

Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

The gradescope portion of your final exam has 29 questions and is worth a total of 170 points. Good Luck!

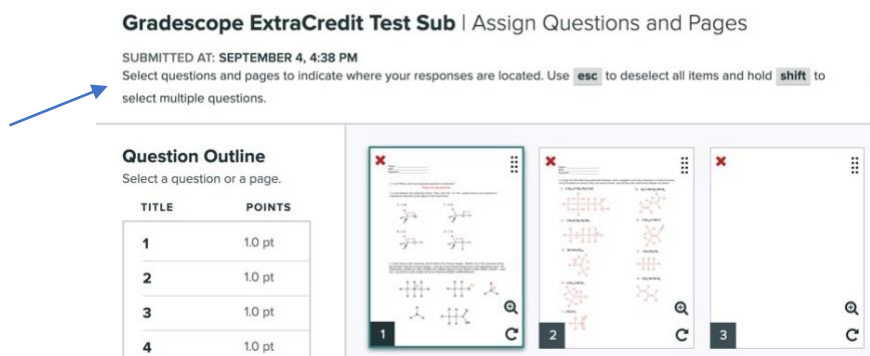
For the Gradescope portion of both weekly homework and midterm exams, you will be required to write answers to all questions, either on paper or using an electronic tablet (e.g. an iPad) and upload them to the appropriate grade scope assignment.

This is the Gradescope portion of your Final Exam. For this assignment, solve the problems on a separate sheet, and then only upload clearly labeled answers. Failure to clearly indicate the correct answer, providing multiple answers, mislabeling of problems, uploading answers in horizontal orientation, or not assigning problems to pages will result in the loss of points, so please, do this correctly!

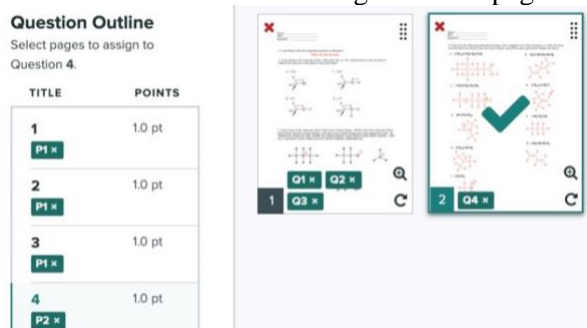
You must include your name, UT EID, and signature on each page you upload.

After answering all questions on a blank sheet and properly numbering answers, upload your work under the appropriate assignment on Gradescope.

After you upload, **you must assign where each question is on the page(s) you uploaded** so we can grade it. Note that assigning questions to specific pages in your upload does not affect your submission time: the assignment is turned in once you have uploaded the assignment and reached the Gradescope webpage below. This means you have no reason to not spend a minute or so and tell us where answers are within your submission pages. *Failure to do this will result in losing points on the assignment.* Note the blue arrow pointing out instructions.



In the picture below, you can see that questions 1-3 were assigned to page 1, and question 4 was assigned to page 2. You are required to assign all question numbers in the 'Question Outline' to the pages you uploaded, so that we always grade what you want us to grade for each question. If a question is answered on multiple pages, assign that question to all relevant pages! If the images are not rotated to be upright in your submission, please rotate them using the arrow shown on the bottom right of each page.



Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

An example showing what a Gradescope submission could look like is below:

- Name
- UT EID
- Signature
- Properly numbered answers on a blank page, no need to copy the question
- Uploaded in vertical direction

Name: Student McStudent pants

UT EID: abc123

Signature: Student McStudent pants

Assignment: Weekly HW #1, Gradescope Portion

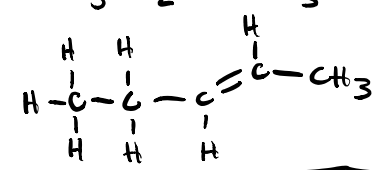
1. Where are the electrons?

~~2A. 13~~ 2A. 13 ← If you make a mistake, clearly erase/scribble it out and note what you want to be graded.

