**NAME (Print):** _____

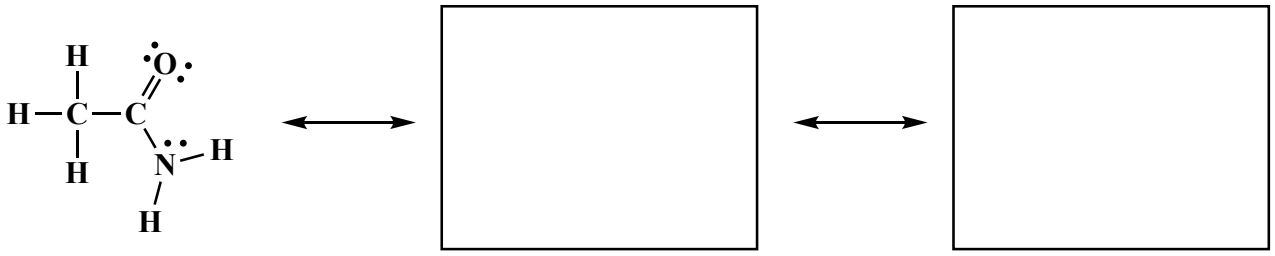
**SIGNATURE:** _____

**Chemistry 320N**
**Dr. Brent Iverson**
**6th Homework**
**February 25, 2026**

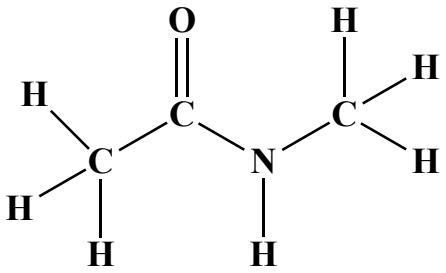
**Please print the first three letters of your last name in the three boxes**

| | | |
|---|---|---|
| | | |

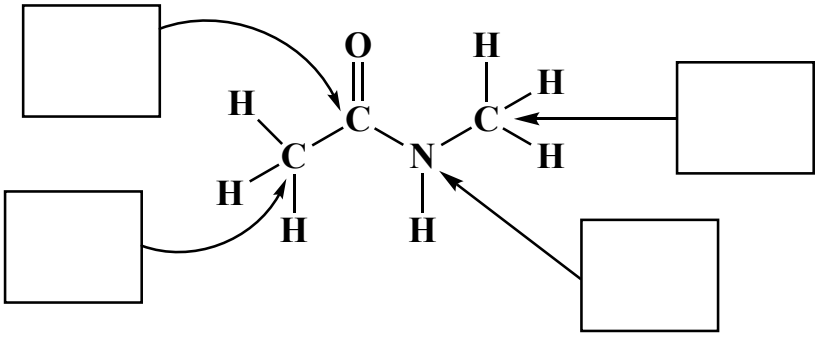
On the left is drawn the Lewis structure of a simple amide. Draw the two next most important contributing structures in the spaces provided. Be sure to show all lone pairs and formal charges.



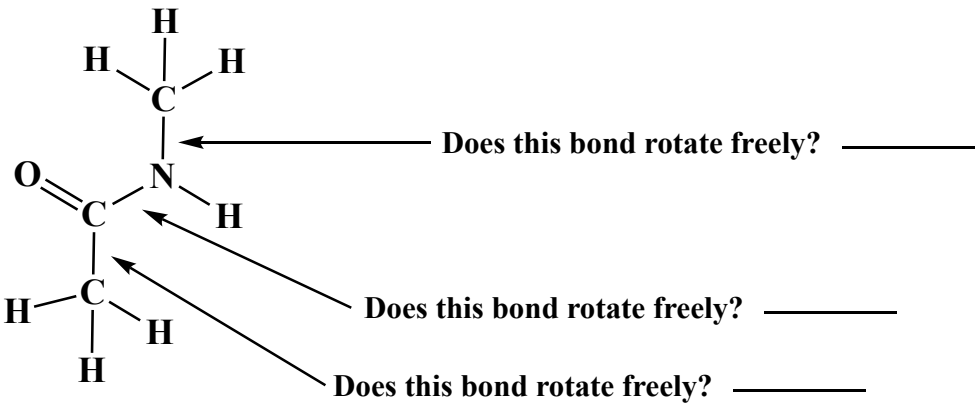
Because of the resonance you described with the above structures, several atoms of an amide bond are in the same plane. On the amide below, circle all the atoms that are in the same plane. Think carefully about this one!!



