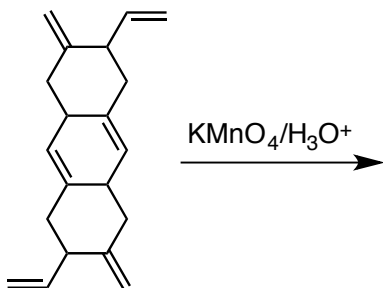
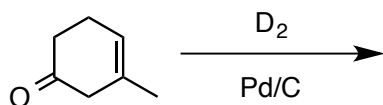
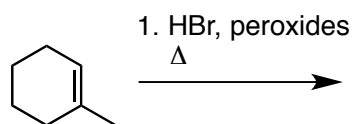
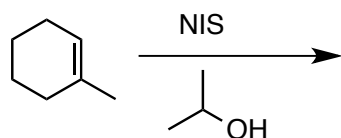
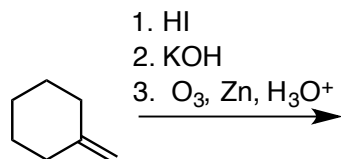
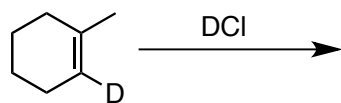


Name: _____

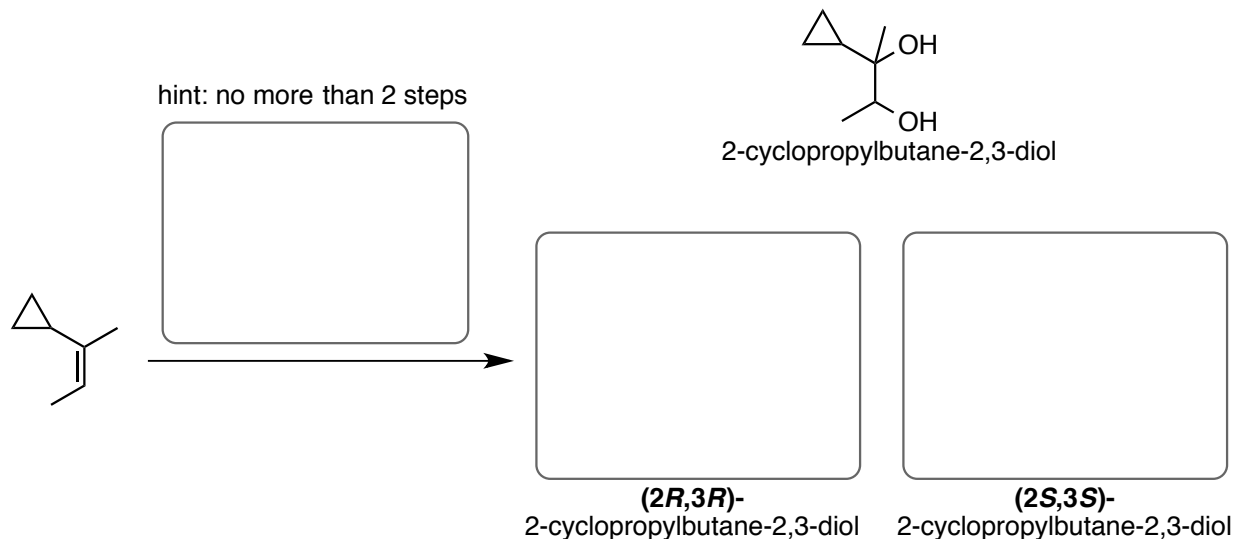
1. 18 pts. Draw the structure of the product(s) for the reactions below. Include dashes and wedges where necessary to show stereochemistry.



Name: _____

2a. 4 pts. There are four stereoisomers of the compound shown on the right (2-cyclopropylbutane-2,3-diol). In the boxes provided, draw the structures of the (2*R*,3*R*)- and (2*S*,3*S*)- stereoisomers.

2b. 6 pts. Synthesis. We have learned approaches to obtain 1,2-diols from alkenes. In the box provided, draw the reaction steps to convert the *alkene* shown on the left, to the racemic mixture of only the **two** stereoisomers having specific configuration of (2*R*,3*R*)- and (2*S*,3*S*).