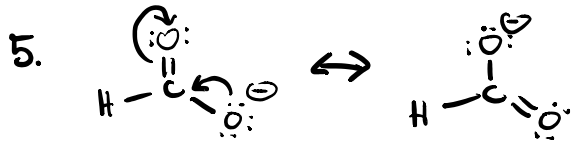
2B. 4

3A. ↑ 3B. ↙ 3C. No dipole

4A. $\text{CH}_3\text{CH}_2\text{CHCHCH}_3$



Feel free to box answers/ add lines to clearly separate your answers

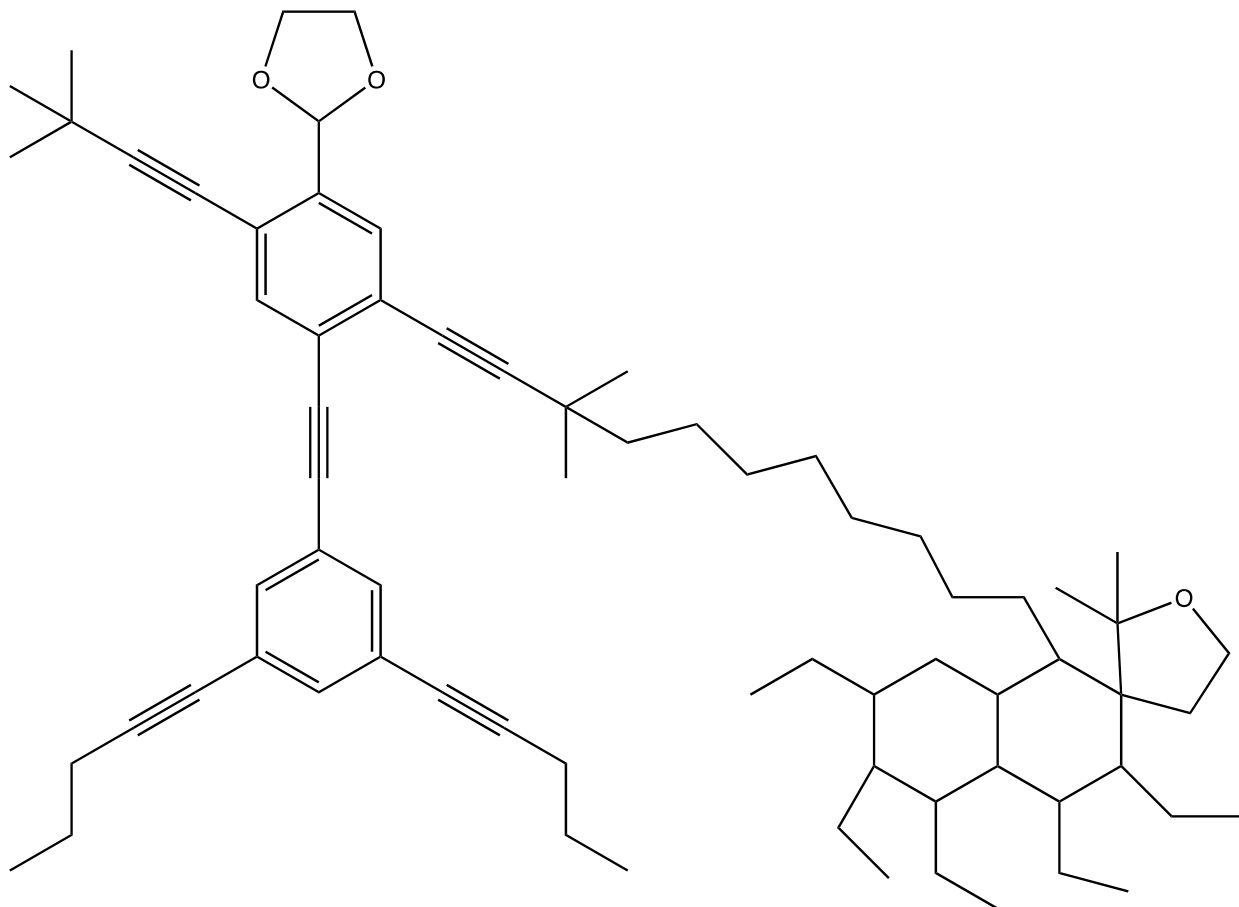
5. 

6A. $\pi_{\text{C}_{2p}-\text{C}_{2p}}$

6B. $\sigma_{\text{C}_{\text{sp}^3}-\text{H}_{1s}}$

Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

Self-Portrait of Dr. Iverson walking his dog Miles.



Official IUPAC name:

1'-(10-(2-((3,5-di(pent-1-yn-1-yl)phenyl)ethynyl)-4-(3,3-dimethylbut-1-yn-1-yl)-5-(1,3-dioxolan-2-yl)phenyl)-8,8-dimethyldec-9-yn-1-yl)-3',4',5',6',7'-pentaethyl-2,2-dimethyl-2,3',4,4',4a',5',6',7',8',8a'-decahydro-1'H-spiro[furan-3,2'-naphthalen]-1-ium-5-ide

