

Answers

CHEMISTRY 12A FALL 2022

EXAM 3

NOVEMBER 22, 2022

NAME- WRITE BIG _____

STUDENT ID: _____

SECTION AND/OR GSI IF YOU ARE IN THE LABORATORY COURSE: _____

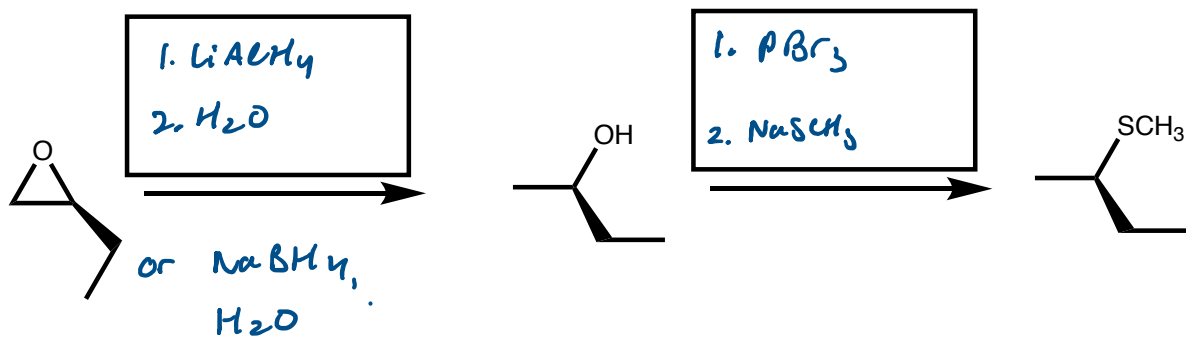
- You will have 75 minutes in which to work.
- BE NEAT! Non-legible structure drawings will not be graded.
- Only answers in the answer boxes will be graded – you can write in other places, but we only grade the answers in the boxes.
- All pages of the exam must be turned in.
- No calculators
- No stencils
- Molecular models may be used

Problem	Points (Maximum)
1	28
2	24
3	14
4	12
5	28
6	14
<i>Total</i>	<i>120</i>

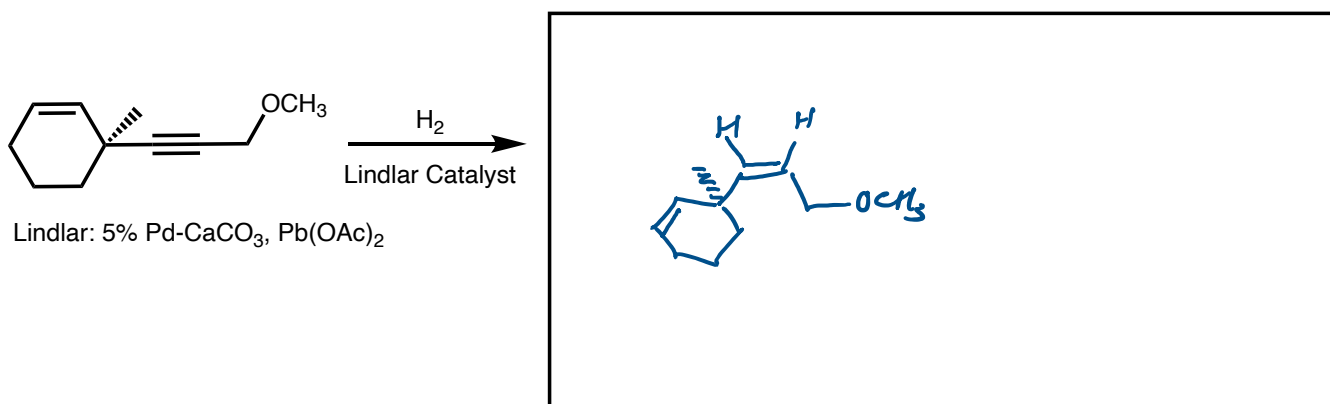
1. (28 points) For each reaction draw reagents in the boxes and draw the major organic products,

including all stereoisomers.

