NAME (Print): \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

Chemistry 320M/328M Dr. Brent Iverson 7th Homework October 25, 2022

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

1. For the following reactions, fill in the boxes with the predominant product or products. You must indicate stereochemistry with wedges and dashes. If a racemic mixture is created, you must write "racemic" under the structures.



2. (3 or 5 pts each) For the following reactions, fill in the boxes with the appropriate structures. I know this is pretty hard, but I think it will be a great way to study your alkene and alkyne reactions. Work together if that helps. If a racemic mixture is formed, you must draw both enantiomers and write "racemic"



3. For the following, fill in the boxes with the product or products that are appropriate. You must indicate stereochemistry with wedges and dashes. If a racemic mixture is created, you must write "racemic" under the structures.



4. Definitions: For the following, please write the definitions of these important organic chemistry terms.

## **Racemic Mixture**

Nucleophile

Electrophile

Enantiomer

Diastereomer

**Meso Compound** 

## The 2018 class overall had difficulty with the mechanism pages of the second midterm. For that reason, I want each of you to work through these mechanisms one more time.

13. (14 pts) Complete the following mechanism for the first step of the hydroboration reaction. Use arrows to indicate the movement of all electrons and be sure to show all electron pairs and formal charges. For this one, we are asking you to draw a transition state. Used dotted lines to indicated any bonds that are being made or broken in the transition state. Note that you should only draw arrows on the structure to the left, not the transition state. YOU ONLY NEED TO DRAW ONE STEREOISOMER OF A CHIRAL TRANSITION STATE OR PRODUCT (using wedges and dashes as appropriate) IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR PRODUCT, MARK IT WITH AN ASTERISK AND LABEL THE MOLECULE AS "RACEMIC" IF APPROPRIATE. Be sure to notice the questions at the end.



14. (14 pts) Complete the mechanism for the following alkene HX addition 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. YOU ONLY NEED TO DRAW ONE STEREOISOMER OF A CHIRAL INTERMEDIATE OR PRODUCT (using wedges and dashes as appropriate) IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR PRODUCT, MARK IT WITH AN ASTERISK AND LABEL THE MOLECULE 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.). Be sure to notice the question at the end.



15. (29 pts) Complete the mechanism for the following acid-catalyzed alkene hydration reaction with a rearrangement. For this mechanism we will ONLY consider the rearranged product. 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. YOU ONLY NEED TO DRAW ONE STEREOISOMER OF A CHIRAL INTERMEDIATE OR PRODUCT (using wedges and dashes as appropriate) IF A NEW CHIRAL CENTER IS CREATED IN AN INTERMEDIATE OR PRODUCT, MARK IT WITH AN ASTERISK AND LABEL THE MOLECULE AS "RACEMIC" IF APPROPRIATE. In the three boxes provided, write which of the 4 most common mechanistic elements describes each step (make a bond, break a bond, etc.). Be sure to notice the question at the end.

