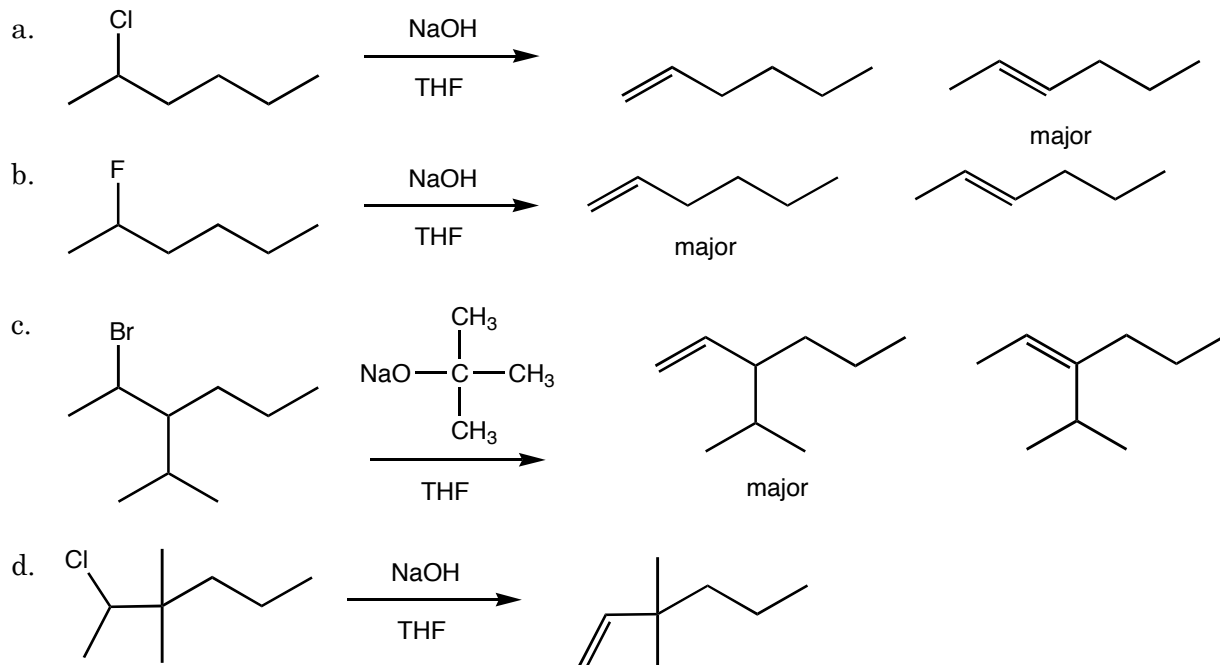
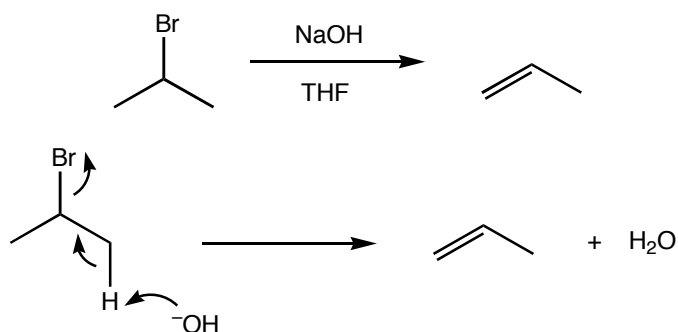


1. Assuming that the following eliminations occur by an E2 mechanism, determine the products of the reactions. Identify the major and minor products (ignore the formation of *Z* and *E* isomers.)