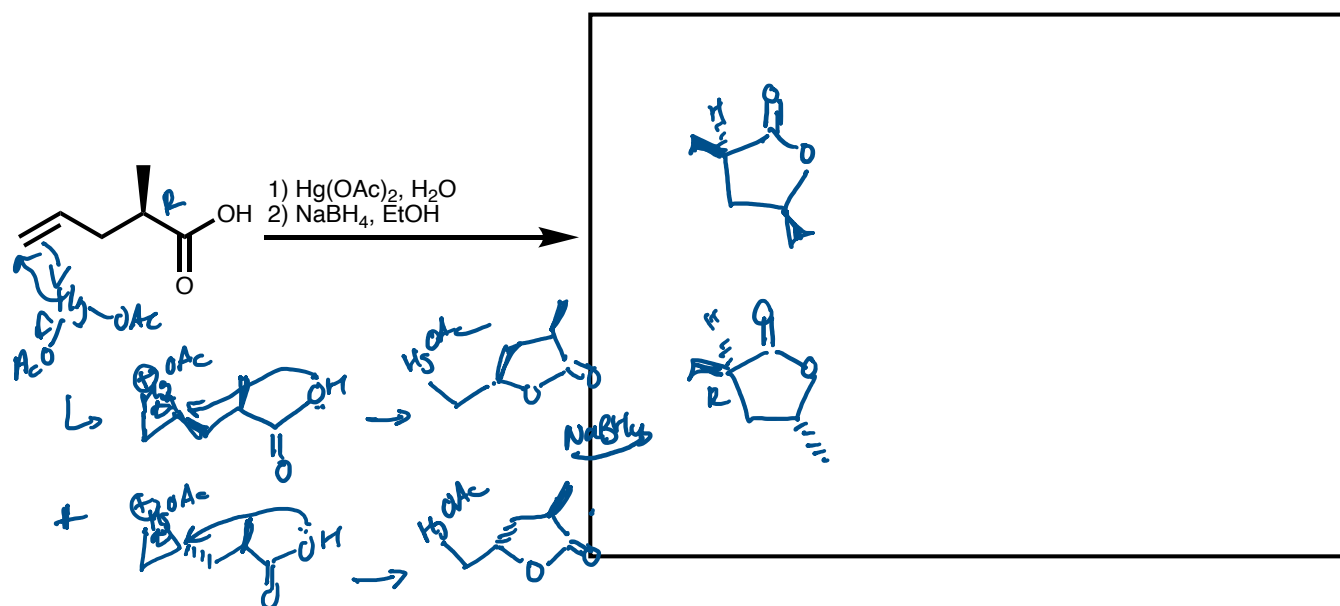
a.



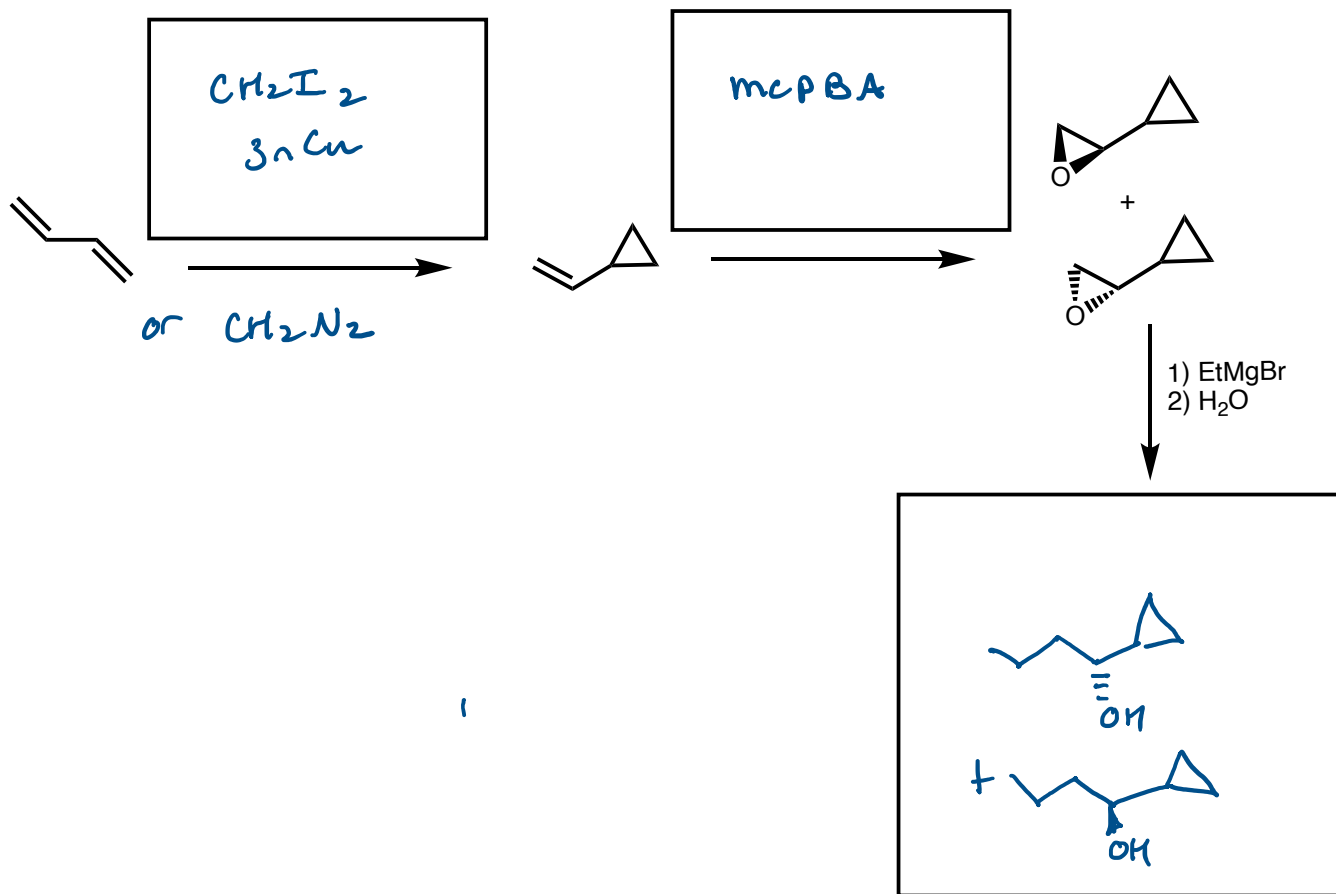
b.



