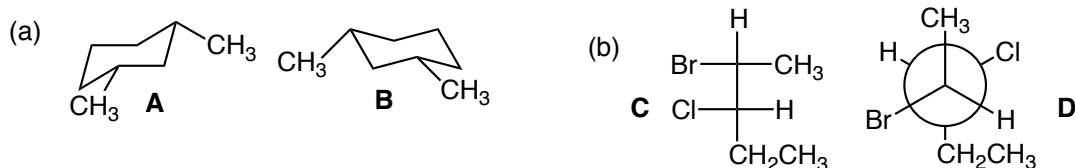
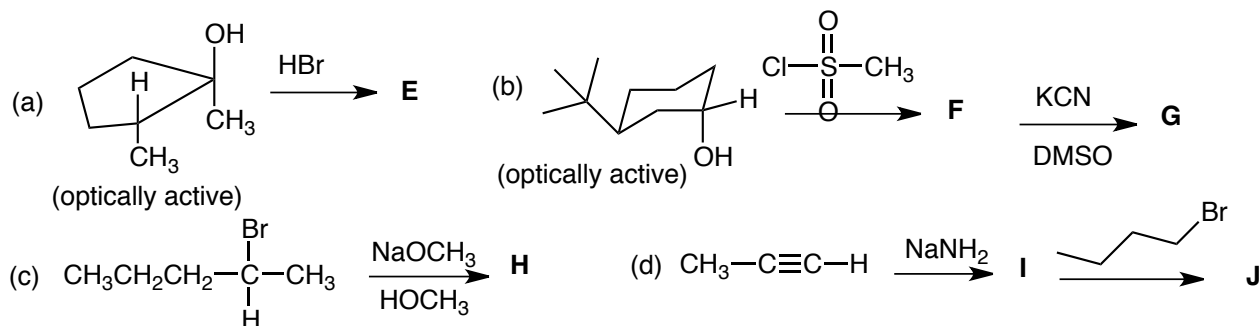


1. When (Z)-2-hexene reacts with bromine (Br_2) in carbon tetrachloride (CCl_4), two products are formed. Show both products, the reaction mechanism by which they are formed, and label all chirality centers as R or S. You must make careful 3-dimensional drawings. (15 pts)

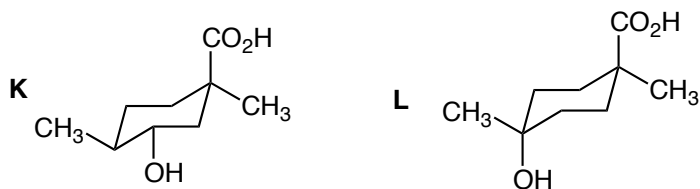
2. Give the relationship between the following molecules. They may be the same molecule, different molecules, constitutional isomers, enantiomers, or diastereomers. Show your work for partial credit. (15 pts)



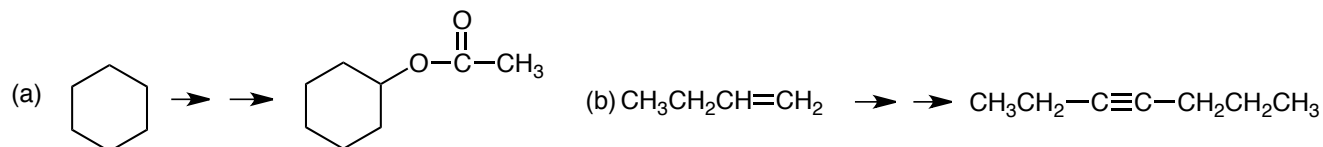
3. Give the product of the following reactions and in each case give the complete reaction mechanism. If more than one product is expected, indicate the major and minor product. In the case of (a) and (b) assume that both starting materials are optically active and predict the optical activity of the product. (40 pts)



4. A chemist in the 1950's isolated a bio-active molecule from a plant. He found that the molecule rotated plane polarized light. He proposed two structures for the molecule. Which structure do you think is the correct one? Briefly explain your reasoning. (10 pts)



5. Synthesize **two** of the following three molecules from the starting materials given on the left. Do all **three** for extra credit. (20 pts)



(c) Prepare optically active S-2-iodopentane from an alcohol.