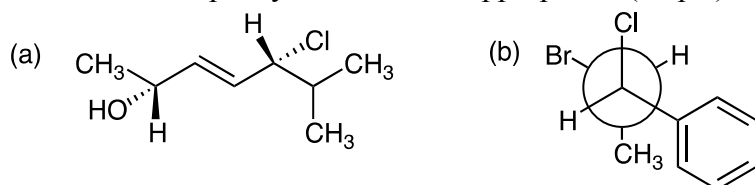
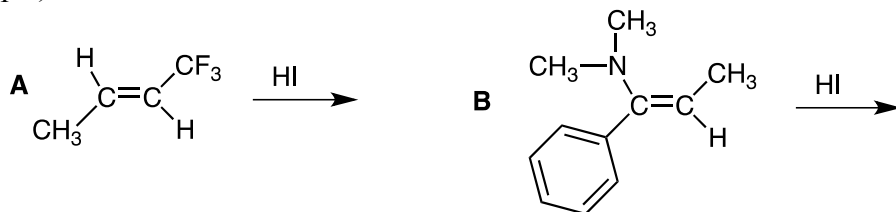


1. Name the following molecules and assign the absolute configuration (R or S) to each chirality center and also specify E or Z where appropriate. (20 pts)

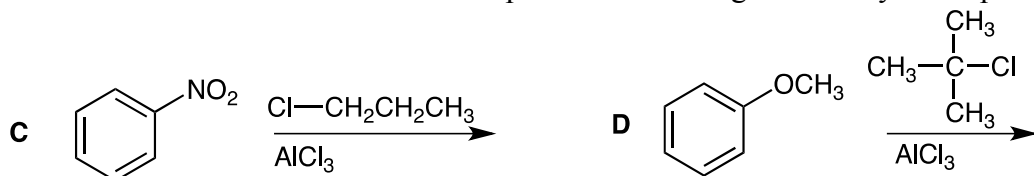


2. Draw the following molecules (a) (2S, 5R)-5-bromo-2-heptanol and (b) the low energy Newman projection looking down the C1-C2 bond for 1-bromo-3-methylbutane. (20 pts)

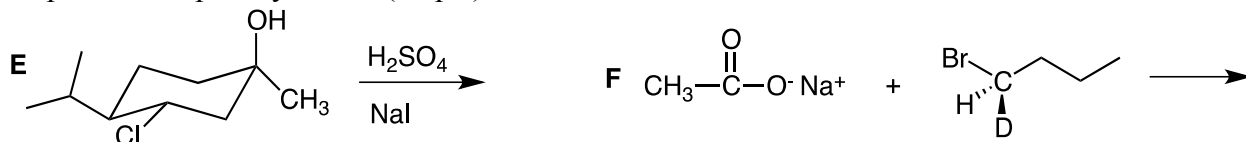
3. Which alkene would react faster with HI? Explain your answer briefly and show the product for each reaction and the full reaction mechanism in each case. Pay attention to the regiochemistry. (30 pts)



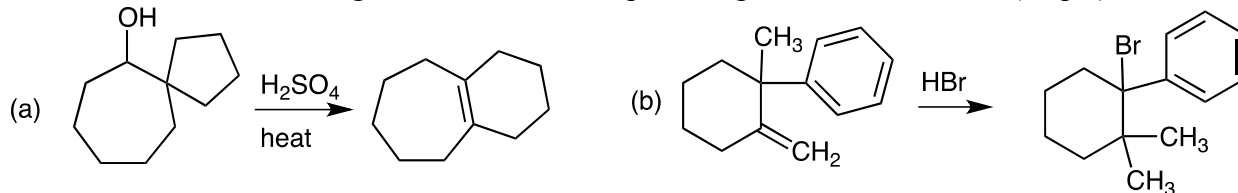
4. Which of the following reactions would be faster? Explain your answer briefly and show the product for each reaction and the full reaction mechanism in each case. Pay attention to both the benzene substrate and the alkane electrophile and to the regiochemistry of the products. (30 pts)



5. In the following two reactions, both of the starting materials are optically active. Give the product of each reaction, showing the full reaction mechanism, and in each case determine whether the product is optically active. (30 pts)

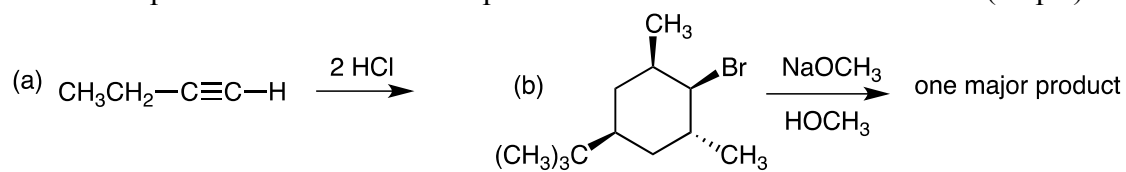


6. Show how the following reactions occur, giving a detailed mechanism in each case, showing all intermediates. No other reagents are needed except those given over the arrow. (45 pts)

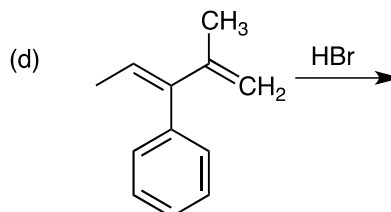
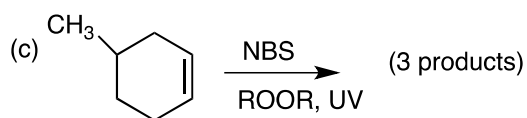


PLEASE TURN OVER THE PAGE

7. Give the product and show the complete reaction mechanism in each case. (45 pts)



(You must make a good 3-D chair drawing to answer this question.)



8. Synthesize **three** of the following molecules from the starting materials shown on the left. There may be more than one step involved. You do not need to show the reaction mechanisms. Do all four for extra credit. (30 pts)