c.

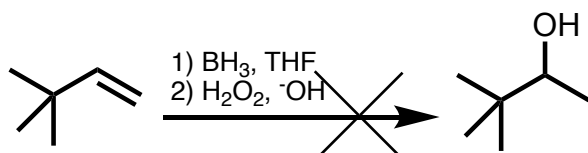


d.



2. (24 points) The following reactions would not occur as written. i. What product would actually be made? ii. Why was the desired product not formed? iii. How could you change either the substrate or reaction conditions to give the desired product?

a.



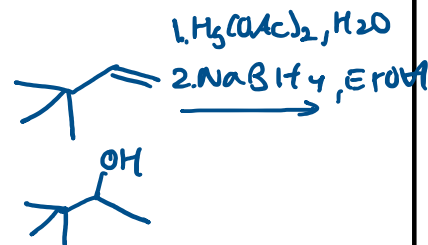
What product is actually made?
(Draw structure or NR for no reaction)



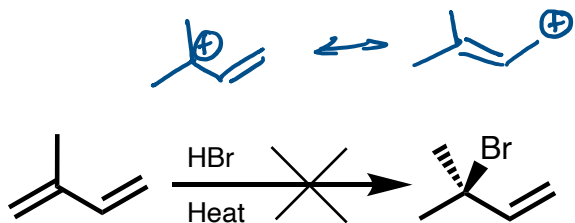
Why was desired product not formed?
(Explain in 1 sentence and include drawings of any relevant structures)


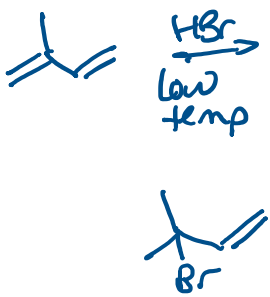
Hydroboration gives anti markovnikov addition

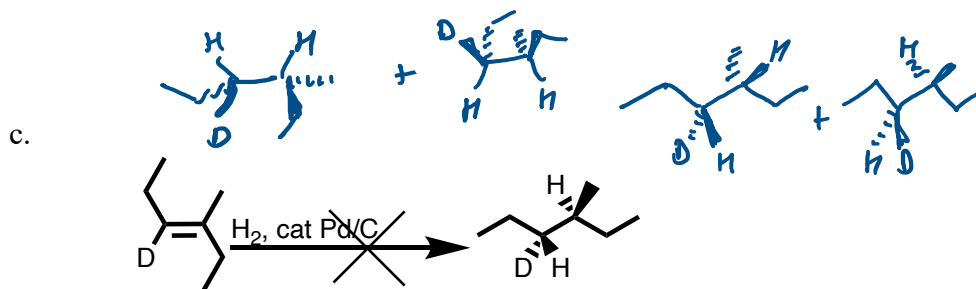
Change the substrate OR reaction to give desired product?
Draw your revised reaction.

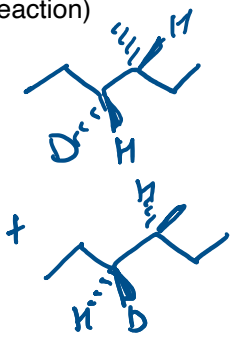
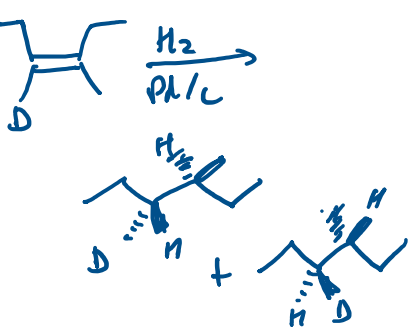


b.

