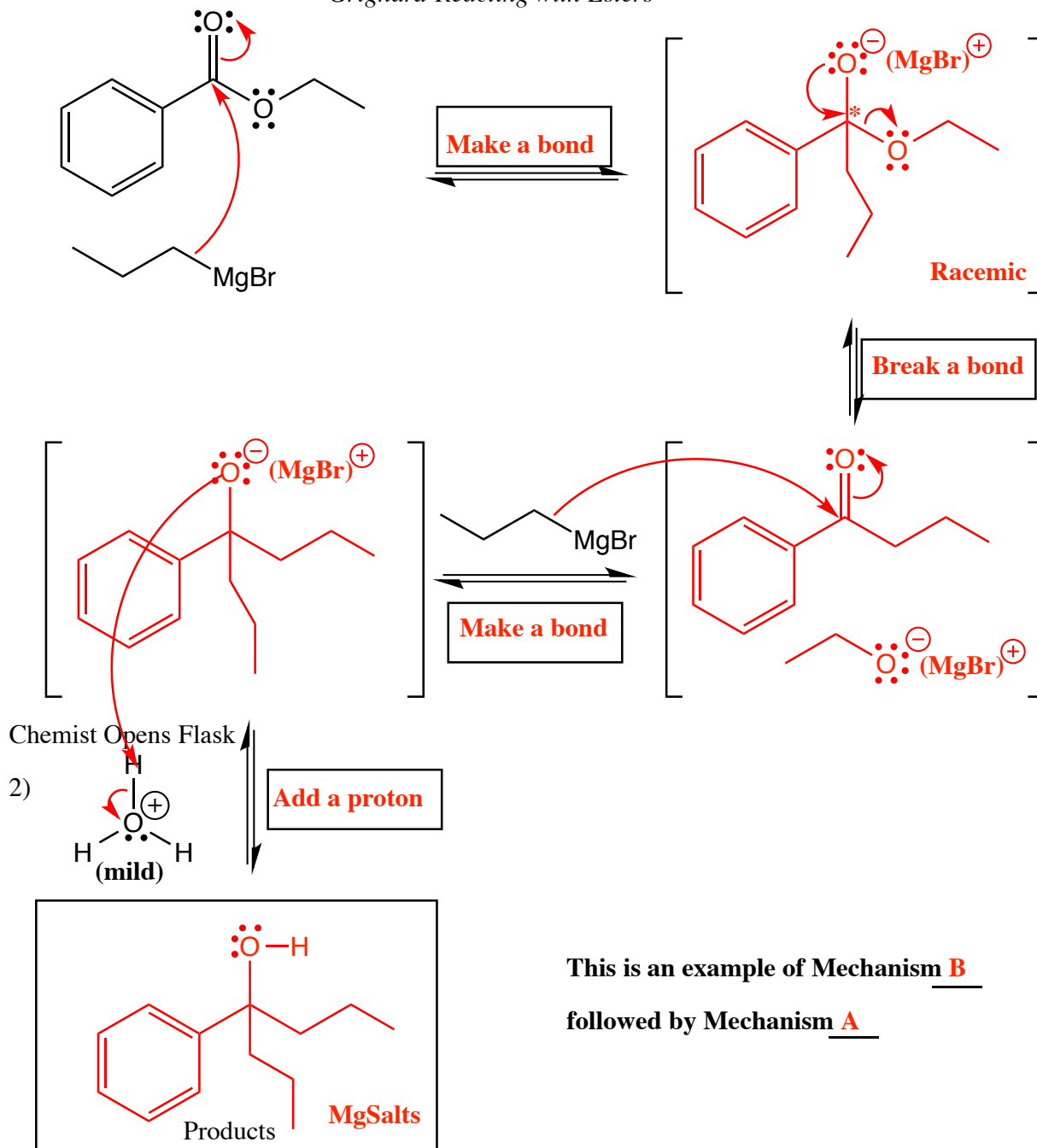


**Chemistry 320N**  
**Dr. Brent Iverson**  
**Practice Homework**  
**March 4, 2024**

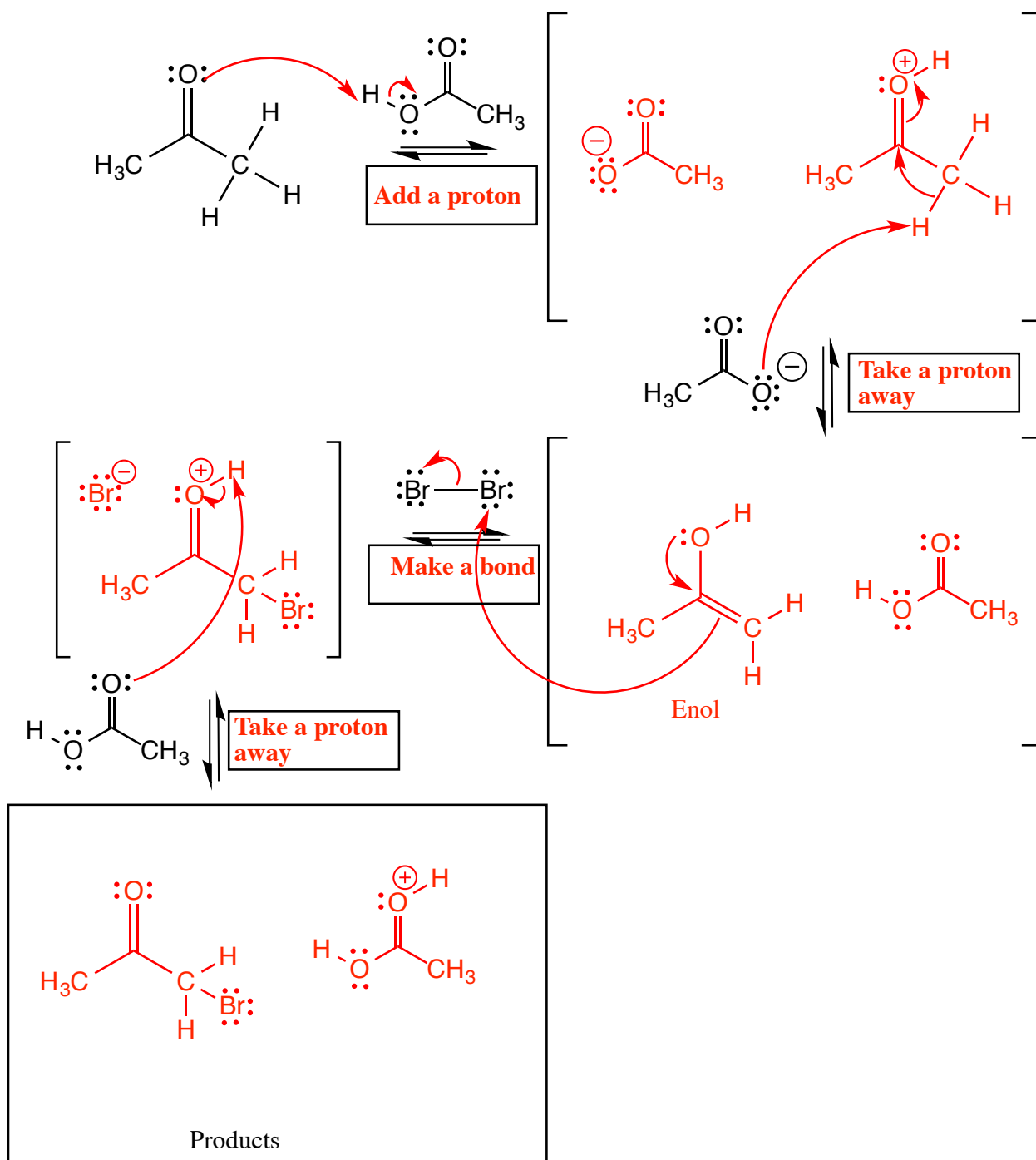
Complete the mechanism for the following reaction. **Be sure to show arrows to indicate movement of all electrons, write all lone pairs, all formal charges, and all the products for each step.** Remember, I said all the products for each step. **IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR PRODUCT, MARK IT WITH AN ASTERISK AS RACEMIC IF RELEVANT.** In the box provided adjacent to each arrow, write the kind of mechanistic element you used ("make a bond", "add a proton" etc.).