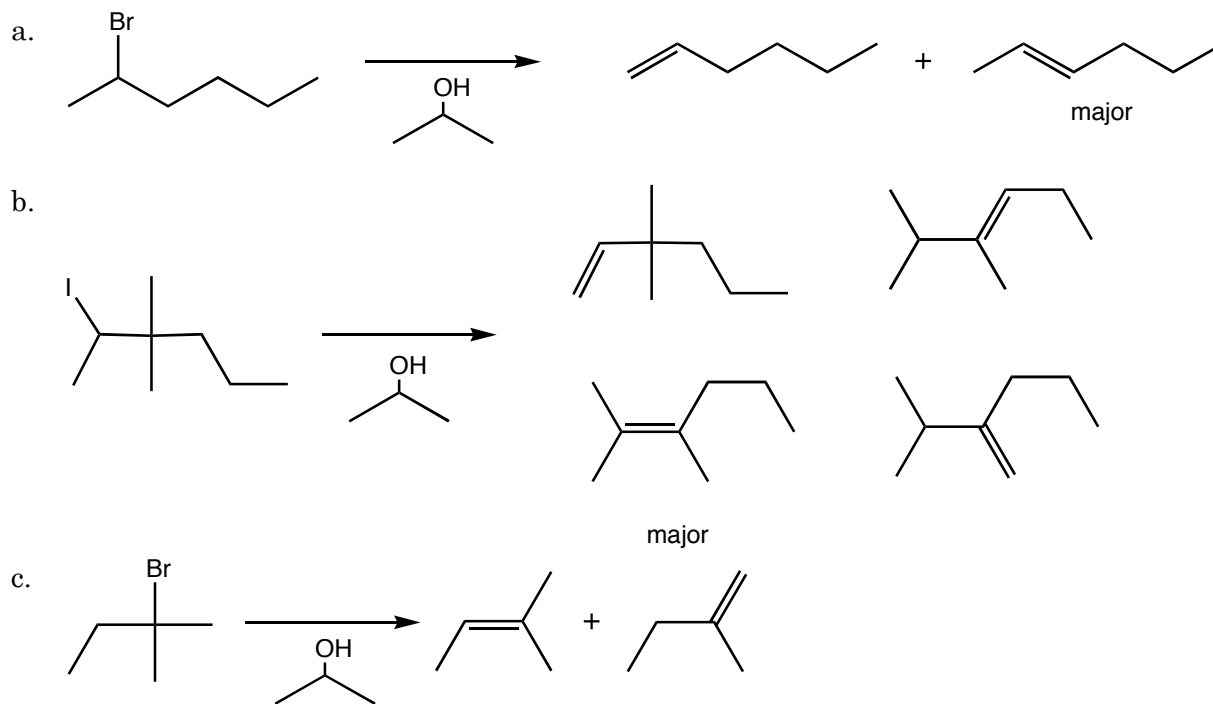
2. Draw the mechanism for the following E2 reaction.



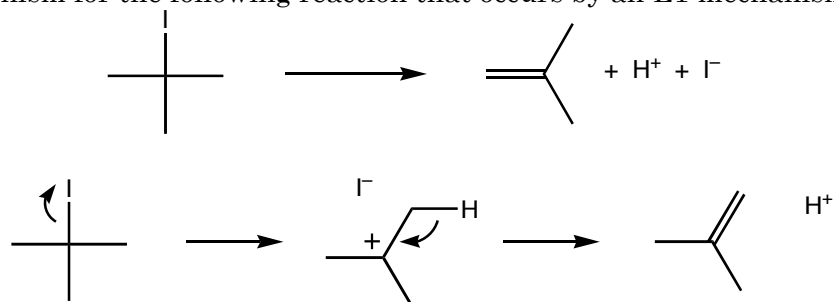
3. Why is a kinetic isotope effect observed in a reaction that occurs by an E2 mechanism but not in a reaction that occurs by an E1 mechanism?

The rate limiting step in an E1 reaction is the heterolytic cleavage (ionization) of the carbon-halogen bond. Since the abstraction of a proton is not involved in the rate determining step, exchanging a hydrogen for a deuterium will not effect the rate of the reaction. However, the abstraction of a proton does occur during the rate-limiting step of an E2 reaction, so a deuterium isotope effect is observed.