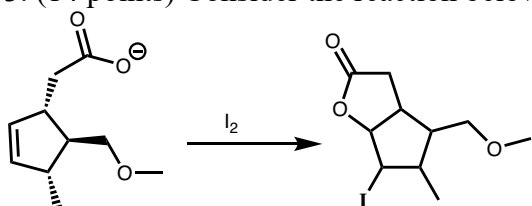


<p>What product is actually made? (Draw structure or NR for no reaction)</p> 	<p>Why was desired product not formed? (Explain in 1 sentence and include drawings of any relevant structures)</p> <p><i>Under thermodynamic conditions (heat) the more stable alkene is formed.</i></p>	<p>Change the substrate OR reaction to give desired product? Draw your revised reaction.</p> 
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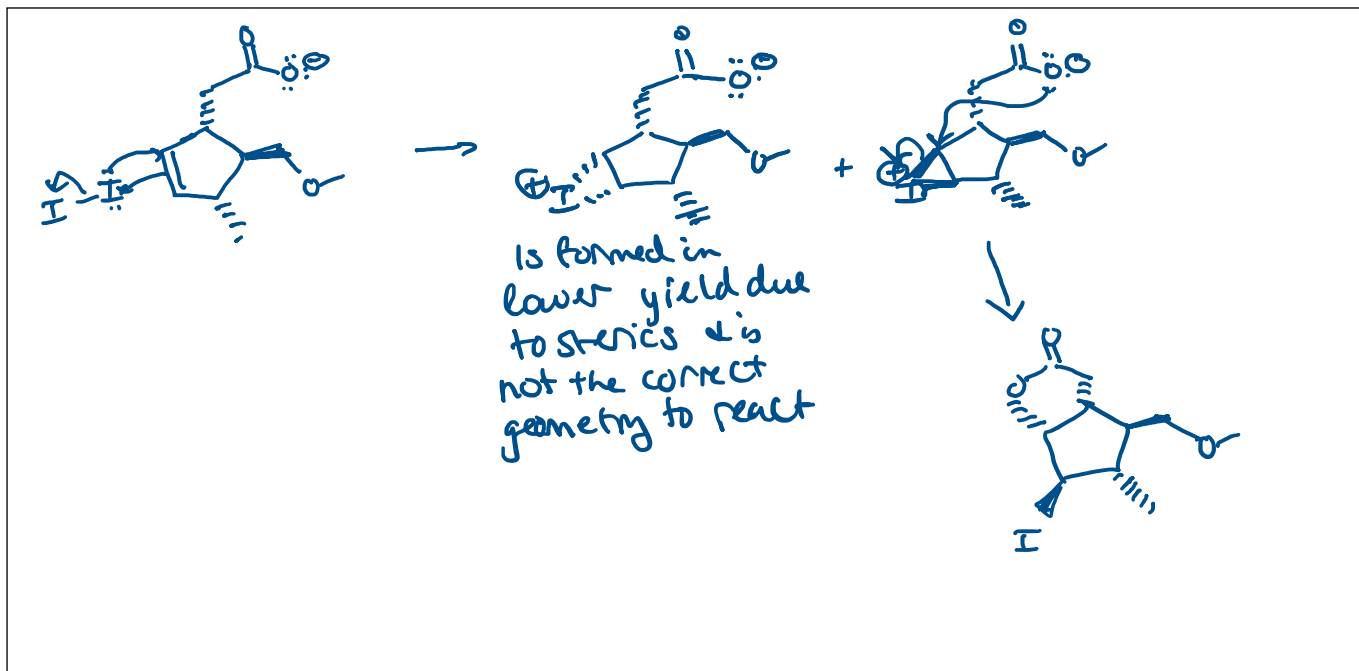


