the desired product from the given starting material. If more than one step is necessary, show the product of each step. Do not show mechanisms. (30 pts)



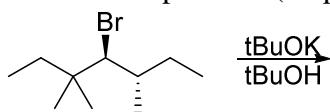
- 3) While rummaging around in your lab you come across a bottle of linalool, which is shown below. Having nothing better to do, you react it with dilute sulfuric acid and find that you have created a cyclic molecule with the same formula as linalool. Show two possibilities for the structure of this cyclic molecule, and give the mechanism for each of them forming. Based on ring stability, which is more likely to be the major product? (30 pts)



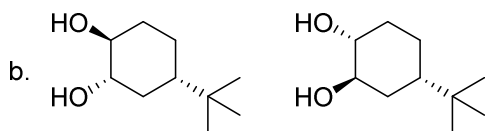
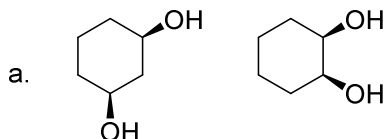
- 4) Draw the following molecules in **both** chair conformations, and circle the most stable. (20 pts)



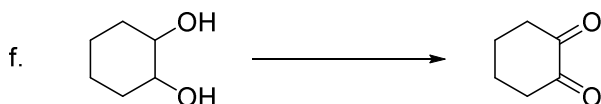
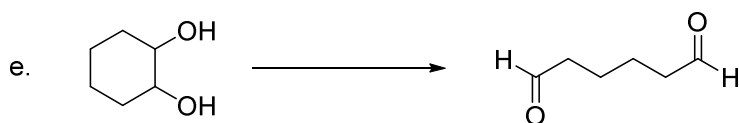
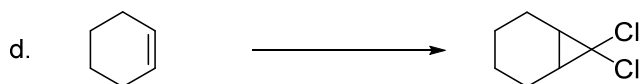
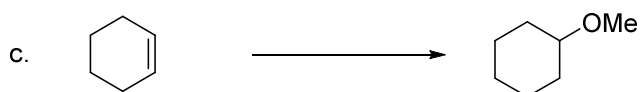
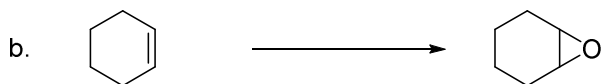
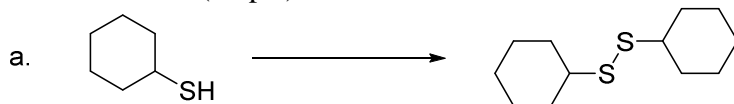
- 5) Show the transition state for this reaction, and draw the product with correct stereochemistry. Give the full IUPAC name of the final product. (30 pts)



- 6) In each of the following pairs of molecules, one reacts with periodic acid and the other does not. Determine which is which, and explain why by using structures or mechanisms. (30 pts)



- 7) Each of these reactions can be done in a single step. On each arrow, show the reagents needed to accomplish each one. In each case, the target product should be the major product of the reaction. (30 pts)



- 8) Extra credit! Write an arrow-pushing mechanism for this reaction, assuming only a single bromine atom is added to the molecule. Clearly label each section of the mechanism, and show at least two examples of termination. (10 pts e.c.)

