

**RULES:** Each team consists of 3 or 4 people (if less than 3, points will be deducted). You can pick your own teammates, and they can vary for all 4 GWs. **You are allowed** to use class notes, textbooks, and discuss answers with the members of **your team only**. **You are NOT allowed** to use web browsing (Internet, AI, etc.) to aid you in any shape or form (including GWs from other years), or to communicate results, answers, or anything related to the GWs with other teams, tutors, etc. (see Syllabus for additional details).

The only ways to use the Internet are to: video chat, e-message, or email your teammates. Again, no web browsing/postings to look for answers! You are expected to abide by the honor system. **One submission per team, signed & dated by all members.**

**To submit, drop off the completed document in Luke's mailbox, located outside of the Chemistry Office in Havemeyer (room 340).**

OR by email to ochemcampos@gmail.com

*Subject heading: **GW Submission**, followed by the message containing the **names of your team members**.*  
Make sure that the file is attached to your email.

**If it can't be printed, it won't be graded!** It is recommended that you print your answers or digitally annotate this PDF to make sure it's legible.

Be concise in your explanations. Adding wrong statements mixed with the correct explanations will lead to a deduction of points.

**Team Name** (feel free to be creative, but not offensive, we may call this name when returning the GW):  
\_\_\_\_\_

Points:

/ 25

**Print the name of team member A (recorder):** \_\_\_\_\_

**Print the name of team member B:** \_\_\_\_\_

**Print the name of team member C:** \_\_\_\_\_

**Print the name of team member D:** \_\_\_\_\_  
(Write N/A, if there are only 3 members of your team)

***On our honor, we have not given or received help on this GW.***

\_\_\_\_\_  
Signature, Team member A Date

\_\_\_\_\_  
Signature, Team member B Date

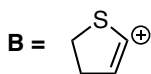
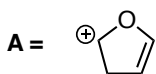
\_\_\_\_\_  
Signature, Team member C Date

\_\_\_\_\_  
Signature, Team member D Date

1. Consider the carbocations shown below.

1a. 4 pts. Which do you expect to be more stable, **A** or **B**, or do they have the same relative stability?

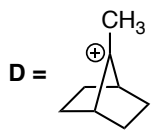
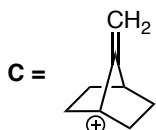
Circle the most stable carbocation.  
(circle both, if they are equally stable)



Briefly explain why:

1b. 4 pts. Which do you expect to be more stable, **C** or **D**, or do they have the same relative stability?

Circle the most stable carbocation.  
(circle both, if they are equally stable)

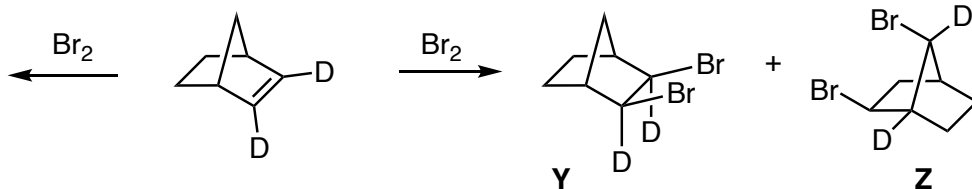


Briefly explain why:

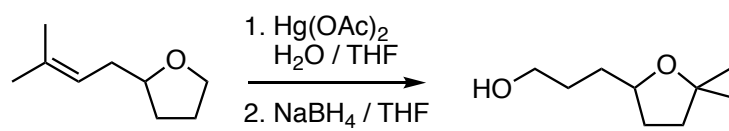
1c. 8 pts. We learned that bromination of alkenes occurs *via* a bromonium ion. In the box below, draw the structure of the **expected product, X**, resulting from the conventional mechanism. Unfortunately, norbornene is the one exception to the bromonium path that you will see in this class. Instead of obtaining compound **X**, we actually observe a mixture of compounds **Y** and **Z** (no bromonium ion formed). Draw a suitable mechanism for the formation of compounds **Y** and **Z**.

**X**. Expected product

via halonium ion



2. 9 pts. Draw the mechanism that accounts for the formation of the product below.



Hint: The blue oxygen came from water.