<p>What product is actually made? (Draw structure or NR for no reaction)</p> 	<p>Why was desired product not formed? (Explain in 1 sentence and include drawings of any relevant structures)</p> <p><i>hydrogenation proceeds by syn addition</i></p>	<p>Change the substrate OR reaction to give desired product? Draw your revised reaction.</p> 
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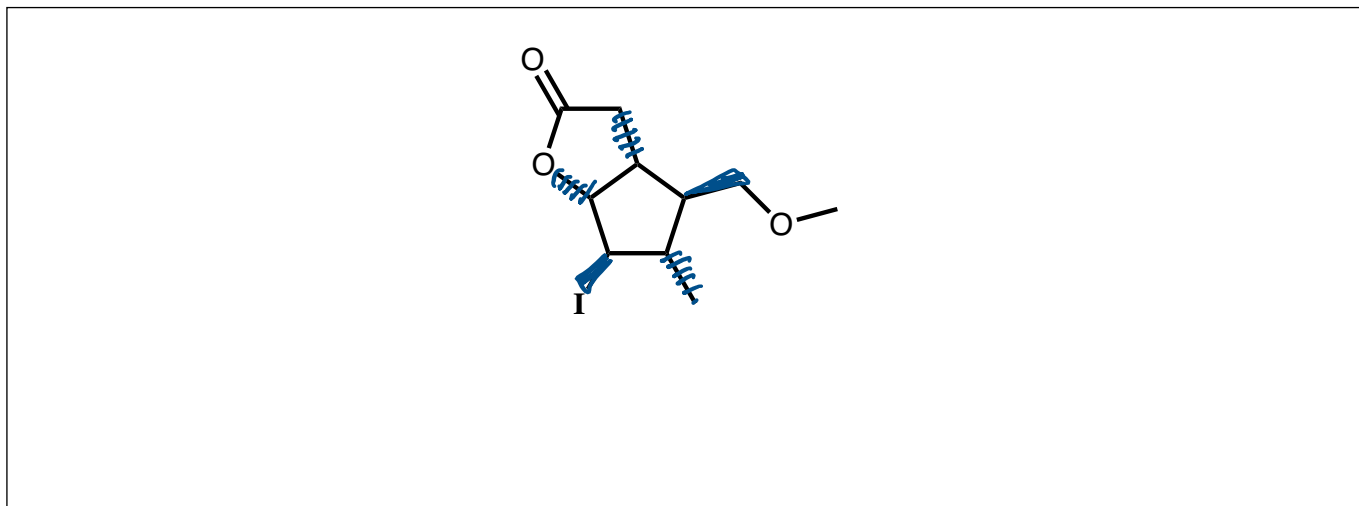
3. (14 points) Consider the reaction below.



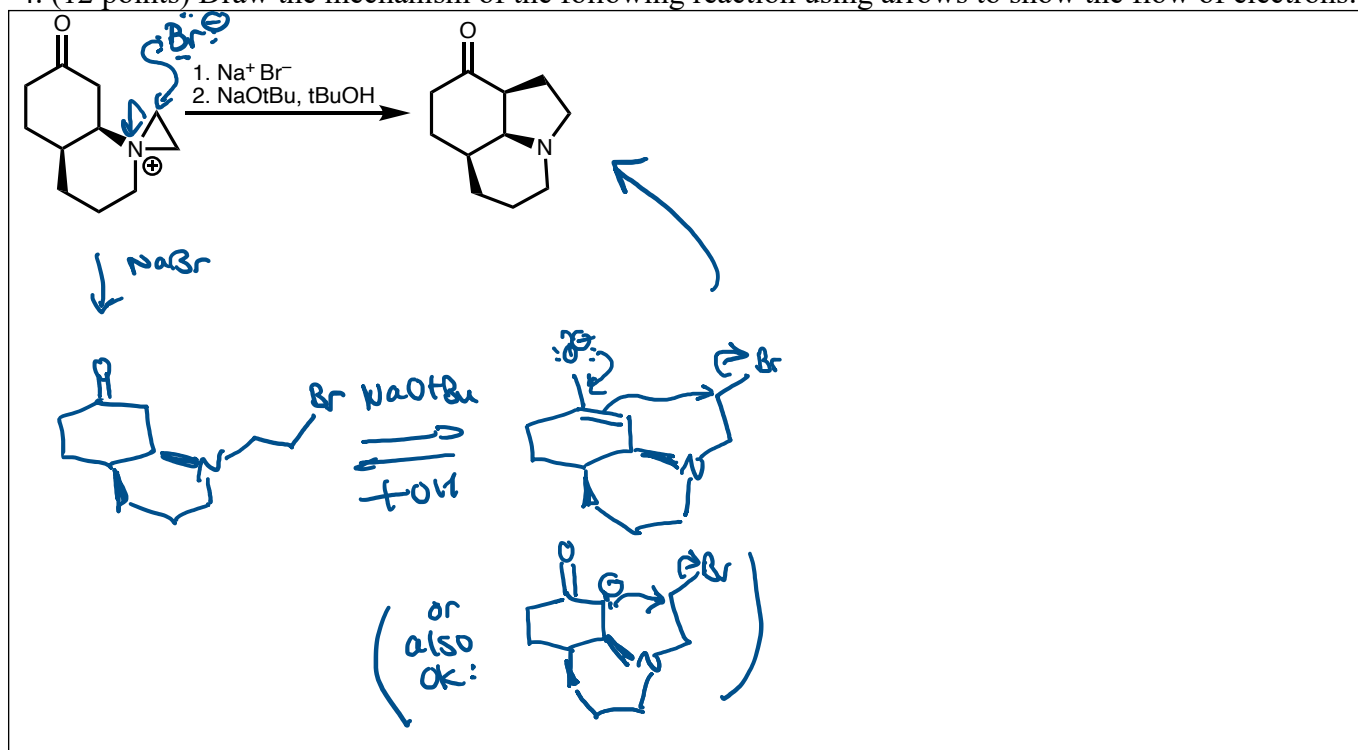
a. In the box below, draw the mechanism of the reaction using arrows to indicate the flow of electrons.