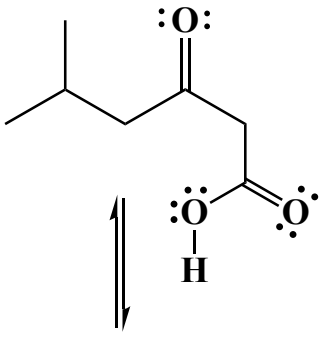
In the boxes provided, write the hybridization state of the given atoms.



(6 pts) In the spaces given, answer the question as "yes" or "no".



Complete the mechanism for the following decarboxylation reaction. **Be sure to show arrows to indicate movement of <u>all</u> electrons, write <u>all</u> lone pairs, <u>all</u> formal charges, and <u>all</u> the products for each step.** Remember, I said <u>all</u> the products for each step. **IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE, MARK IT WITH AN ASTERISK. IF A CHIRAL CENTER IS CREATED IN THE PRODUCTS YOU NEED TO DRAW BOTH ENANTIONMERS, AND LABEL THE PRODUCT MIXTURE AS RACEMIC IF RELEVANT.**




**Reactive Conformation**

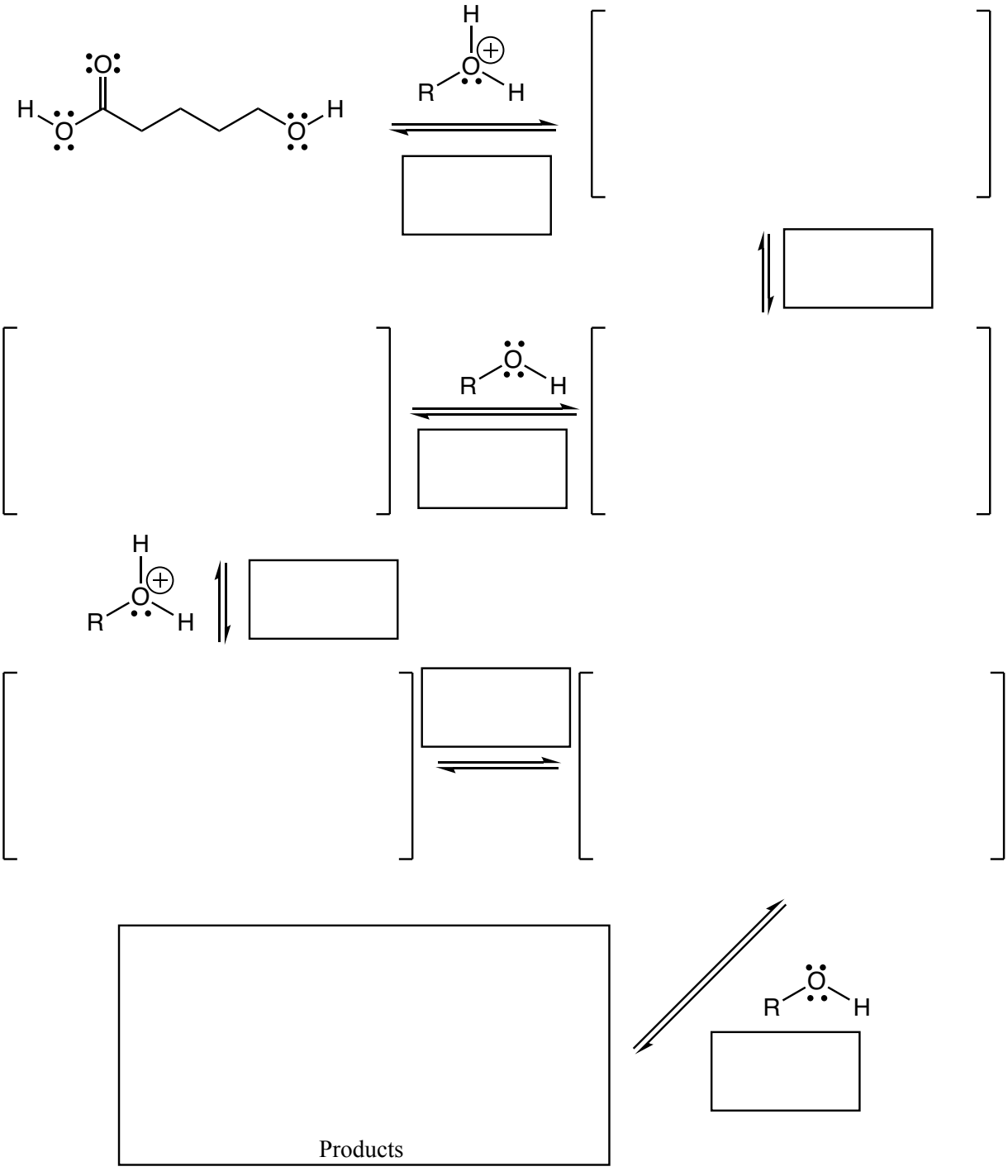
**Initial product**

\+

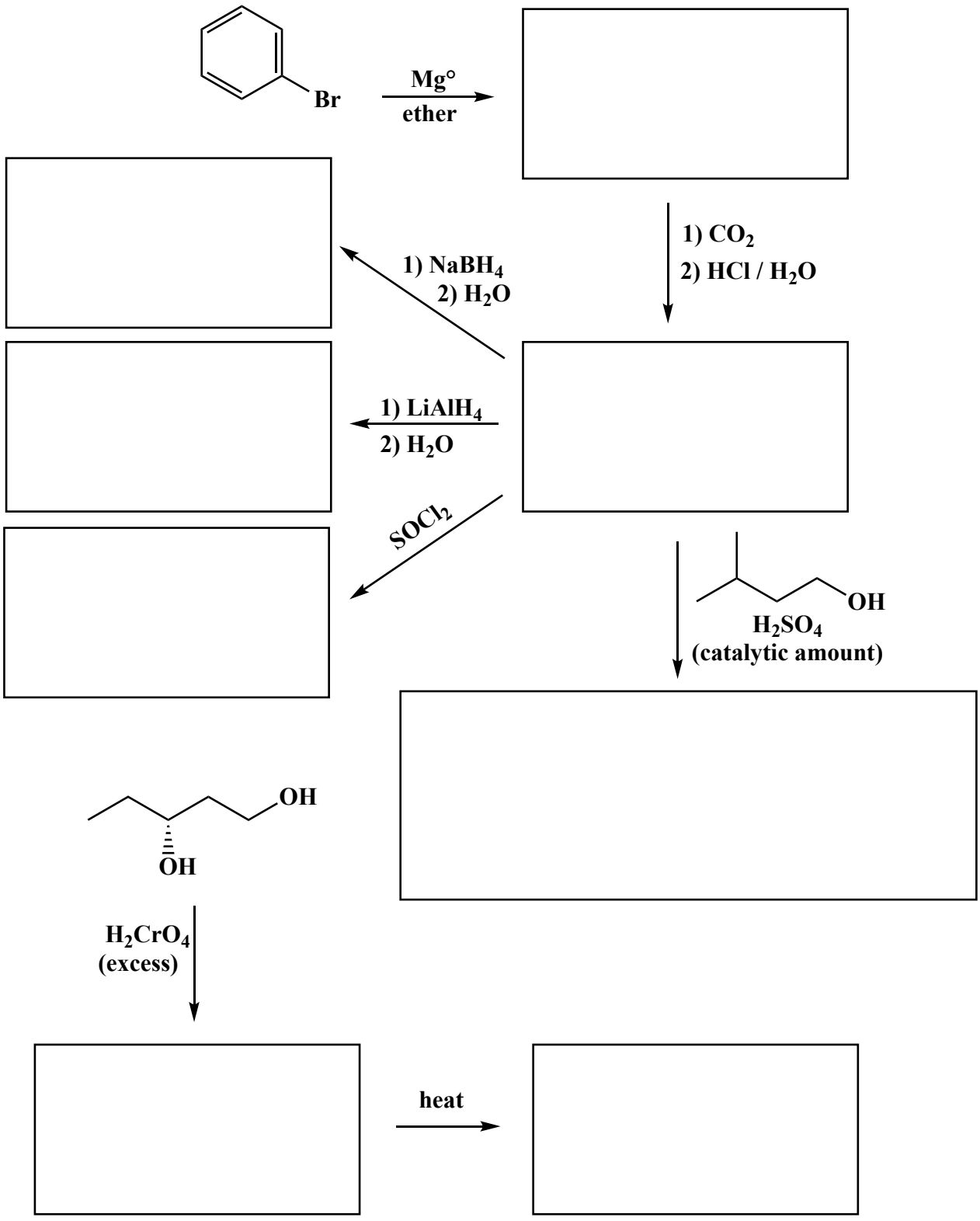
**2nd product**

**Final product**

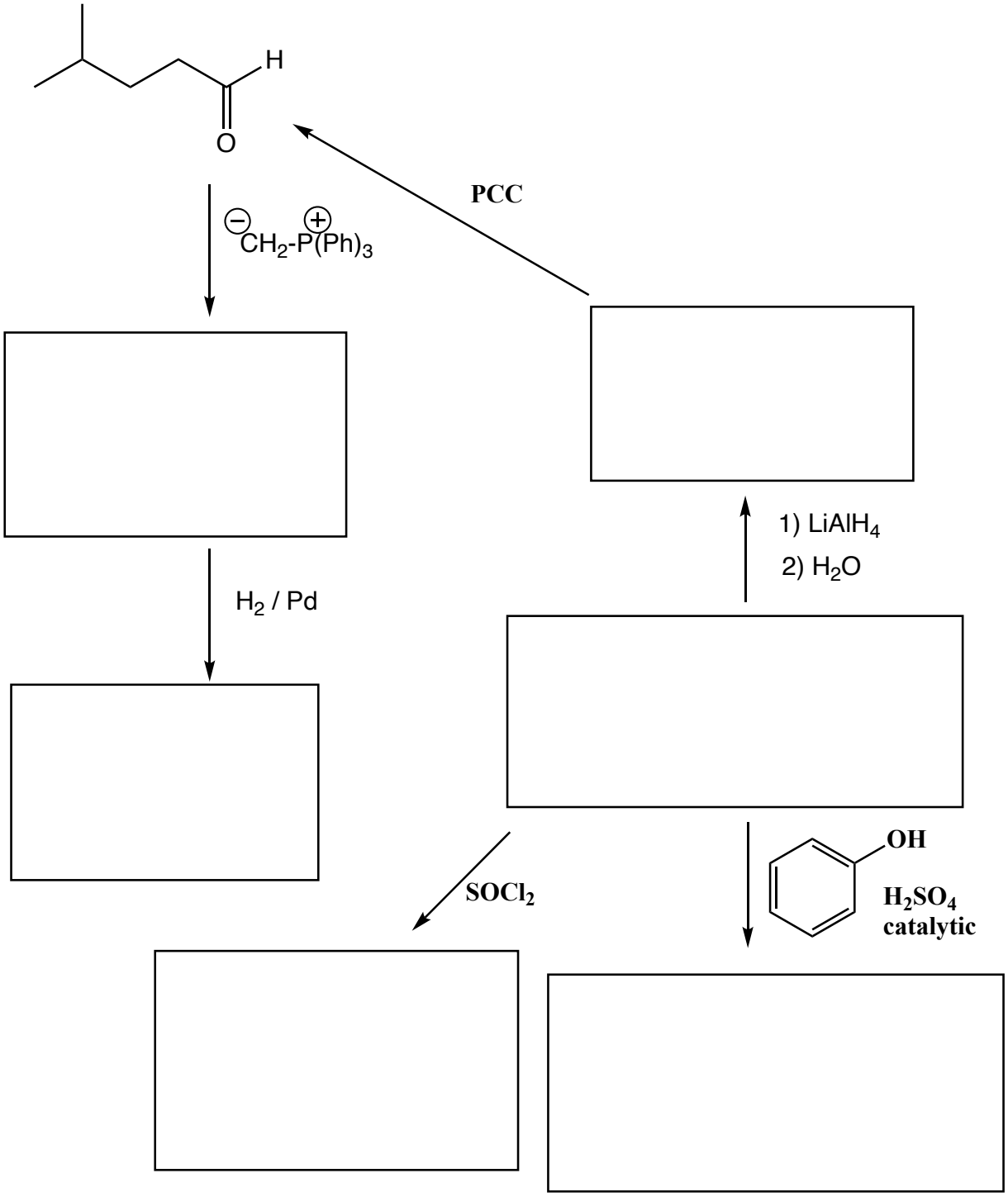
Complete the mechanism for the following acid-catalyzed lactone formations reaction. **Be sure to show arrows to indicate movement of <u>all</u> electrons, write <u>all</u> lone pairs, <u>all</u> formal charges, and <u>all</u> the products for each step.** Remember, I said <u>all</u> the products for each step. **IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE, MARK IT WITH AN ASTERISK AND LABEL AS RACEMIC IF APPROPRIATE. IF A CHIRAL CENTER IS CREATED IN THE PRODUCTS YOU NEED TO DRAW BOTH ENANTIONMERS, AND LABEL THE PRODUCT MIXTURE AS RACEMIC IF APPROPRIATE. In the boxes provided adjacent to the first two sets of arrows, write which of the four basic mechanistic elements are involved (i.e. "Make a bond", "Add a proton", etc.)** I realize these directions are complex, so please read them again to make sure you know what we want.



