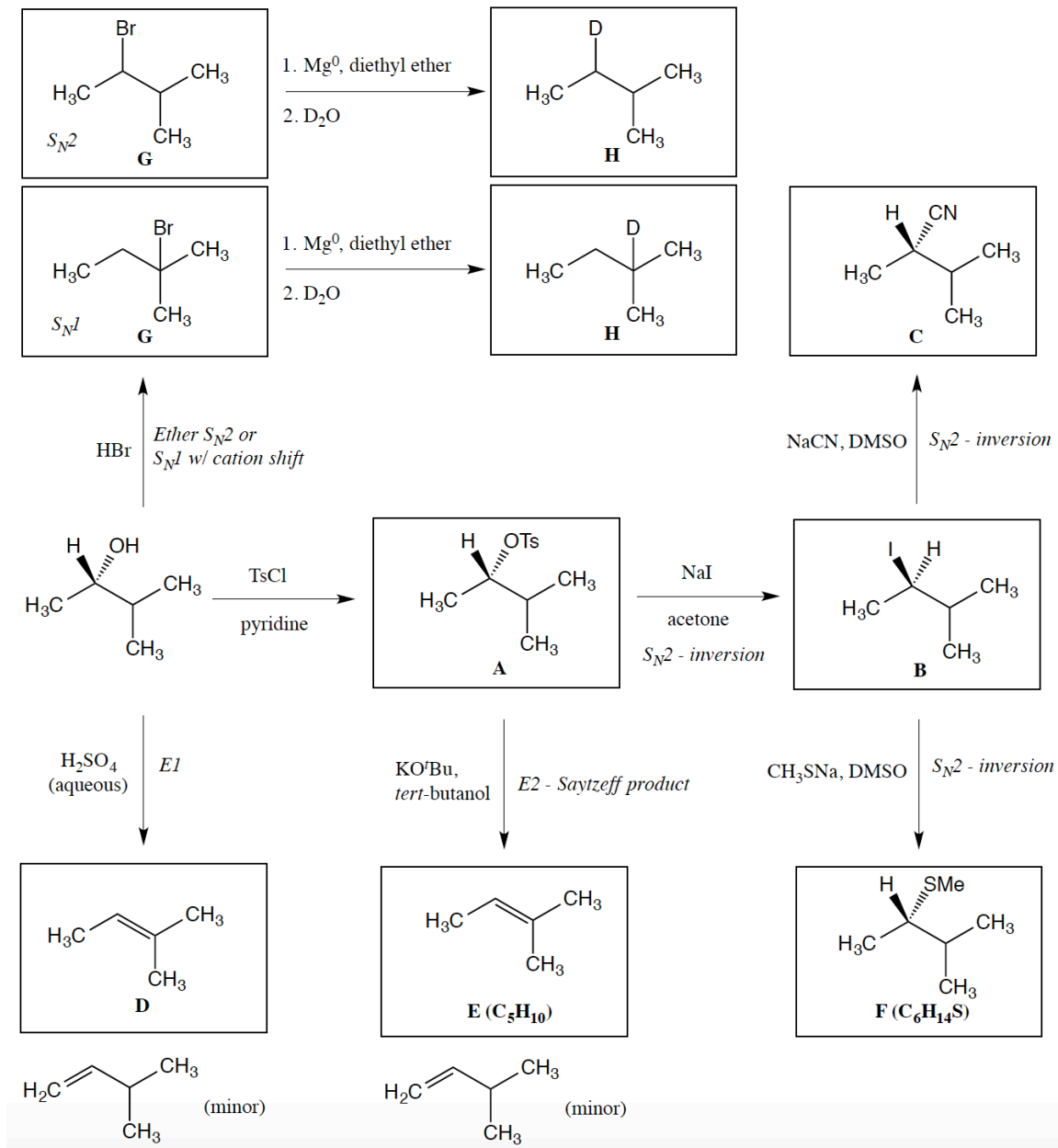
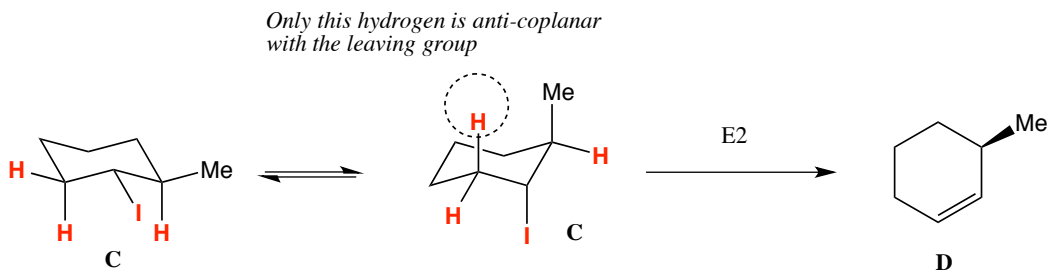
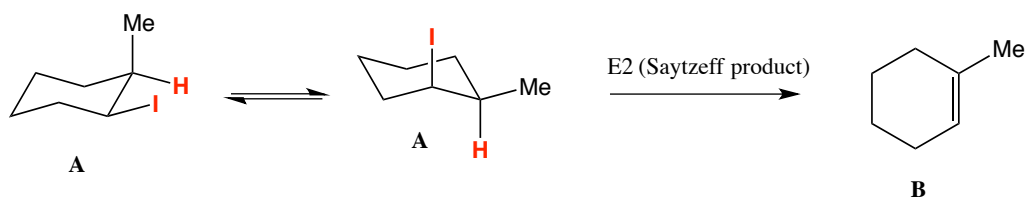
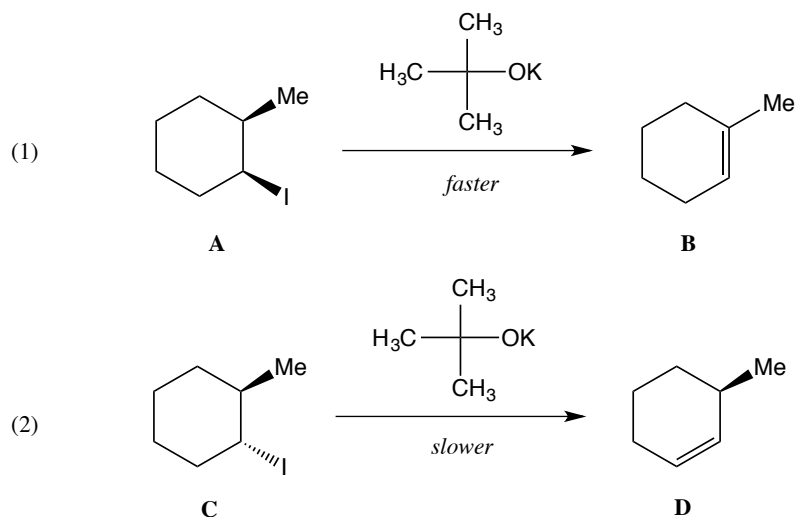