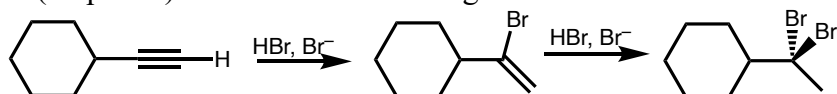
b. Only one stereoisomer of the product is formed. Please add wedges and dashes to the structure below to indicate that stereoisomer.



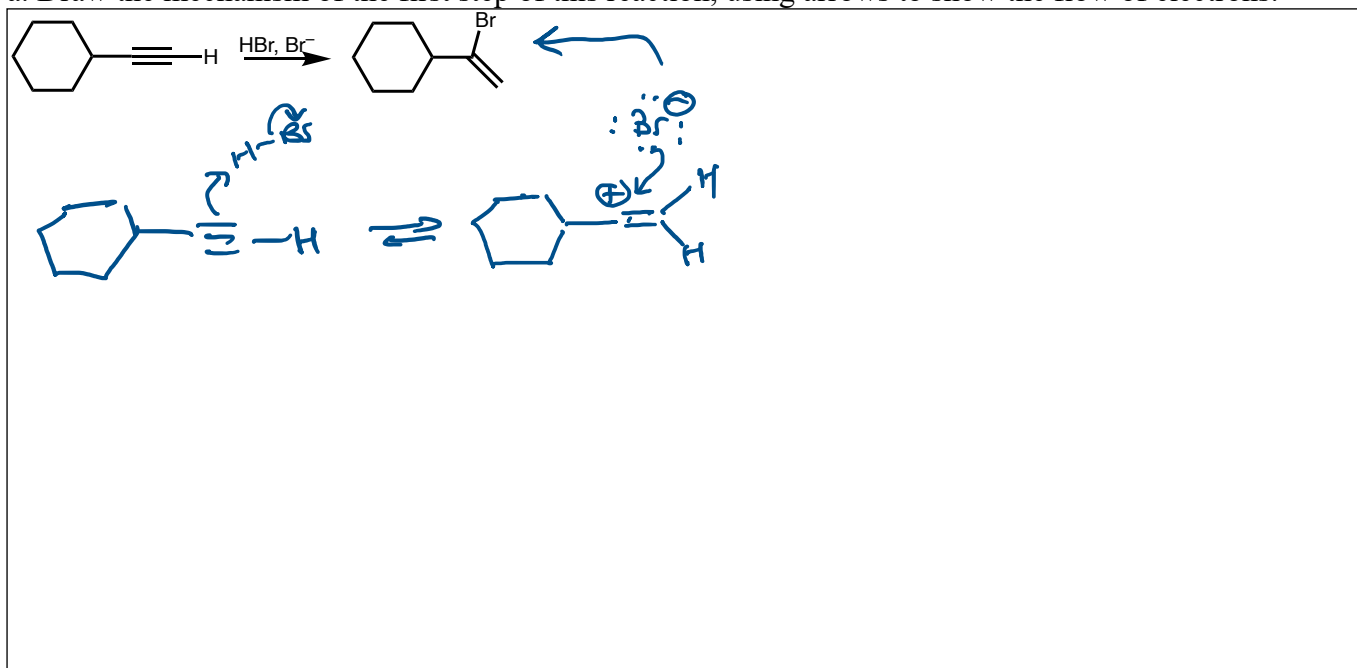
4. (12 points) Draw the mechanism of the following reaction using arrows to show the flow of electrons:



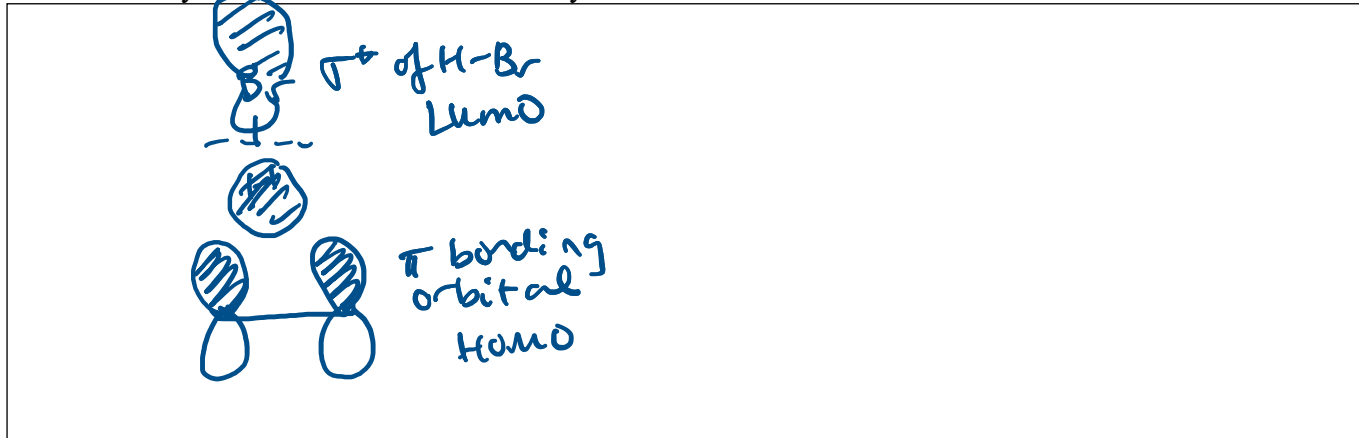
5. (28 points) Consider the following reaction:



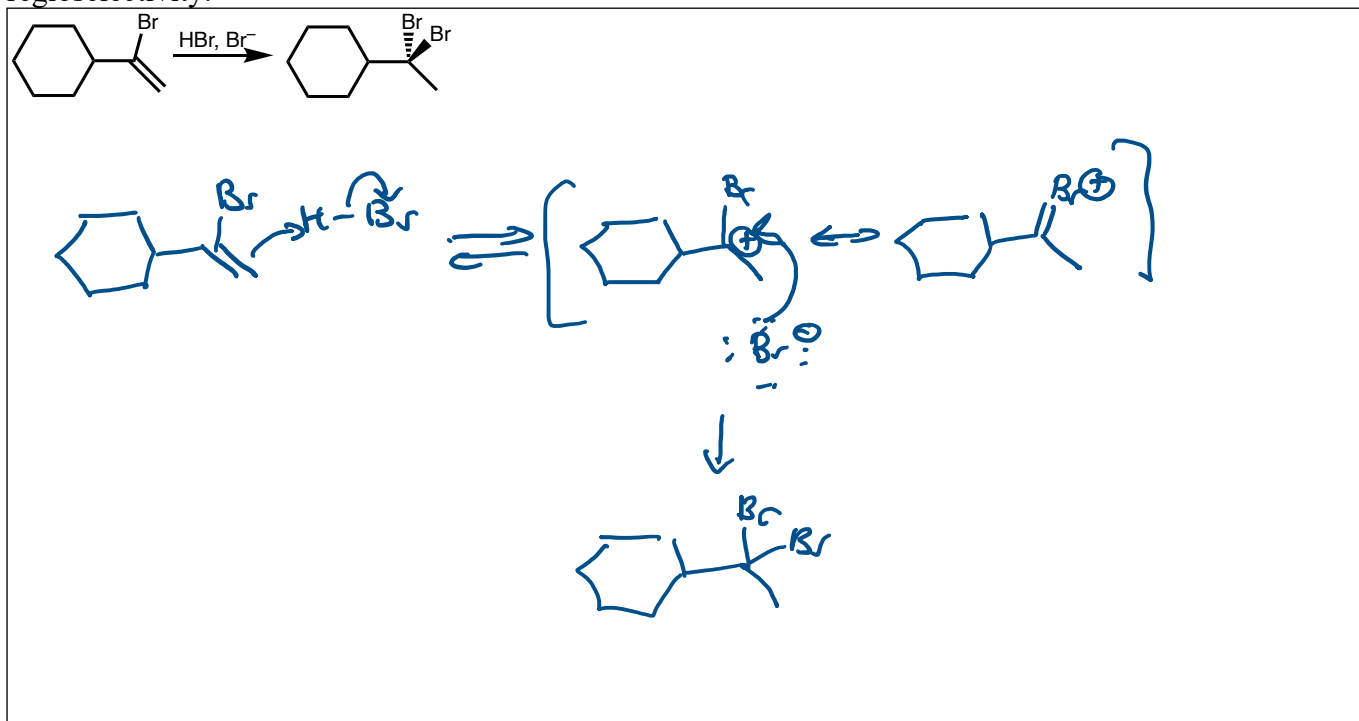
a. Draw the mechanism of the first step of this reaction, using arrows to show the flow of electrons.