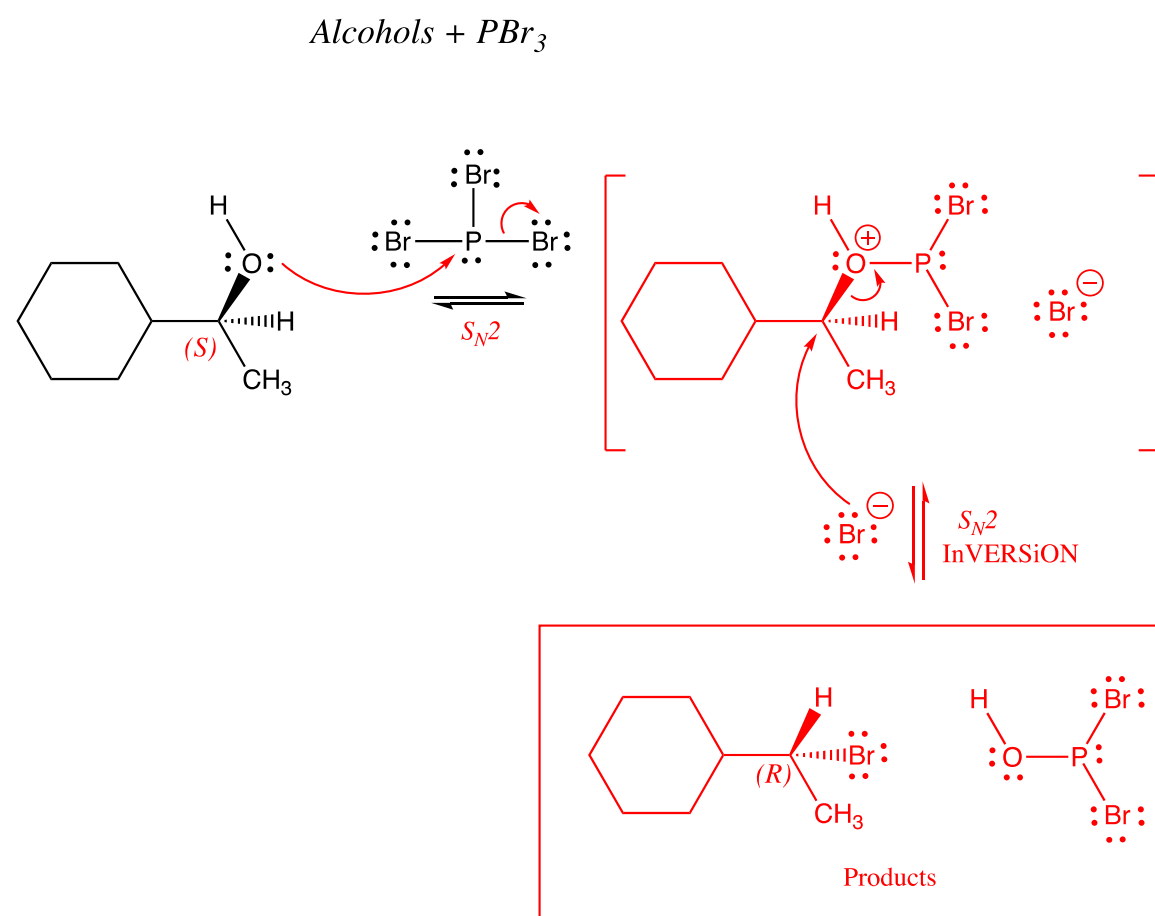
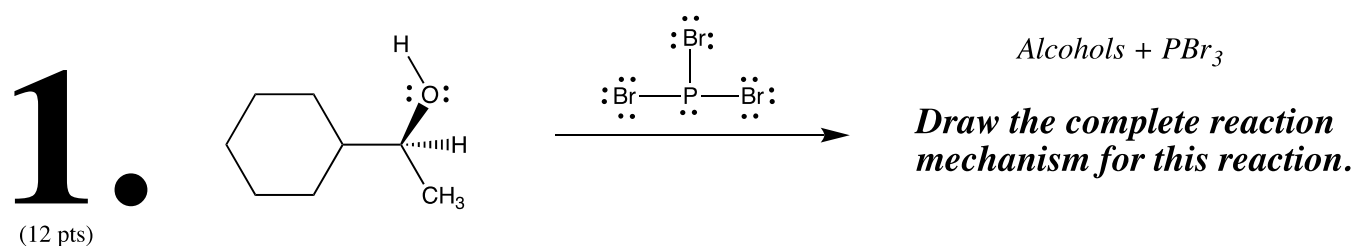
This is not a question, and was just put here to make you smile.

Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

The Final Exam: Gradescope Portion is worth a total of 170 points.

Questions 1-3 are mechanism questions worth a total of 50 points.

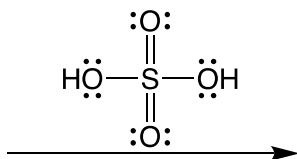
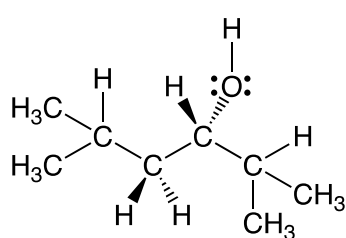
1 – 3. Complete the following mechanisms. Be sure to show arrows to indicate movement of all electrons, draw all electrons, all formal charges, and all the products for each step. Remember, I said all the products for each step. **YOU ONLY NEED TO DRAW ONE STEREOISOMER OF A CHIRAL INTERMEDIATE OR PRODUCT (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.**



Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

2.

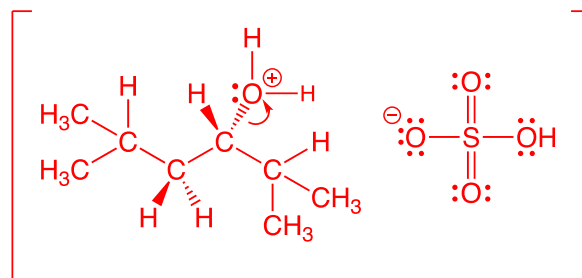
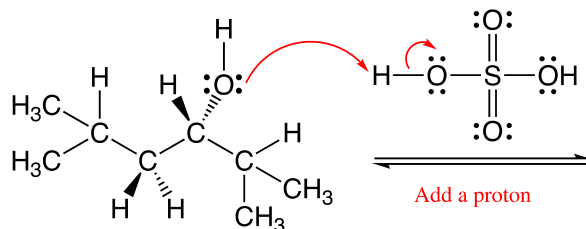
(17 pts)