## Grignard Reacting with Esters

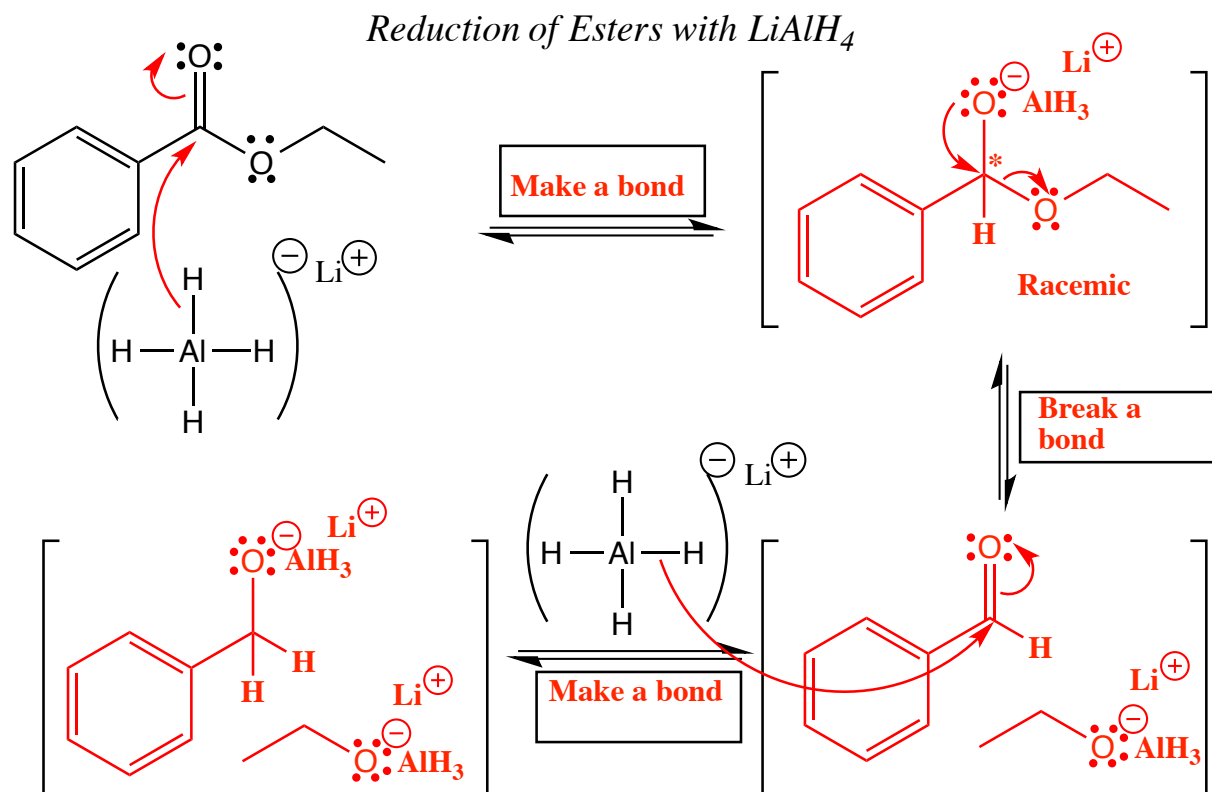


Complete the mechanism for the following reaction. **Be sure to show arrows to indicate movement of all electrons, write all lone pairs, all formal charges, and all the products for each step.** Remember, I said **all** the products for each step. **IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR PRODUCT, MARK IT WITH AN ASTERISK AS RACEMIC IF RELEVANT.** In the box provided adjacent to each arrow, write the kind of mechanistic element you used ("make a bond", "add a proton" etc.).

*$\alpha$ -Halogenation of an Aldehyde or Ketone Catalyzed by Acid*

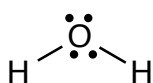


Complete the mechanism for the following reaction. **Be sure to show arrows to indicate movement of all electrons, write all lone pairs, all formal charges, and all the products for each step.** Remember, I said **all** the products for each step. **IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR PRODUCT, MARK IT WITH AN ASTERISK AS RACEMIC IF RELEVANT.** In the box provided adjacent to each arrow, write the kind of mechanistic element you used ("make a bond", "add a proton" etc.).



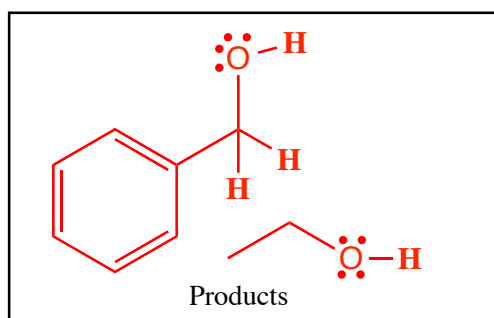
Chemist Opens Flask

2)