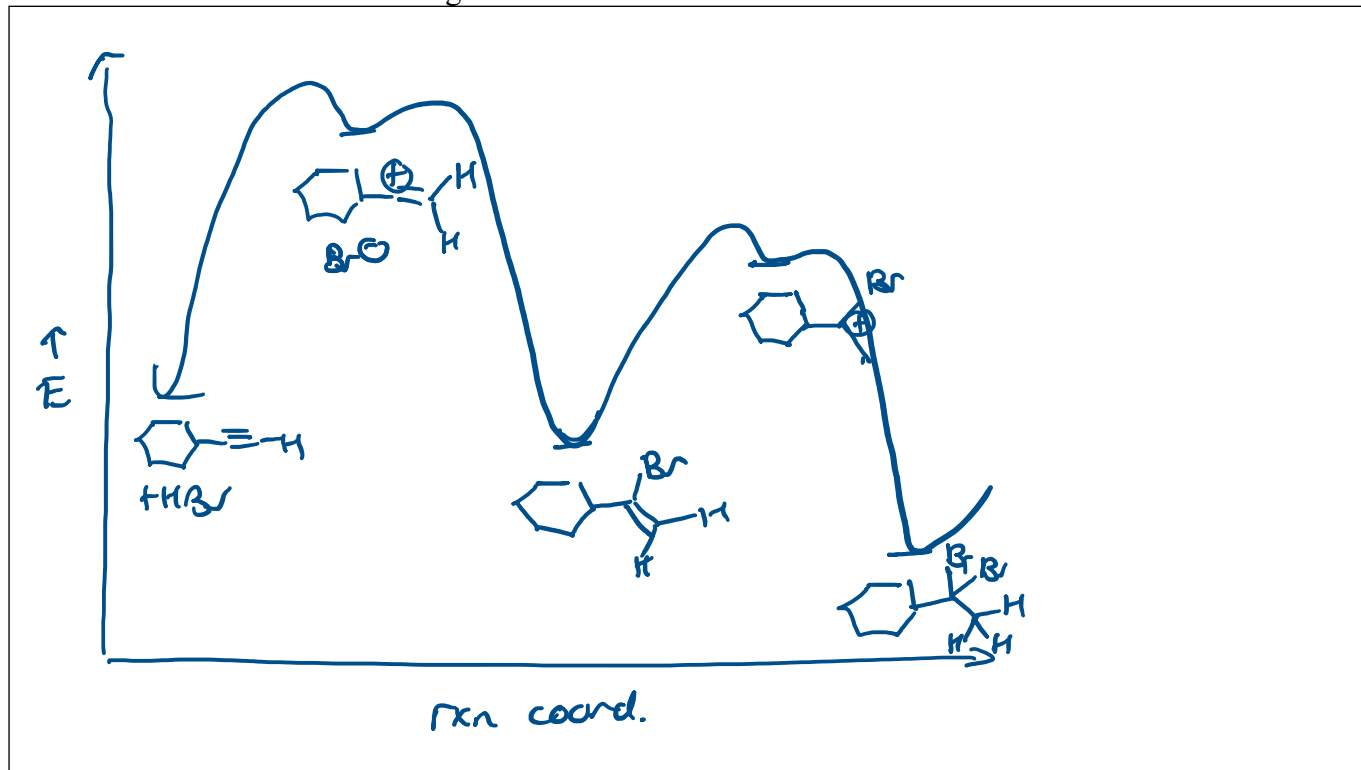
b. In the box below, sketch the interaction between the orbital the alkyne uses as the Lewis Base and the orbital used by the HBr to react with the alkyne.



c. This reaction does not stop at the brominated alkene. In the box below draw the mechanism of the bromination of the alkene. Indicate in your mechanism why this reaction proceeds with the observed regioselectivity.



d. Draw an energy diagram showing both steps of the reaction. Assume that the second reaction (bromination of the alkene) is faster than the first reaction (bromination of the alkyne). Draw in all intermediates and show in this diagram that the second reaction is faster than the first reaction.



6. (14 points) Synthesize the indicated product from the indicated starting material. All of the carbons in the product should come from the indicated starting material. You can use any other reagents. In your synthesis, show each product formed by each set of reagents you use.