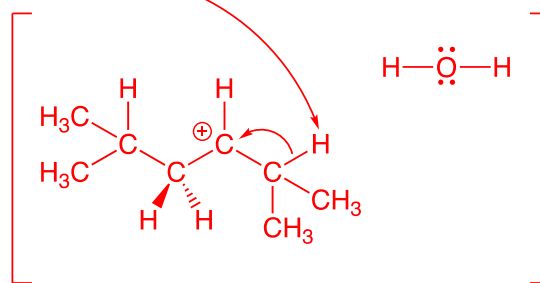
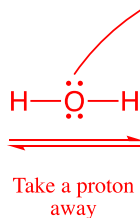
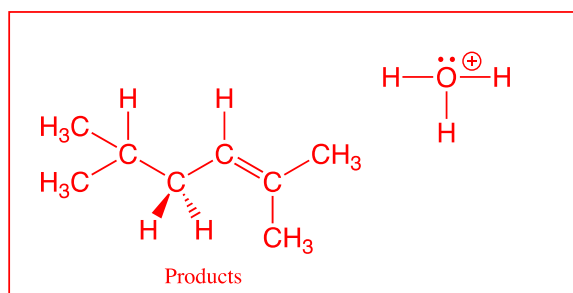
Alcohol Dehydration

Draw the complete reaction mechanism for this reaction.

Alcohol Dehydration



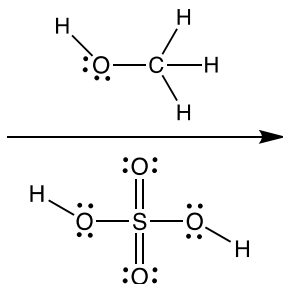
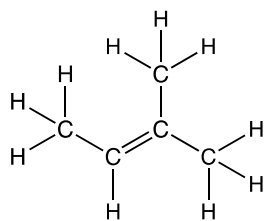
Break a bond



Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

3.

(21 pts)

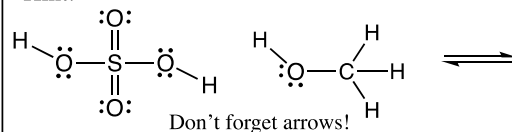


Acid-catalyzed Reaction of an Alcohol with an Alkene

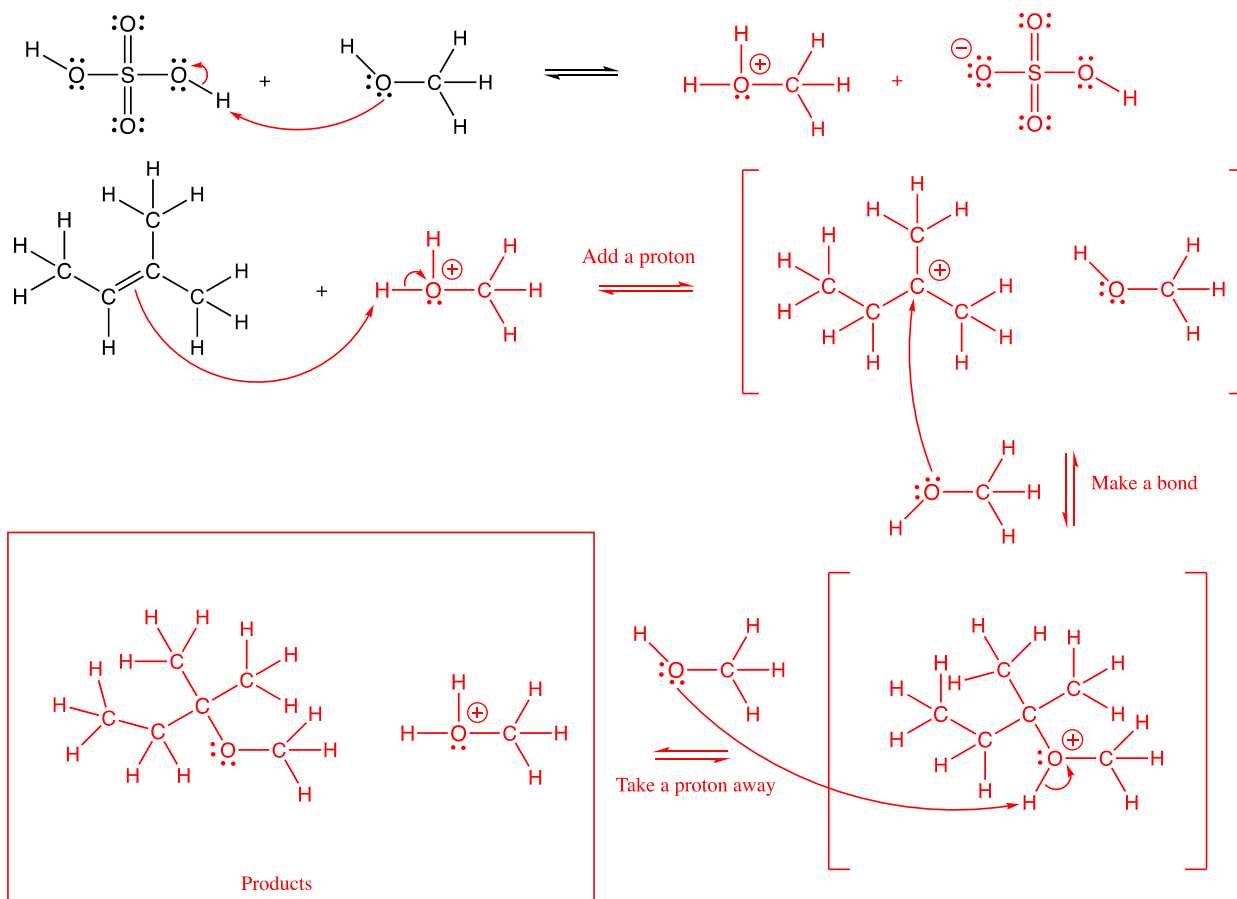
Draw the complete reaction mechanism for this reaction.

