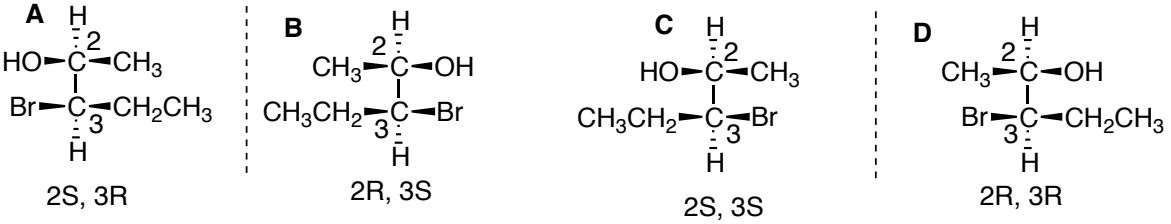
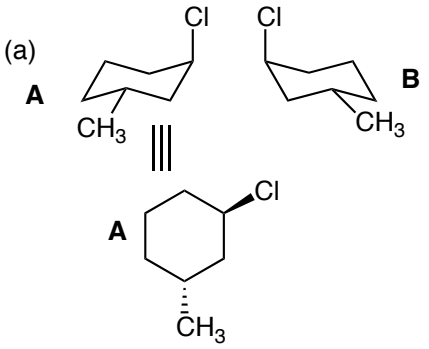
L. I. U.

Chem. 121, Sect 012, Exam III Fall, 2012, 100 points

1. Draw all of the stereoisomers of 3-bromo-2-pentanol and assign the absolute configuration (R or S) to each chirality center. (13 pts).

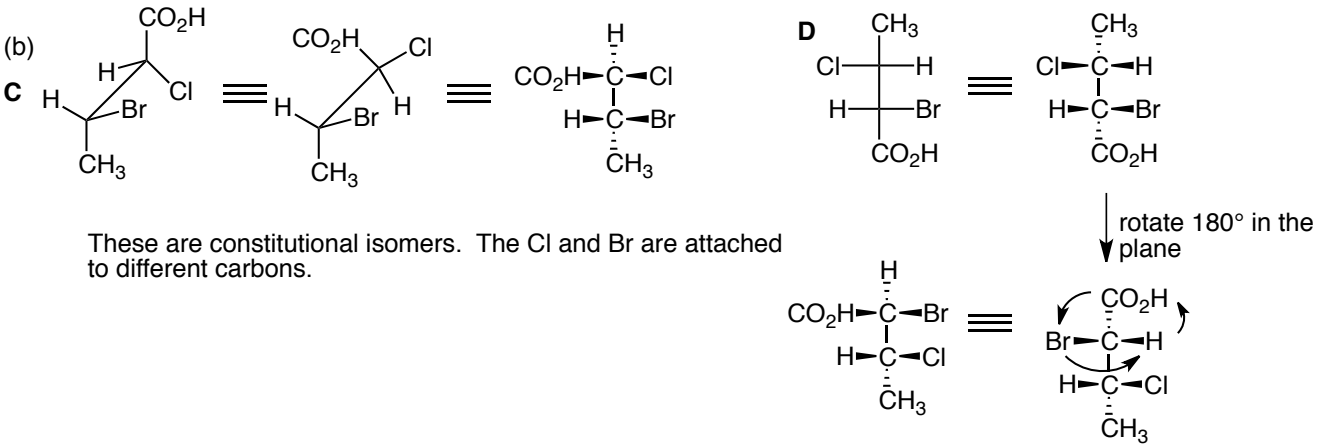


2. Give the relationship between the following molecules. They may be the same molecule, different molecules, constitutional isomers, enantiomers, or diastereomers. Show your work for partial credit.



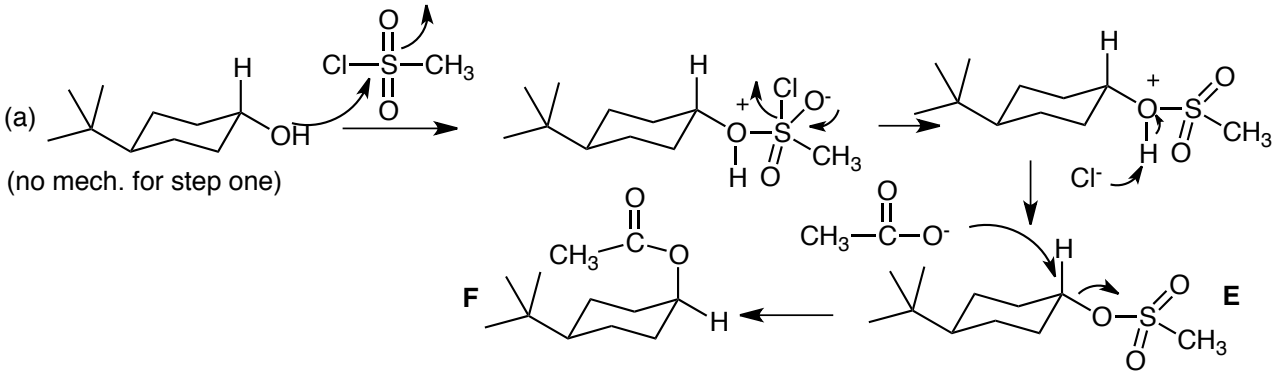
These molecules are mirror images and there is no plane of symmetry. Therefore, they are each chiral and they are not superimposable. Therefore, they are enantiomers.