Add a proton

This is an example of Mechanism B  
followed by Mechanism A

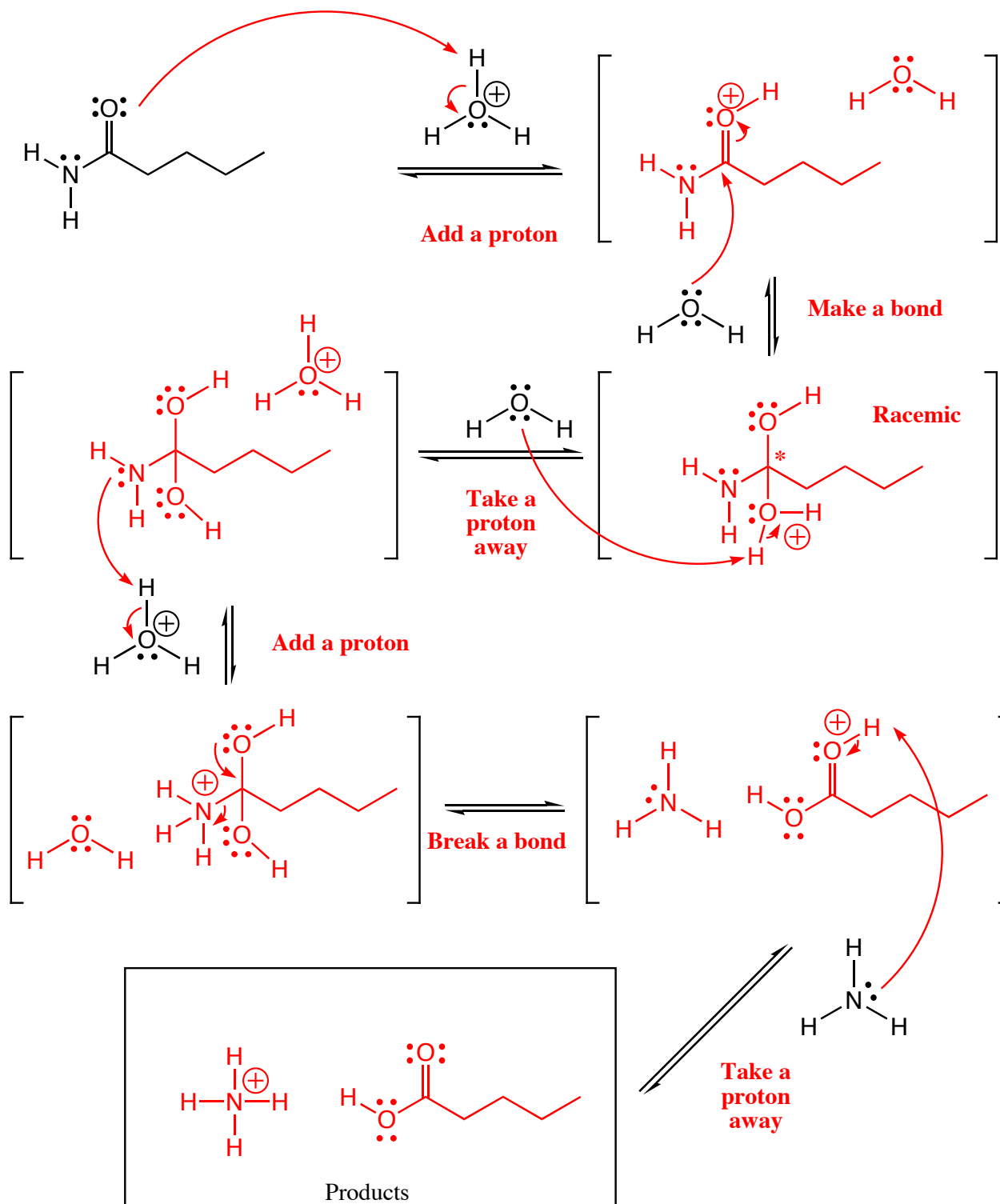


I choose not to write arrows on this last step so you do not have to either. You are also not responsible for what happens to the  $\text{AlH}_3$  species.

Signature \_\_\_\_\_

Pg 5 \_\_\_\_\_ (35)

12. (35 pts) Complete the mechanism for the following amide hydrolysis reaction. **Be sure to show arrows to indicate movement of all electrons, write all lone pairs, all formal charges, and all the products for each step.** Remember, I said all the products for each step. **IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR PRODUCT, MARK IT WITH AN ASTERISK AND LABEL IT AS RACEMIC IF APPROPRIATE.** In the boxes provided, write which of the 4 mechanistic elements describes each step (make a bond, break a bond, etc.).