(3 or 5 pts each) Fill in the box with the product or products that are missing from the following chemical reaction equations. When a racemic mixture is formed, **you must write "racemic" under both structures EVEN THOUGH YOU DREW BOTH STRUCTURES**. For these draw all carbon containing products.

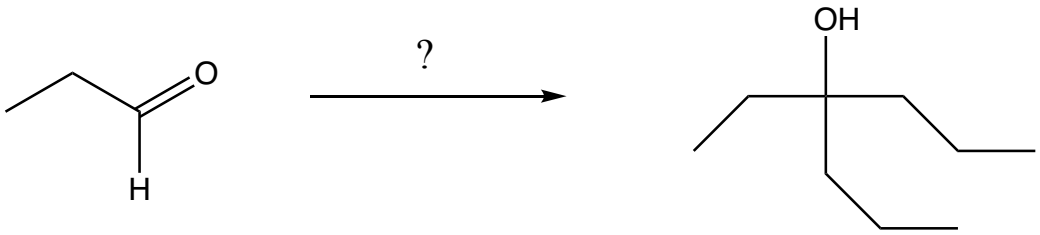


Fill in the box with the product or products that are missing from the following chemical reaction equations. When a racemic mixture is formed, **you must write "racemic" under both structures EVEN THOUGH YOU DREW BOTH STRUCTURES**.



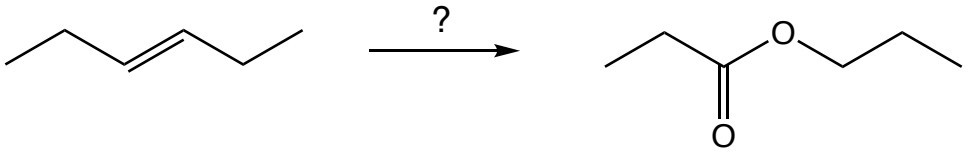
These are synthesis questions. You need to show how the starting material can be converted into the product(s) shown. You may use any reactions we have learned. Show all the reagents you need. Show each molecule synthesized along the way and be sure to pay attention to the regiochemistry and stereochemistry preferences for each reaction. If a racemic molecule is made along the way, you need to draw both enantiomers and label the mixture as "racemic".

(16 pts) **All of the carbon atoms of the products must come from the starting material for this one!**



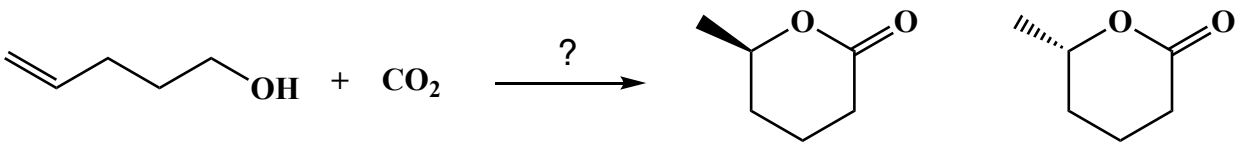
(13 pts) Using any reagents turn the starting material into the indicated product. All carbon atoms must come from the starting material. Draw all molecules synthesized along the way. When it doubt, draw the molecule! Hint: this should look familiar as a homework problem.

All of the carbons of the produce must come from the given starting material.



(13 pts) Using any reagents turn the starting material into the indicated product. All carbon atoms must come from the starting material. Draw all molecules synthesized along the way. When it doubt, draw the molecule! Hint: this should look familiar as a homework problem.

All of the carbons of the produce must come from the given starting material.




**Racemic**

(17 pts) Using any reagents turn the starting material into the indicated product. All carbon atoms must come from the starting material. Draw all molecules synthesized along the way. When it doubt, draw the molecule! Hint: this should look familiar as a homework problem.

All of the carbons of the produce must come from the given starting material.