Don't forget to include the acid-base reaction between methanol and sulfuric acid first!

Hint:



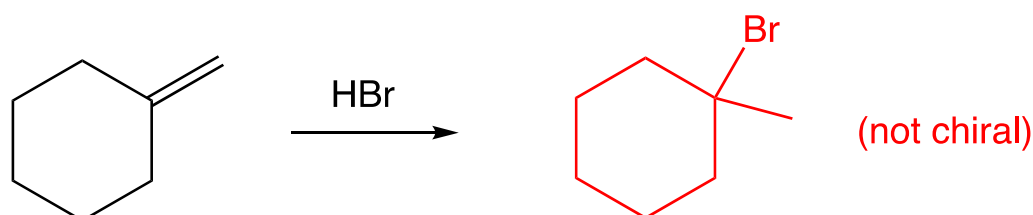
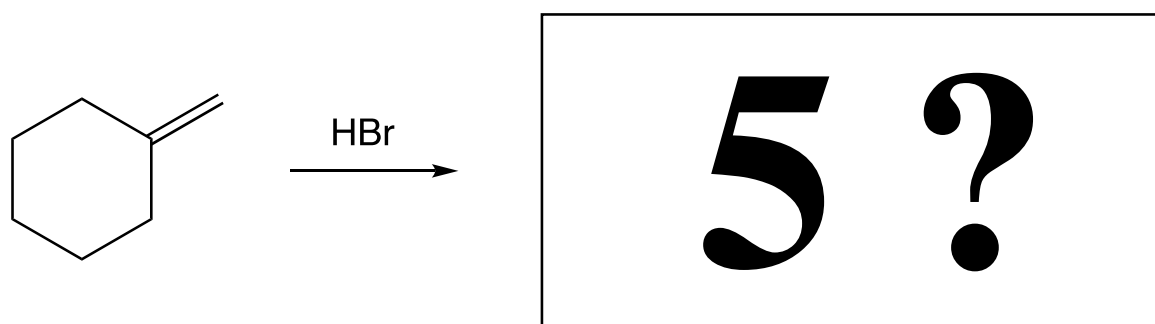
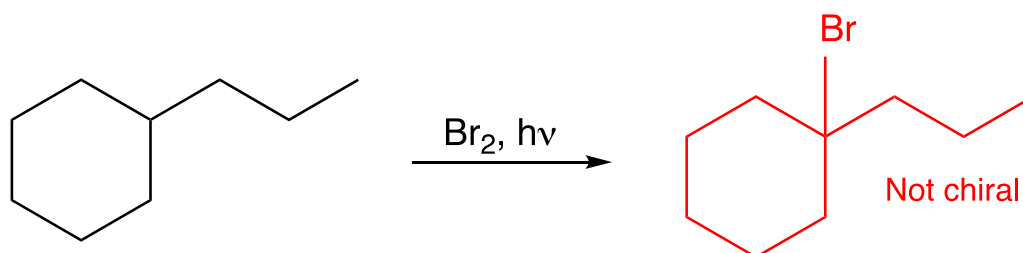
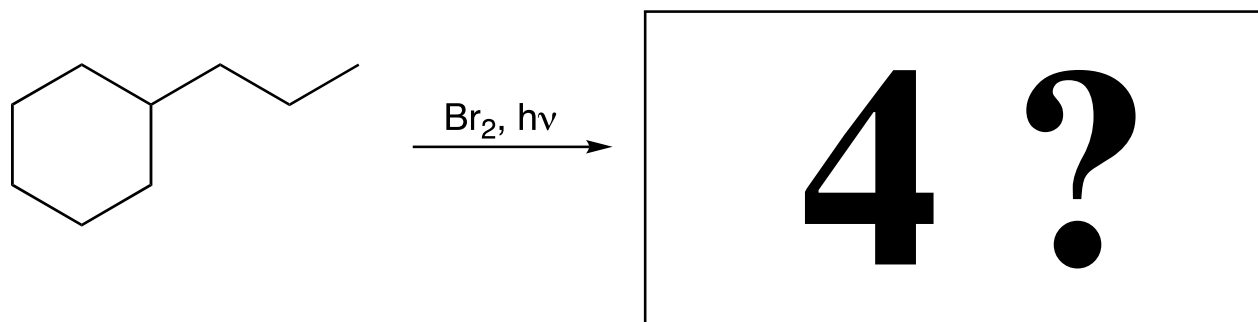
Acid-catalyzed Reaction of an Alcohol with an Alkene