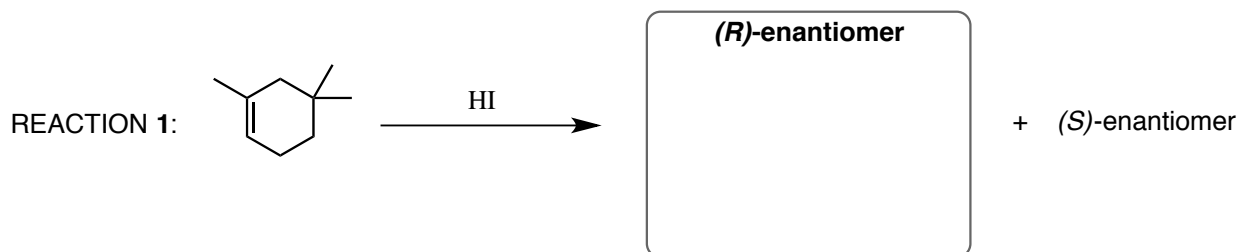


2c. 9 pts. Imagine that you have cyclohexane in the lab, but you really need **cyclohexanol** for your key experiment. Assuming that you have all reagents and solvents for synthesis in the lab, how would you convert **cyclohexane TO cyclohexanol**?

pts. this pg.

Name: _____

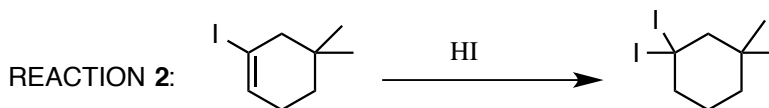
3a. 2 pts. A) The reaction below yields a racemic mixture. Using dashes and wedges, draw the specified enantiomer product.



3b. 8 pts. The ionic electrophilic addition *mechanism for the reaction above* is a two-step process. Draw the reaction coordinate for **the rate-limiting step only**. Clearly label all important points, the transition state(s) "TS", intermediates, reactants, free energy of activation (ΔG^\ddagger), and include the **structures** at the energy minimum and energy maximum points.



3c. 7 pts. 1-iodo-5,5-dimethylcyclohex-1-ene reacts with HI by ionic electrophilic addition, *i.e.* Reaction 1 and Reaction 2 undergo similar mechanism to yield their respective products as shown.



Do you expect **Reaction 2** to be faster, slower, or the same as **Reaction 1**? Draw structures, if it helps your explanation.

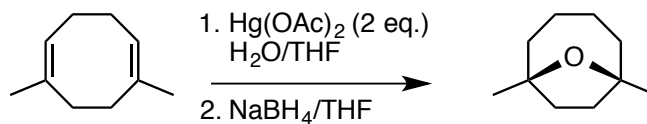
Put an **X** in the appropriate box: ☐ Faster ☐ Slower ☐ Same

Briefly explain why:

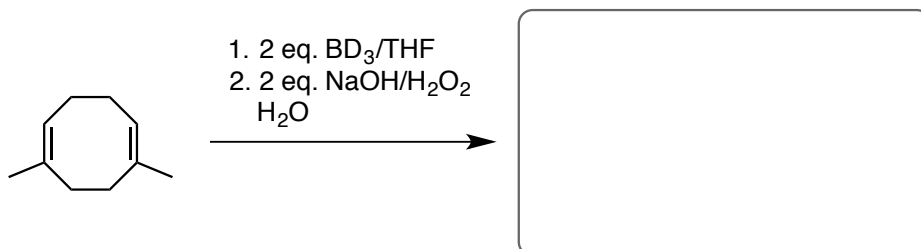
pts. this pg.

Name: _____

4a. 12 pts. The oxymercuration-demercuration of (1Z,5Z)-1,6-dimethylcycloocta-1,5-diene using 2 equivalents of mercury(II) acetate yields the *cyclic ether* product shown below. Draw the mechanism that best explains the formation of the product.



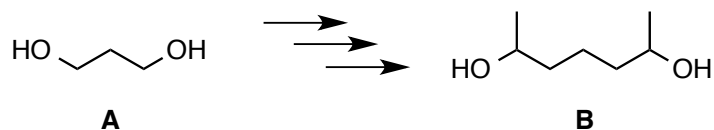
4b. 3 pts. Draw the structure of the product(s) for the reaction below. Include dashes and wedges if necessary to show stereochemistry.



pts. this pg.

Name: _____

5a. 8 pts. Synthesize compound **B** from compound **A**. Note: *acetylene is your only source of carbon* to build your molecule. You can use any other reagent to introduce functional groups only.



5b. 10 pts. Propose the synthesis of **2-propanol** from **acetylene**. Note: acetylene is your only source of carbon to build your molecule. You can use any other reagent to introduce functional groups only.

pts. this pg.