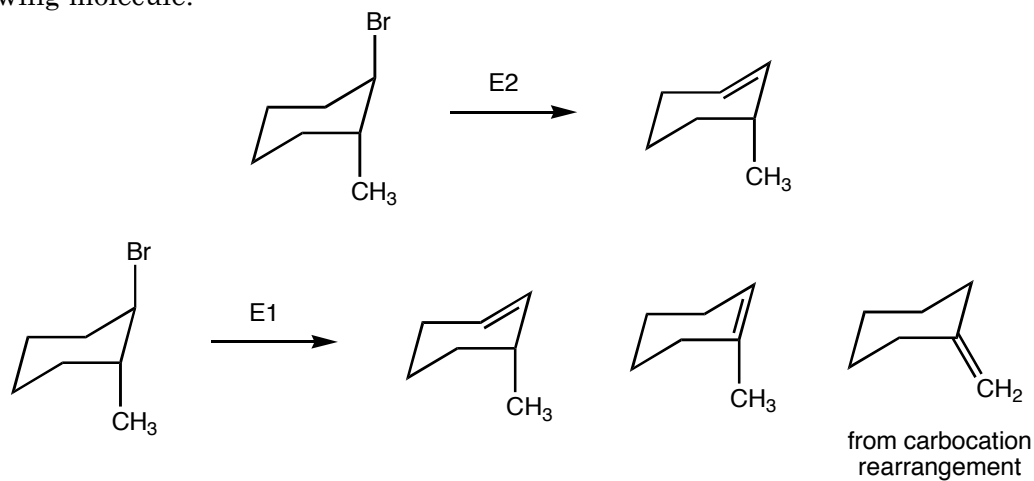
4. Assuming that the following eliminations occur by an E1 mechanism, determine the products of the reactions. Identify the major and minor products (ignore the formation of *Z* and *E* isomers and remember to consider the possibility of carbocation rearrangement.)



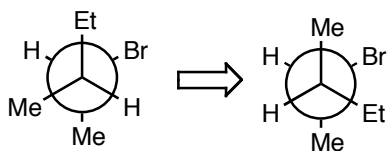
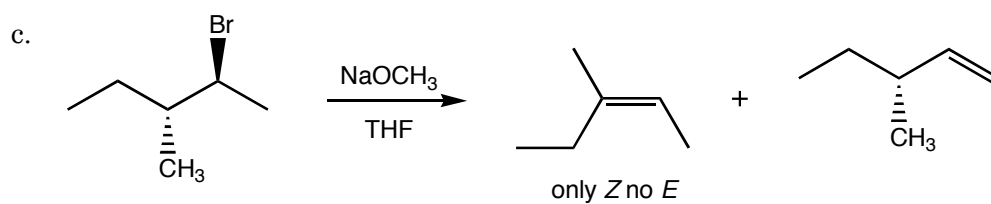
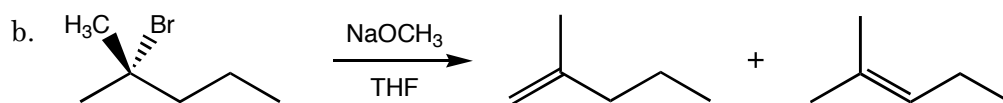
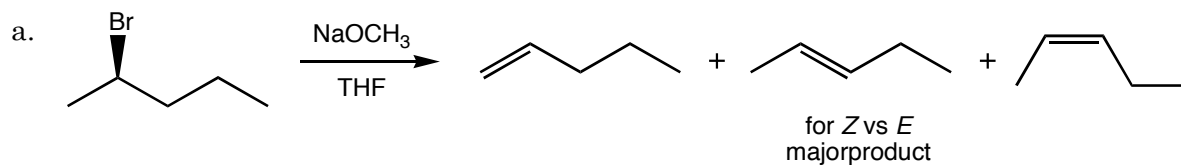
5. Draw the mechanism for the following reaction that occurs by an E1 mechanism.