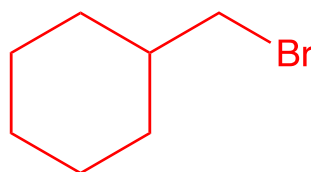
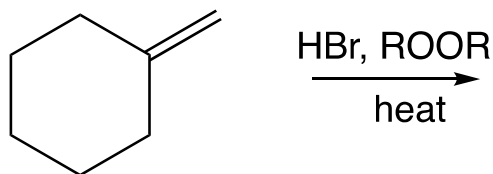
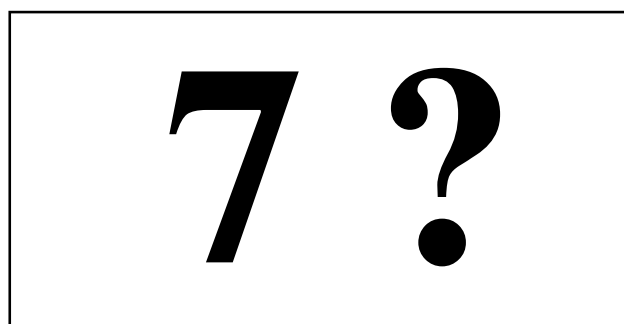
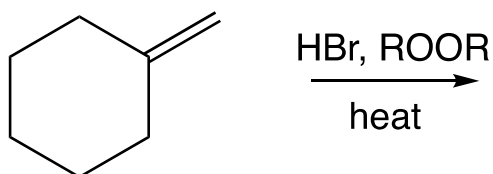
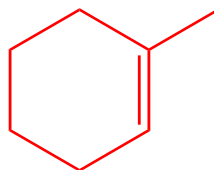
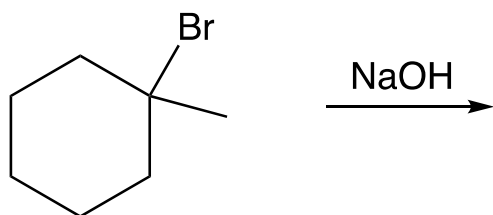
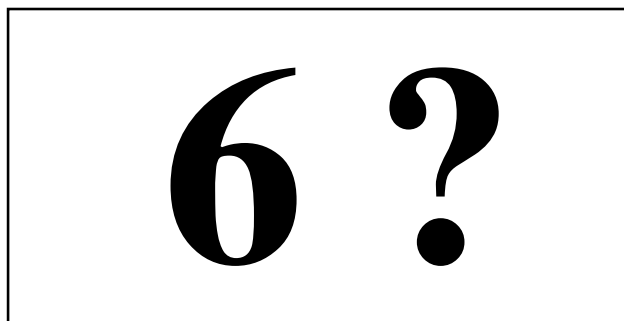
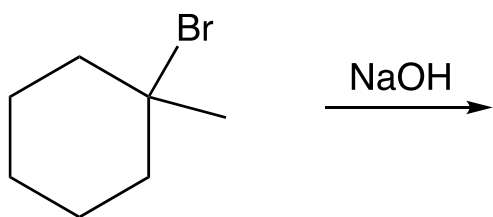
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

Questions 4 – 23 are 'box questions' worth 66 points total.

