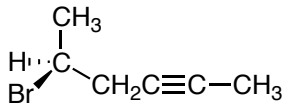
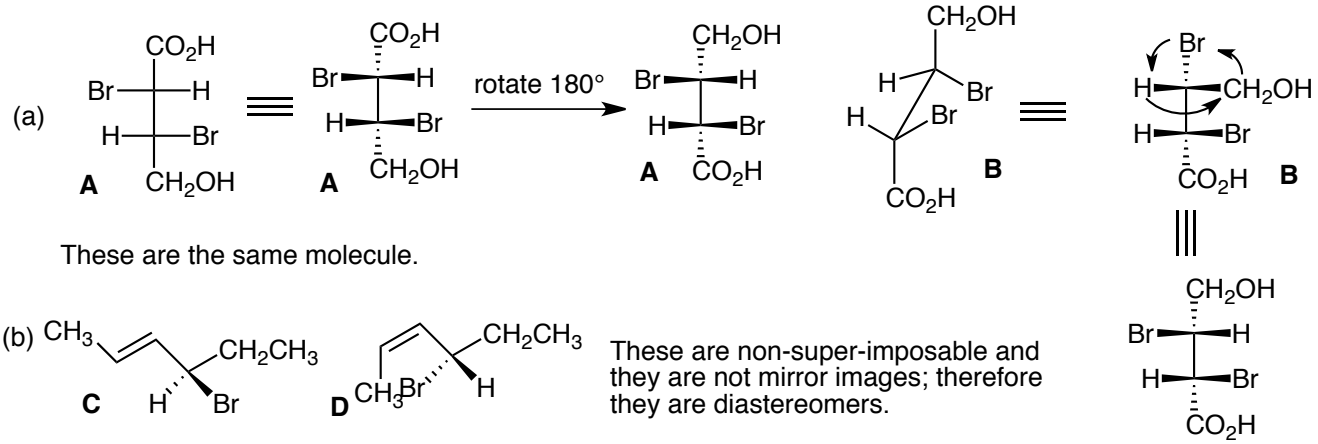
L. I. U.

Chem. 121, Sect 005, Exam III Fall, 2011, 100 points

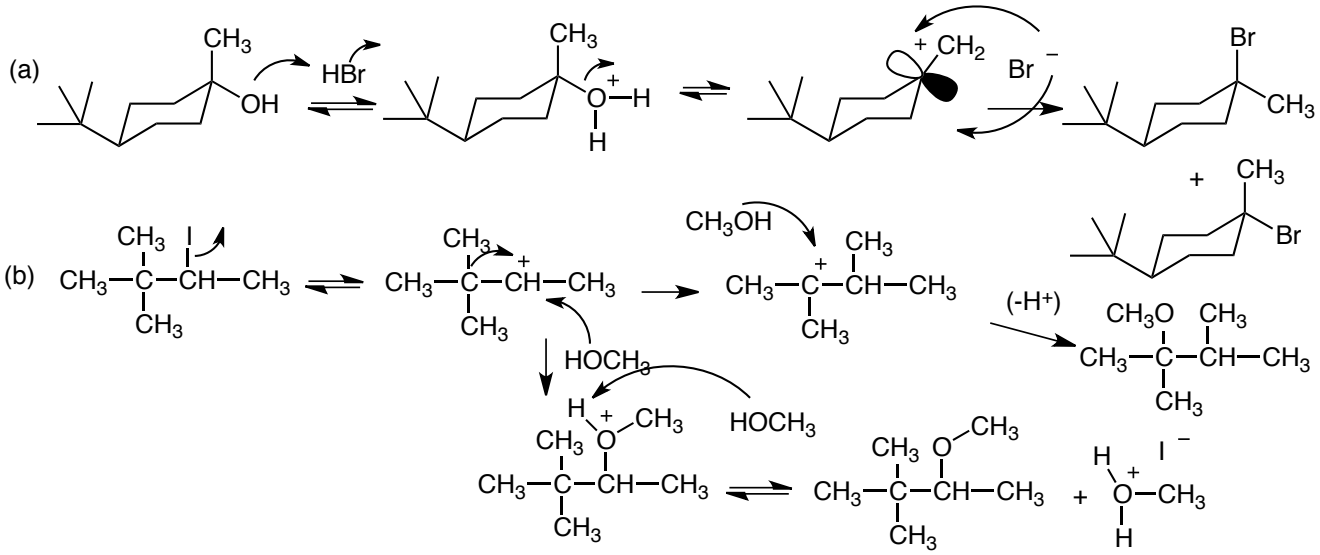
1. Draw (S)-5-bromo-2-hexyne (10 pts)