## Answers to Problem Set 8

Question 1. Starting with (*S*)-3-methyl-2-propanol, provide structures **A-H** for the following reactions. Pay attention to stereochemistry where appropriate.

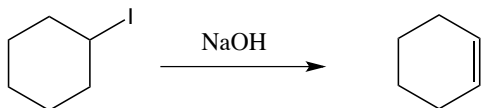


Question 2. When *cis*-1-iodo-2-methylcyclohexane (**A**) is treated with potassium *tert*-butoxide, 1-methylcyclohexene (**B**) is formed as the major product (reaction 1). However, when *trans*-1-iodo-2-methylcyclohexane (**C**) is treated with potassium *tert*-butoxide, 3-methylcyclohexene (**D**) is formed (reaction 2) and the reaction proceeds more slowly than does reaction 1. Explain why the observed products are formed in reaction 1 and 2 and why reaction 2 proceeds more slowly.

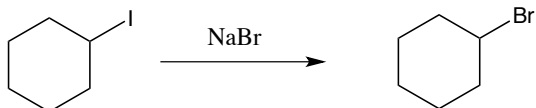


**Compound C reacts more slowly because it must react through its diaxial conformation, which is much higher energy. At any given time only a small percentage of the molecules of C are in the diaxial conformation.**

Question 3. Explain the major difference in reactivity between the following pair of reactions:



*Hydroxide is a strong base and a moderate nucleophile.  
Elimination (E2) can be favored on secondary substrates.*



*Bromide is a moderate nucleophile but a weak base.  
Substitution (S<sub>N</sub>2) will be favored on secondary substrates.*