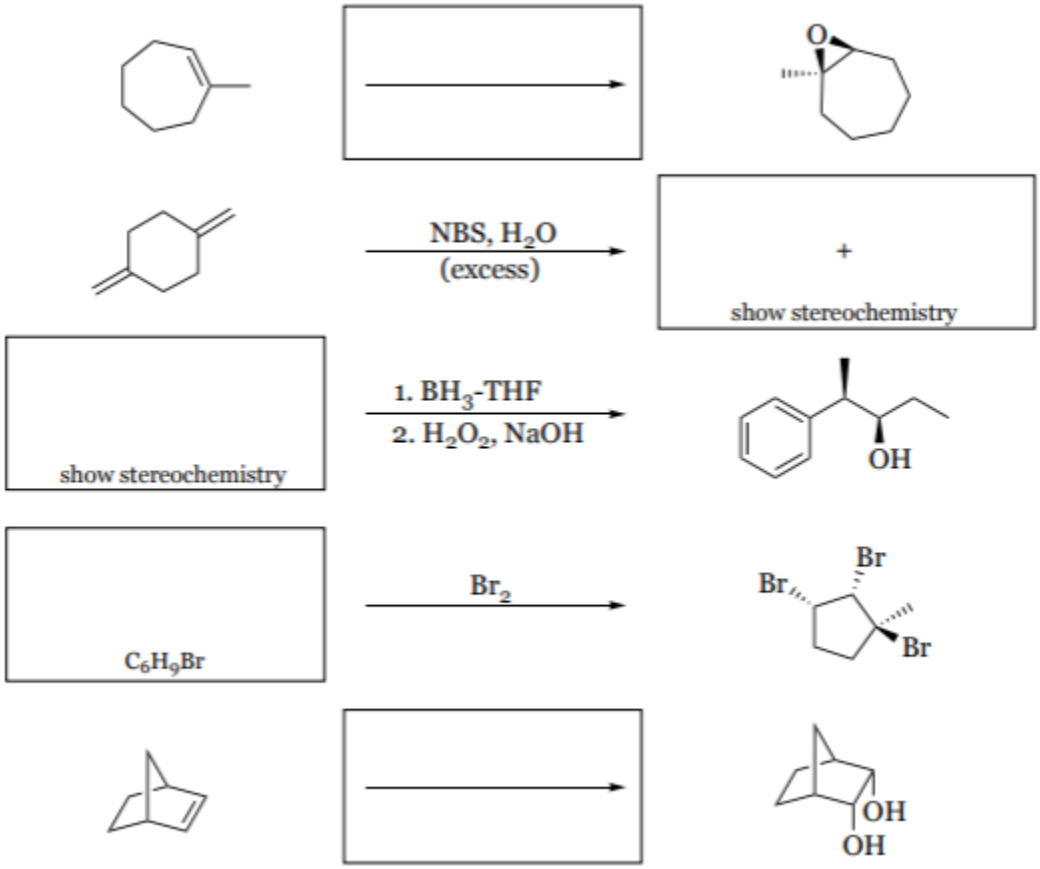
Problem Set 6

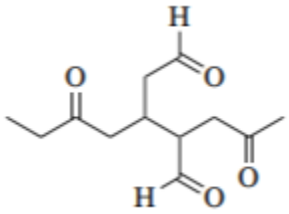
Organic Chemistry 1 (Greenberg)

Fall 2025

1. Draw the missing starting materials, reagents, conditions, and/or products for each of the following reactions. Assume that no carbocation rearrangements occur. Note that for some of the reactions, not all stereoisomers produced are shown.



2. A compound with molecular formula C12H18 undergoes reductive ozonolysis to form the molecule below:

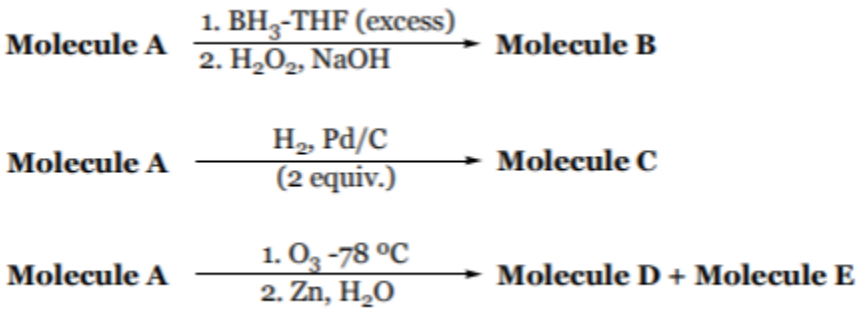


   A. Draw the three possible identities of this starting compound.

   B. Of the compounds drawn in Part (a), which is least stable?

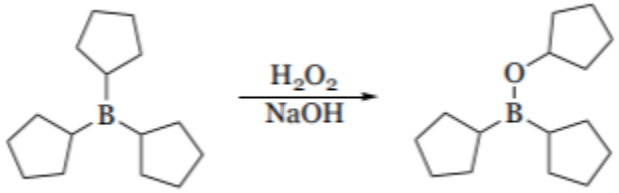
   C. Of the compounds drawn in Part (a), which reacts most readily with one equivalent of Br2?

3. **Molecule A** has molecular formula C7H10O and contains a 5-atom π system. **Molecule B**, which has three stereoisomers in total, is produced when **Molecule A** undergoes hydroboration-oxidation with excess BH3. **Molecule A** takes up two equivalents of H2 over a Pd/C catalyst to form several stereoisomeric products, and the one optically inactive stereoisomer that forms has no butane-like gauche interactions in its lower energy chair conformation. When **Molecule A** undergoes reductive ozonolysis, **Molecule D** (a dialdehyde with acidic protons) and **Molecule E** are produced. Draw the structures of all five molecules; you do not need to show stereochemistry in your answers.



4. This question focuses on a part of the hydroboration-oxidation mechanism.

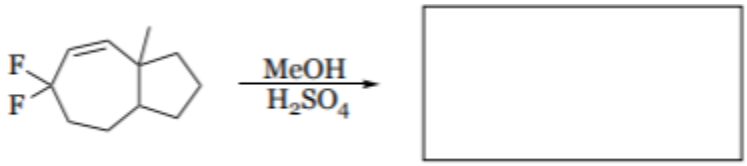
    a. Provide the mechanism for the transformation below:



b. A 1,2-alkyl shift occurs during the mechanism in Part (a). What factor drives this step to completion?

c. The reaction eventually produces three equivalents of an alcohol, alongside B(OH)3 as a byproduct. Draw this alcohol product.

5. Draw the major product and provide a mechanism for the reaction below. A single carbocation rearrangement occurs.



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Tip of the Week:

Tip of the Week: The beginning of fall also means the start of flu season--get your shot today! Hopkins holds flu clinics on all of its campuses. Students must upload verification of their immunization or a valid exemption by Friday, Nov 21st, 2025. Find out more information here: https://wellbeing.jhu.edu/PrimaryCare/annual-flu-vaccine-requirement/.