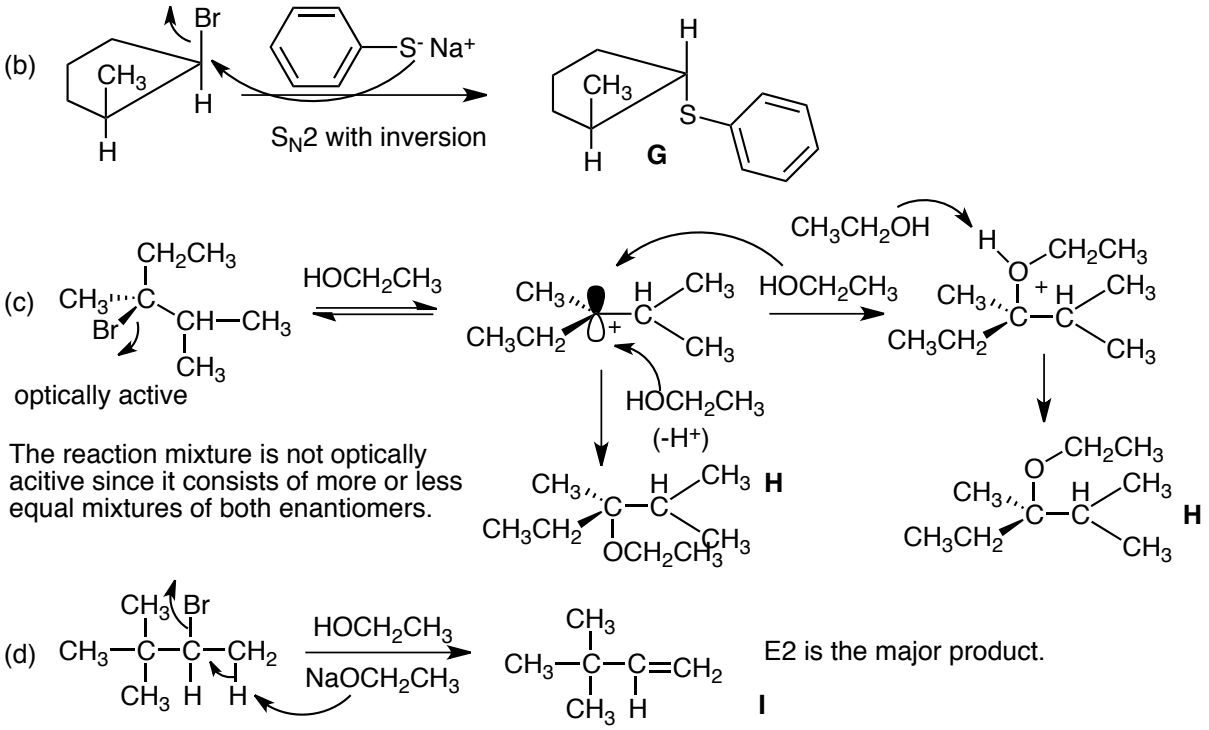
(12 pts)



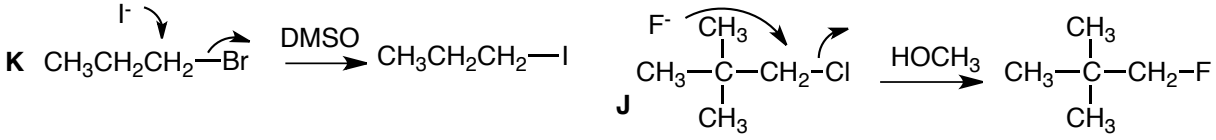
These are constitutional isomers. The Cl and Br are attached to different carbons.

3. Give the product(s) of the following reactions, giving the full reaction mechanism in each case and showing the correction stereochemistry where applicable. If there is more than one product expected, indicate the major and minor product. For (c) indicate whether or not the product is optically active. (40 pts)





4. Which reaction would proceed faster? Explain, paying careful attention to all reasons, including the substrate structure, the nature of the nucleophile, the leaving group and the effect of the solvent. Give the product of each reaction and indicate the reaction mechanism. (15 pts)



Reaction **K** is faster. the Br is a better leaving group than Cl; the substrate is less hindered to backside attack, I^- is a better nucleophile than F^- and finally, DMSO is a polar aprotic solvent, very good in S_N2 reactions since it is good at solvating the cation, K^+, but not the anion.

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