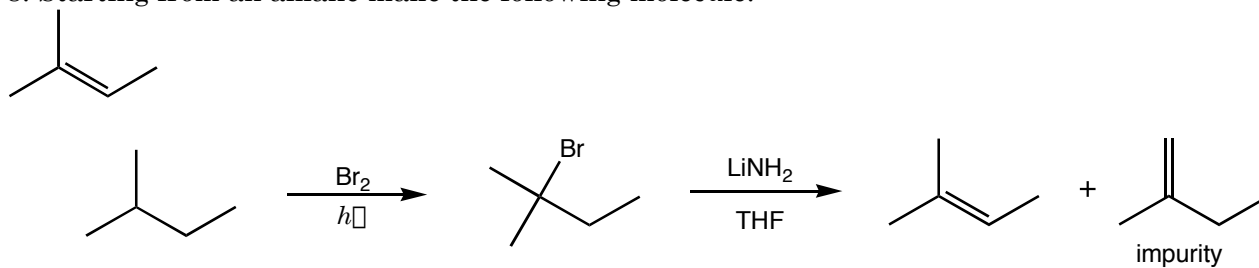
6. Draw the products that you expect to form from an (a.) E2 elimination and a (b.) E1 elimination on the following molecule:



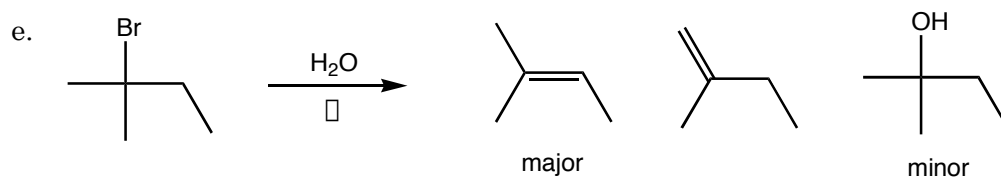
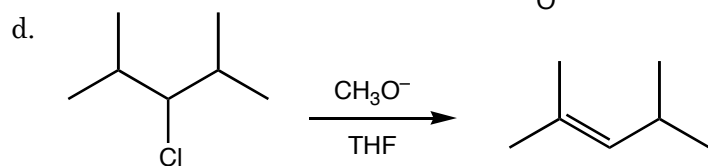
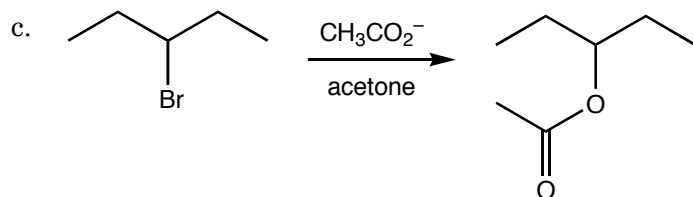
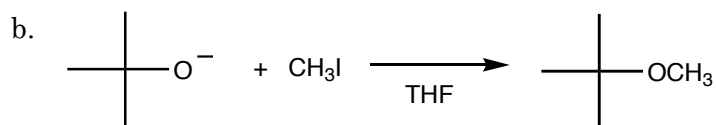
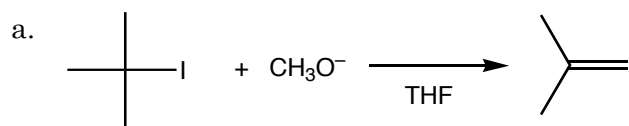
7. For the following reactions that occur by an E2 mechanism, draw all of the possible alkene products, and for alkenes that exist as *Z* and *E* isomers, indicate which isomer forms in excess (if only one isomer forms make certain to indicate that it is the exclusive product).



8. Starting from an alkane make the following molecule.



9. Determine the products (all) of the following reactions and identify the major product(s) (ignore stereochemistry).



10. Starting with any alcohol and any alkyl halide, make the following ethers,

a. $(\text{CH}_3)_2\text{CHOCH}_2\text{CH}_3$ (draw a skeletal structure of the molecule too).