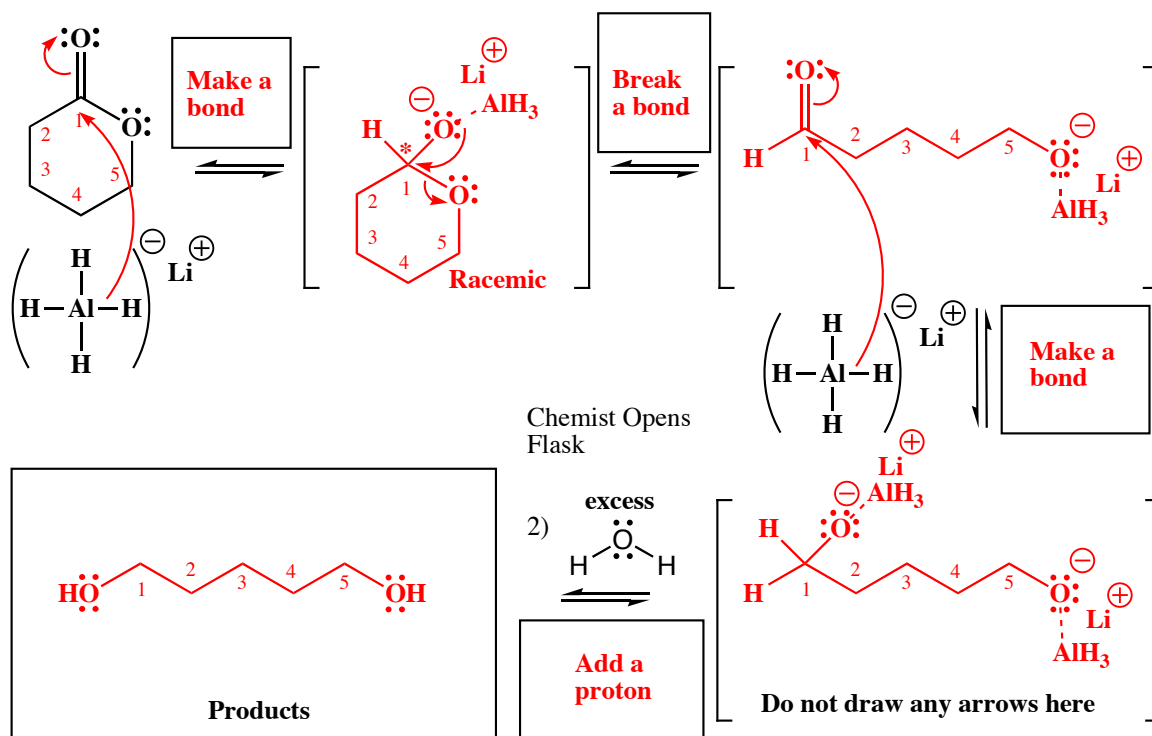
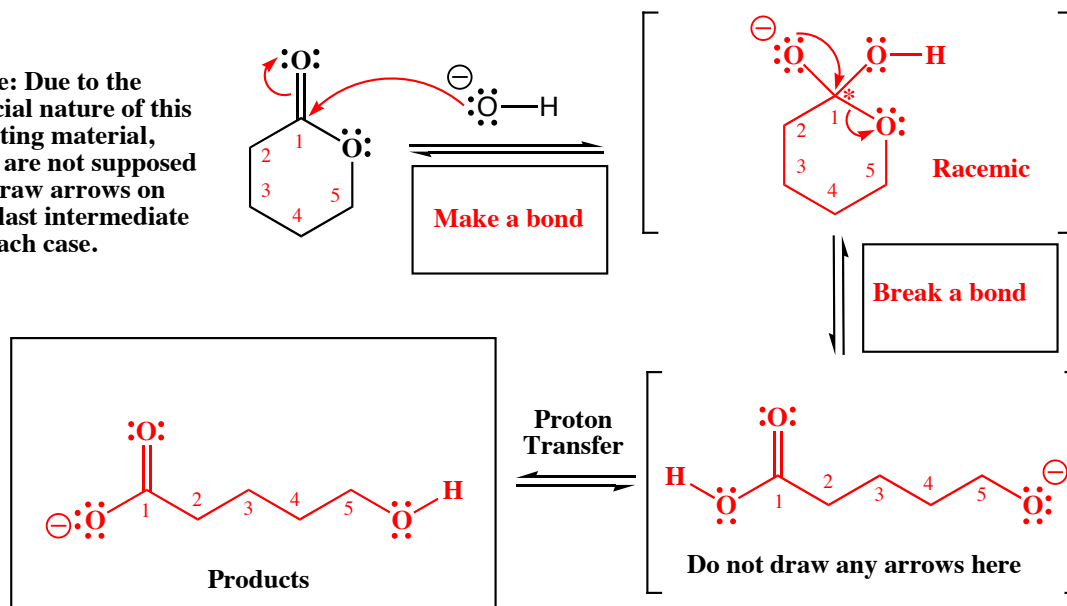