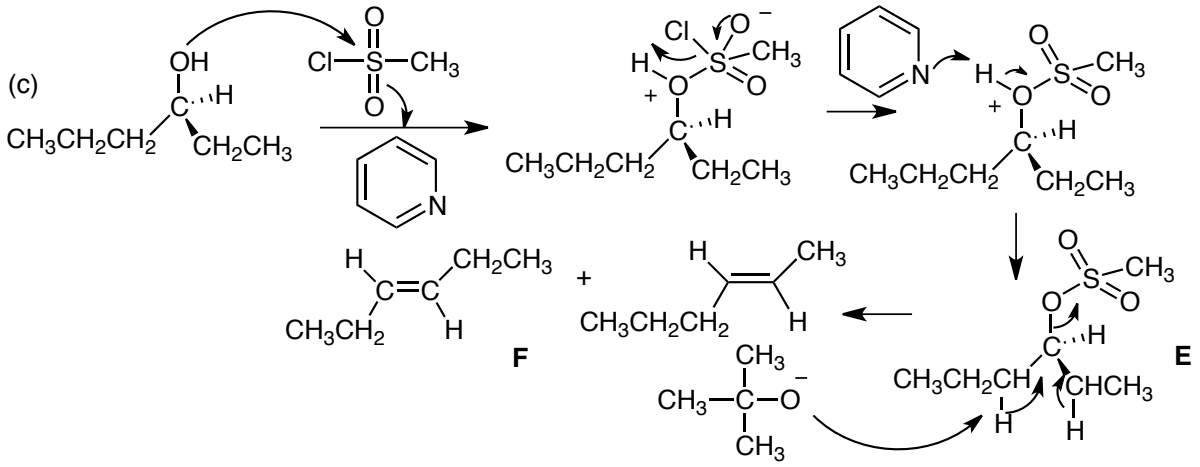


2. Give the relationship between the following pairs of molecules. They may be the same molecule, different molecules, constitutional isomers, diastereomers, or enantiomers. (15 pts)

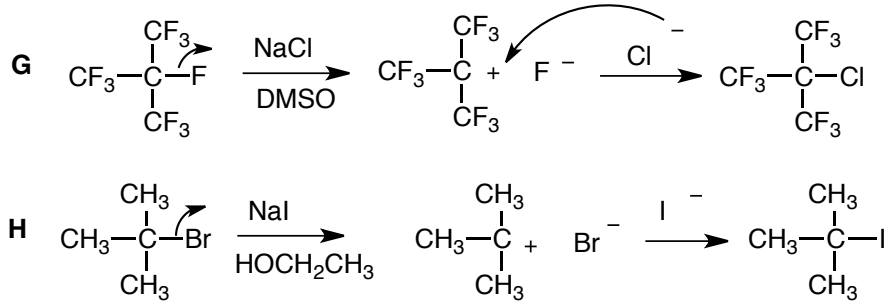


3. Give the product for each of the following reactions and show the complete reaction mechanism by which it is formed. If there is more than one product formed, be sure to indicate this and specific which is the major and minor product. (40 pts)





4. (a) Give the product(s) of the following two reactions, showing the complete reaction mechanism in each case and (b) then indicate which reaction would proceed faster. Explain your answer considering **ALL** factors that would influence the relative rates of the two reactions. (15 pts)



(b) Reaction **H** will be much faster for four reasons. (i) It forms a more stable carbocation (lower in energy) and therefore it will form faster since the CF_3 groups in **G** will destabilize the carbocation and raise its energy, making it form faster. (ii) The leaving group in **H** is better, since Br^- is a weaker base than F^-. (iii) The polar protic solvent, ethanol in **H** will stabilize the carbocation better than the polar aprotic DMSO. (iv) Iodide anion, I^-, is a better nucleophile than Cl^- and will attack the carbocation faster, though this step is fast in both reactions and does not really affect the overall rate of either reaction.

5. Synthesize **TWO** of the following **THREE** molecules. Do all three for extra credit. (20 pts)