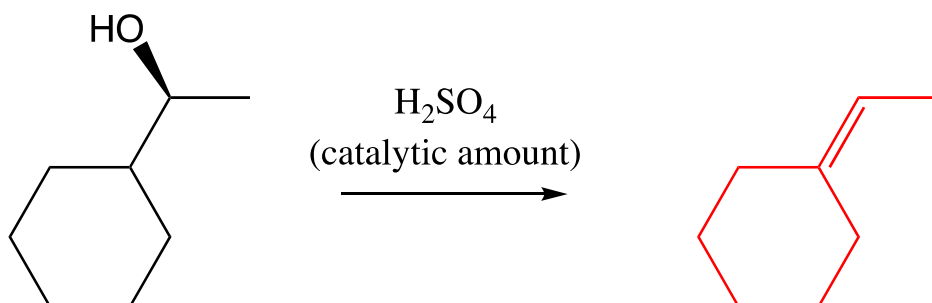
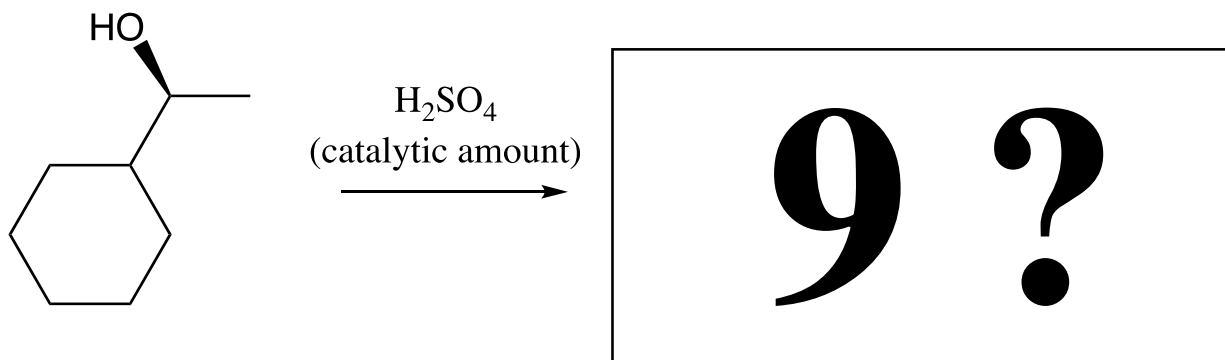
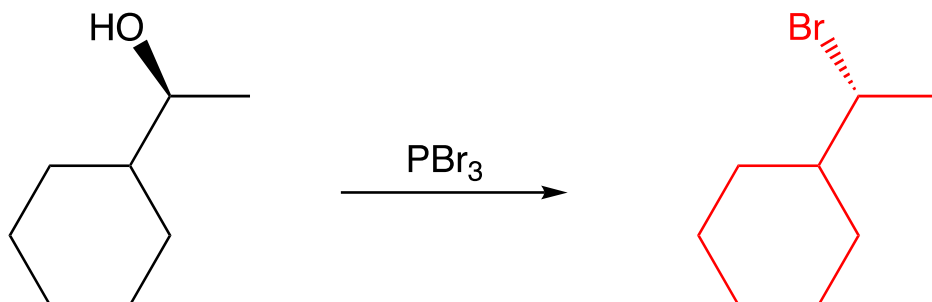
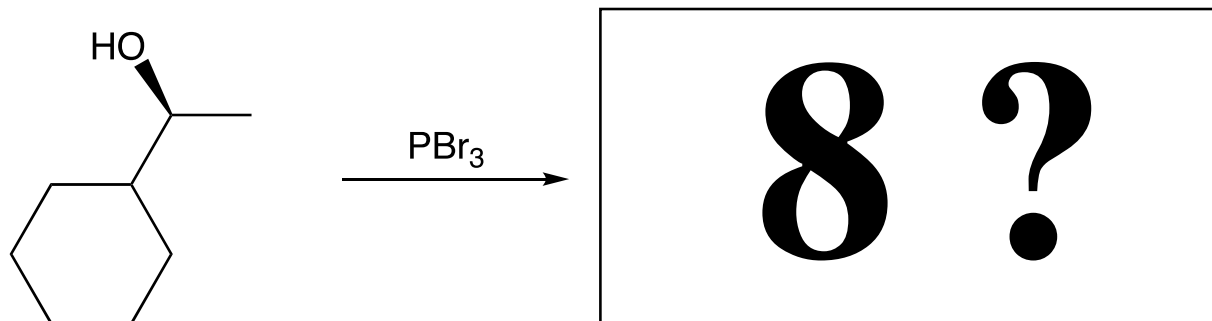
For the following reactions, fill in the box with the predominant **starting materials**, **product(s)**, or **reagent(s)** necessary to complete the following reactions. **You must indicate stereochemistry with wedges and dashes. You must draw all stereoisomers** produced as predominant products **and write "racemic"** under the structures when appropriate.



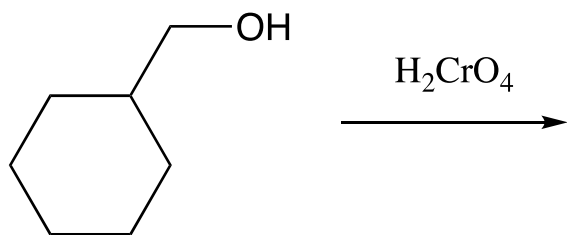
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



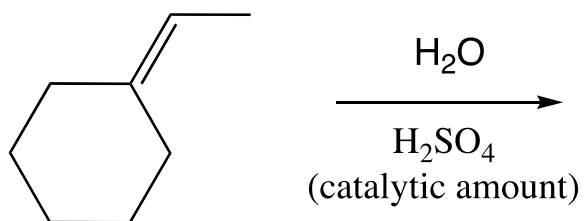
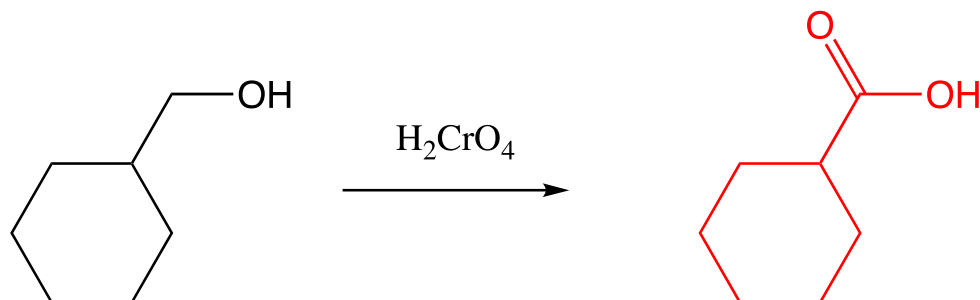
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



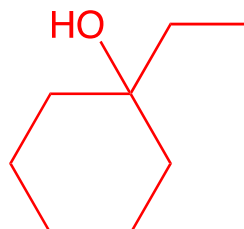
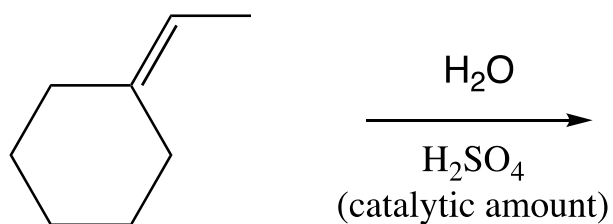
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



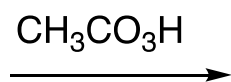
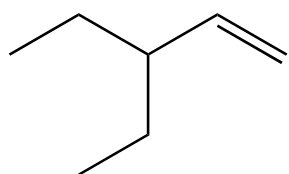
10 ?