Signature \_\_\_\_\_

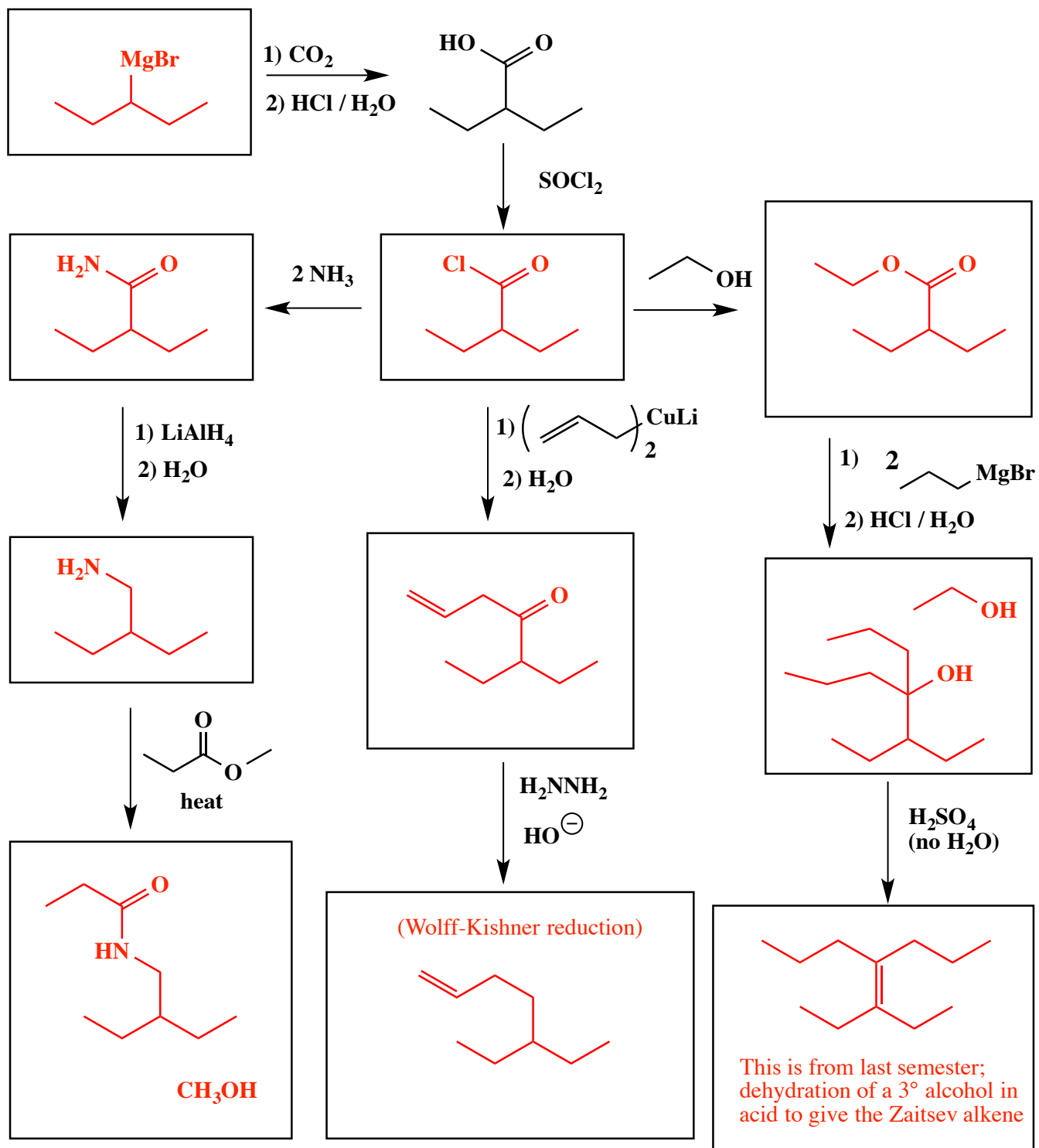
Pg 6 \_\_\_\_\_ (30)

13. (30 pts) Complete the mechanisms for the following two lactone reactions. **Be sure to show arrows to indicate movement of all electrons, write all lone pairs, all formal charges, and all the products for each step.** Remember, I said all the products for each step. **IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR PRODUCT, MARK IT WITH AN ASTERISK AND LABEL IT AS RACEMIC IF APPROPRIATE.** In the boxes provided, write which of the 4 mechanistic elements describes each step (make a bond, break a bond, etc.).

