GW3: Due at 6pm EST on 4/5/24

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.

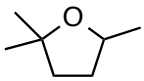
_____ _____
Signature, Team member A Date

_____ _____
Signature, Team member B Date

_____ _____
Signature, Team member C Date

_____ _____
Signature, Team member D Date

1. 5 pts. Considering that **either** (*E*)-2-methylhexa-2,4-diene **or** (*E*)-2-methylhexa-1,4-diene yield the same product **X** by oxymercuration-demercuration using 2 eq. of $Hg(OAc)_2$, propose the synthesis of **X.** Your **only sources of carbon are**: 2-methylprop-1-ene, acetylene, and chloromethane. You can use *any reagent* to plan your synthesis.

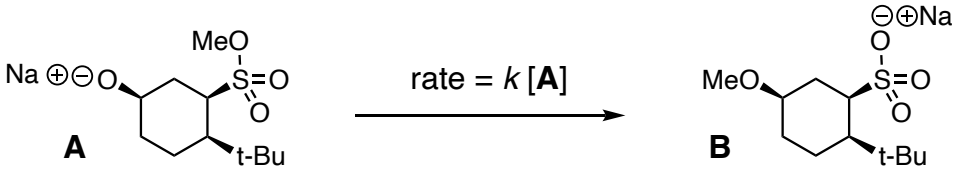


Product X

Consider the reactions below. *Note*: transitions states are drawn separately from arrow-pushing mechanisms.

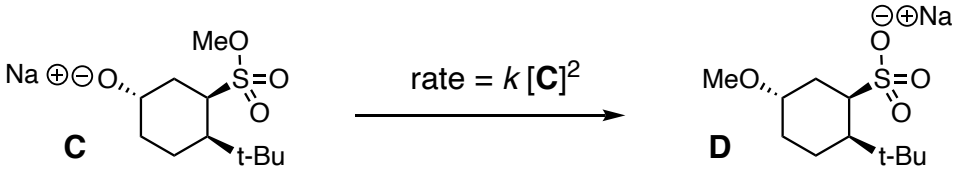
2a. 5 pts. The rate law for **reaction 1** was found to be first order with respect to compound **A**. Propose a mechanism for the reaction, *and draw the transition state that **best** represents the RLS*.

Reaction 1:



2b. 5 pts. The rate law for **reaction 2** was found to be second order with respect to compound **C**. Propose a mechanism for the reaction, *and draw the transition state that **best** represents the RLS*.

Reaction 2:



3a. 5 pts. Draw the **molecular orbital diagram** for the allyl cation, $C_3H_5^+$. Identify the number of **NET bonding interactions**. Focus only on the p-orbital interactions and do not include sigma-bonding orbitals.

3a. 5 pts. Draw the **molecular orbital diagram** for the cyclopropenium cation, $C_3H_3^+$. Identify the number of **NET bonding interactions**. Focus only on the p-orbital interactions and do not include sigma-bonding orbitals.