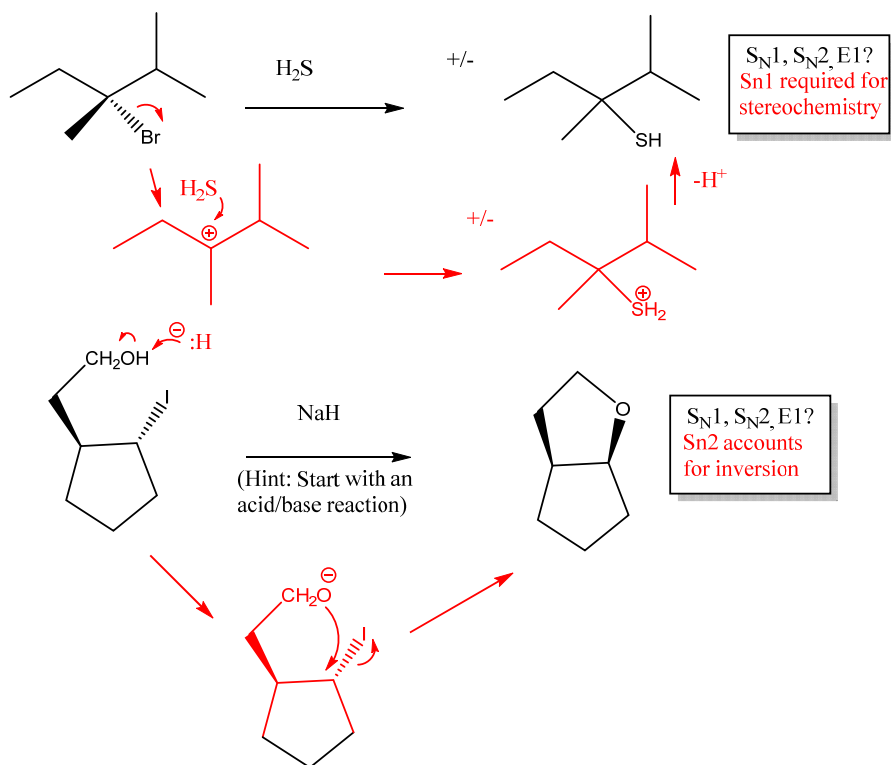


Answers Discussion Worksheet #7  
Compare/contrast Sn1/Sn2/E1/E2

Skill 1: Predict the major mechanism and draw major products

- Alkyl halides can potentially undergo substitution and/or elimination reactions. In some cases there is one predominant mechanism
- Compare key factors in making the decision.
  - First, look at substrate. 3° precludes Sn2, 1°/methyl precludes Sn1/E1
  - Second, look at the Nu<sup>-</sup>/B<sup>-</sup>:
    - Strong nucleophiles favor Sn2
    - Strong bases favor E2
    - Weak nucleophiles disfavor Sn2 compared to Sn1
    - Weak bases disfavor E2 compared to E1
  - Solvents have minor effects—polar aprotic solvents will help favor S<sub>N</sub>e
  - Leaving groups do not generally help distinguish Substitution vs elimination
    - But if the LG is poor, no reaction will occur!
- Once you have determined the predominant mechanism(s), predict the product using all the concepts previously learned
  - Consider regiochemistry when important!
  - Consider stereochemistry when important!

Problem 1. Draw full mechanisms, including all intermediates and arrows, for the following three reactions. Indicate whether the reaction mechanism is S<sub>N</sub>1, S<sub>N</sub>2, or E1.



Problem 2. Draw the major product(s) of each reaction and specify the most likely mechanism(s) by which it(they) is/are formed (  $S_N1$ ,  $S_N2$ , E1, E2, or more than one of these.)