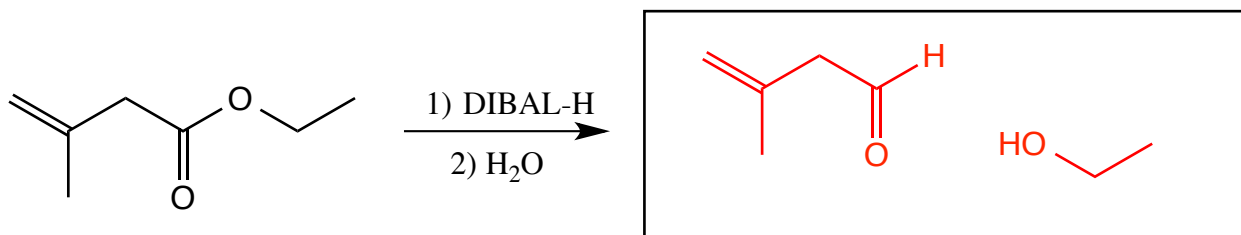
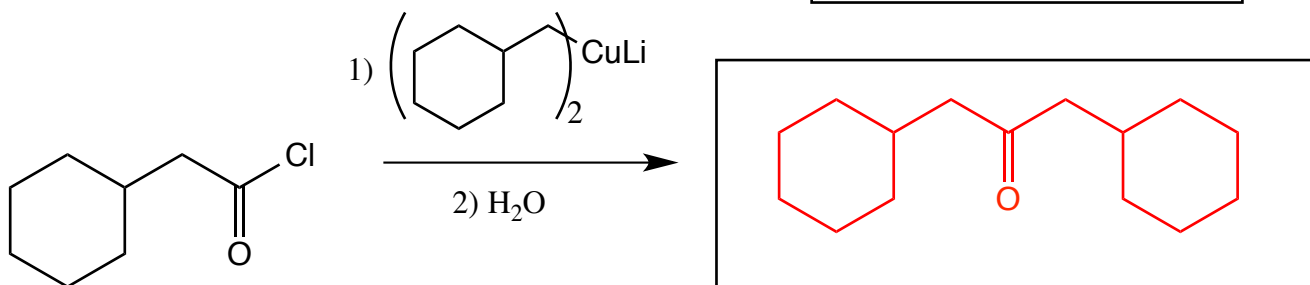
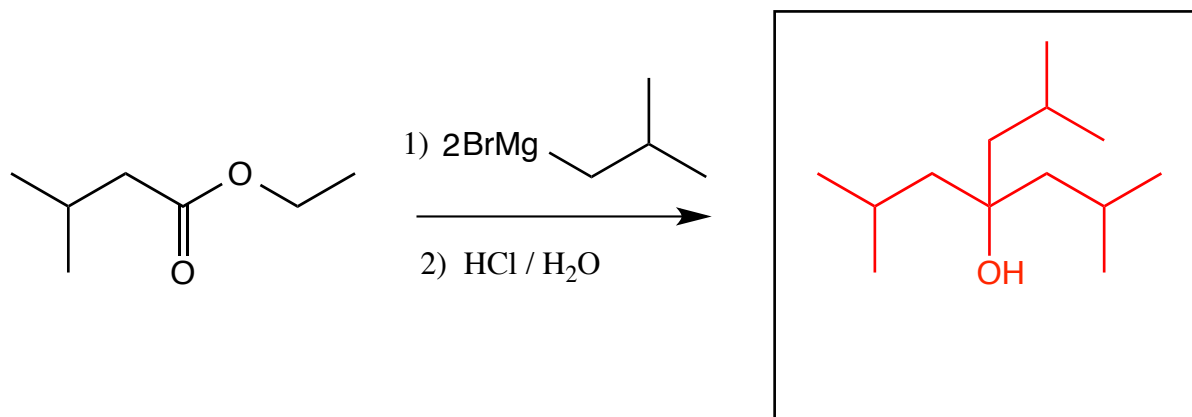
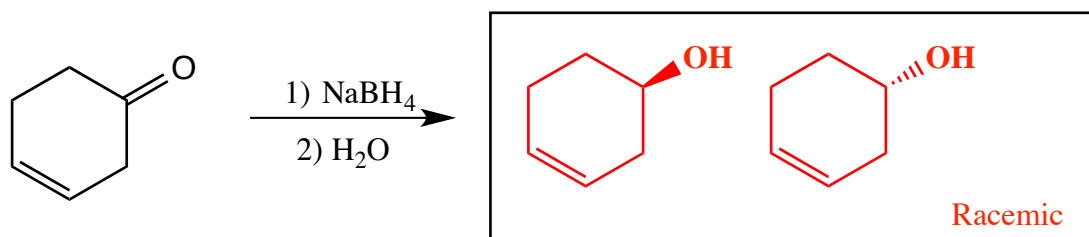
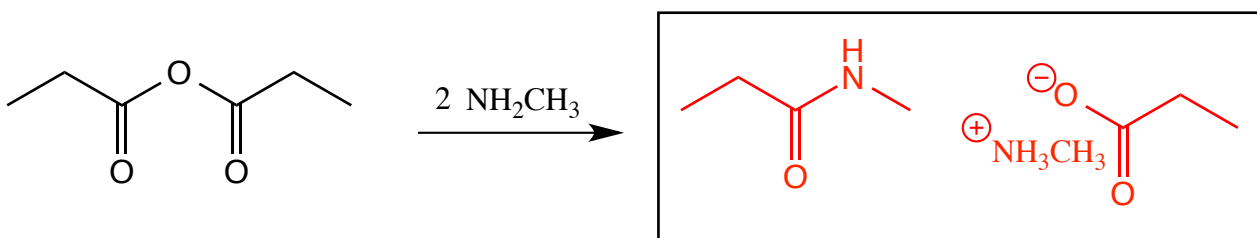
Note: Due to the special nature of this starting material, you are not supposed to draw arrows on the last intermediate in each case.



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**.



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.**

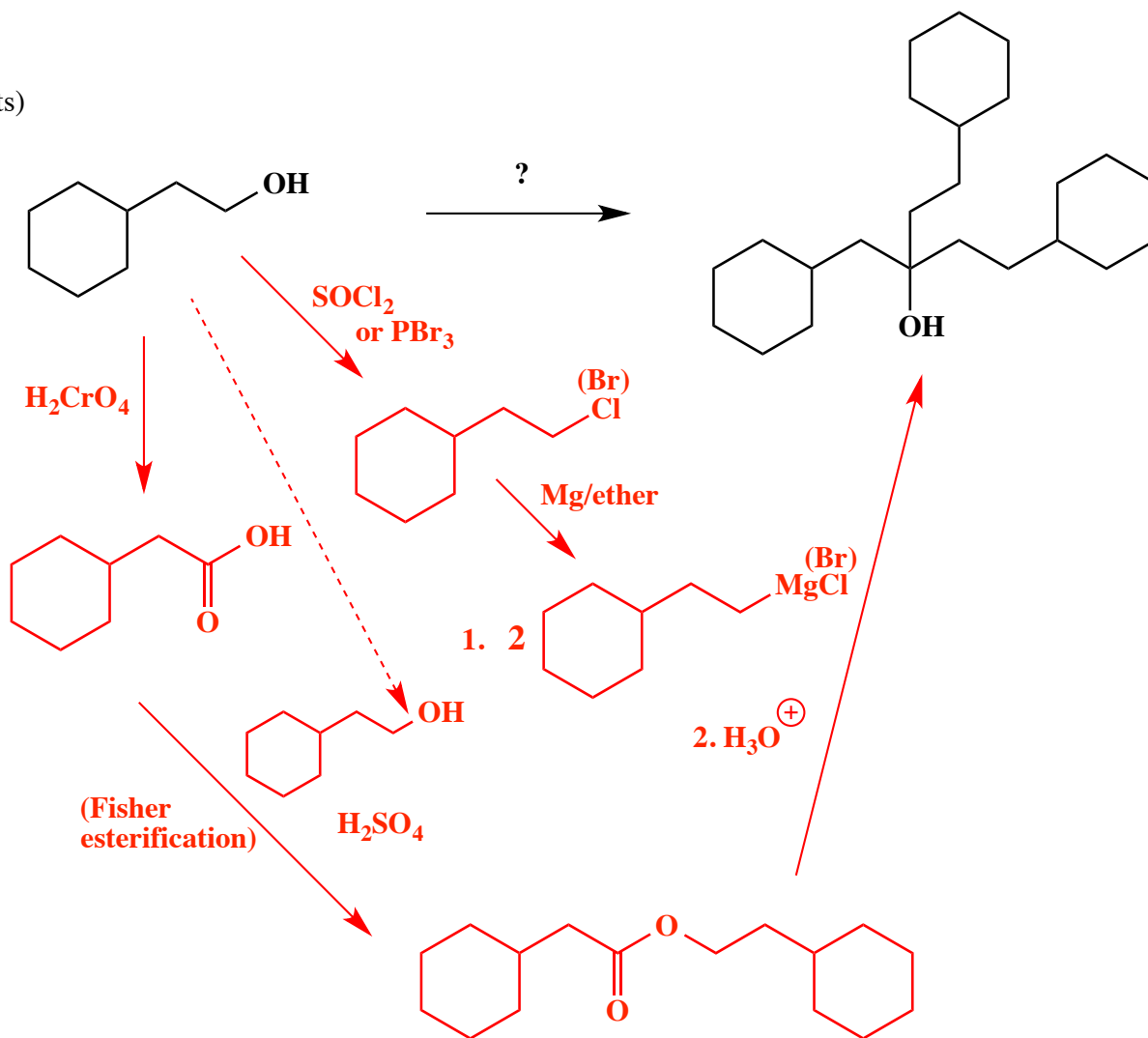




Using any reagents turn the starting material into the indicated product. All carbon atoms must come from the starting material. Draw all molecules synthesized along the way. When in doubt, draw the molecule!  
Hint: this should look familiar as a homework problem.

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

(13 pts)



Signature \_\_\_\_\_

Pg 11 \_\_\_\_\_(13)

17. Using any reagents turn the starting material into the indicated product. All carbon atoms in the product must come from the starting material. Draw all molecules synthesized along the way. When in doubt, draw the molecule! Label all chiral centers with an asterisk (\*) and make sure to right "Racemic" where appropriate. Hint: this should look familiar as a homework problem.

Remember, all of the carbons of the product must come from the given starting material.

(13 pts)

B)