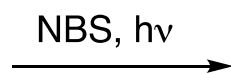
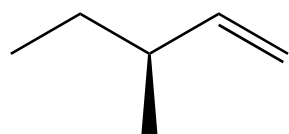
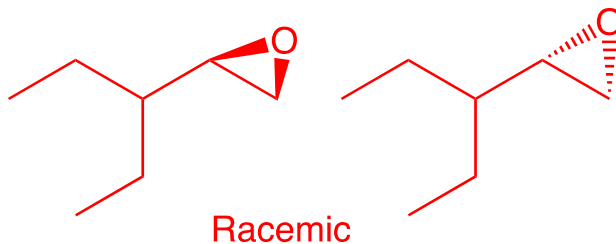
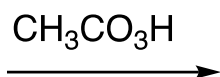
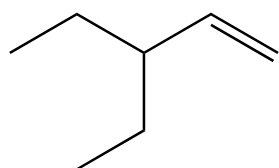
11 ?



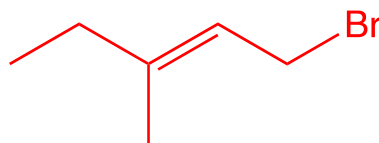
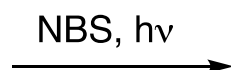
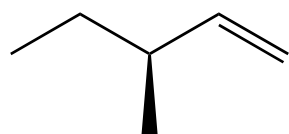
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



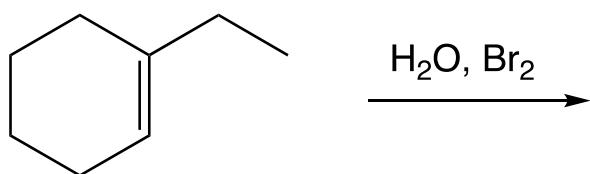
12 ?



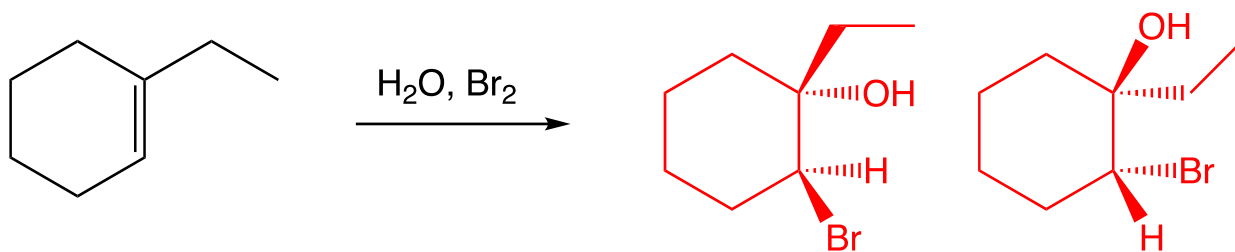
13 ?



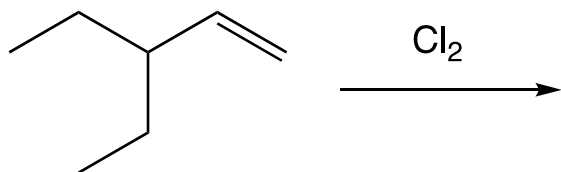
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



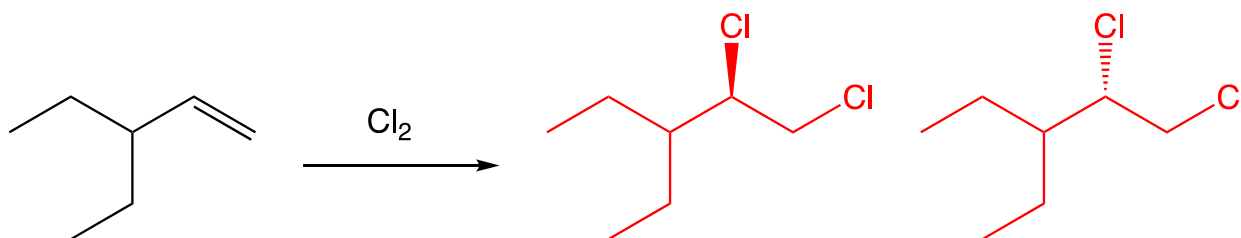
14 ?



Racemic

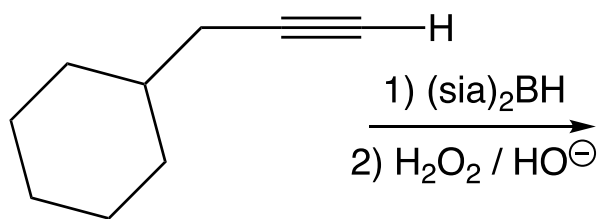


15 ?

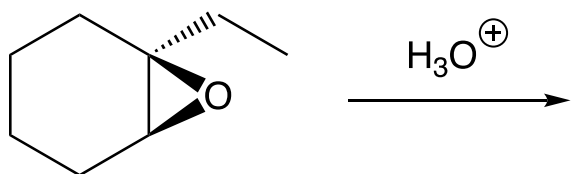
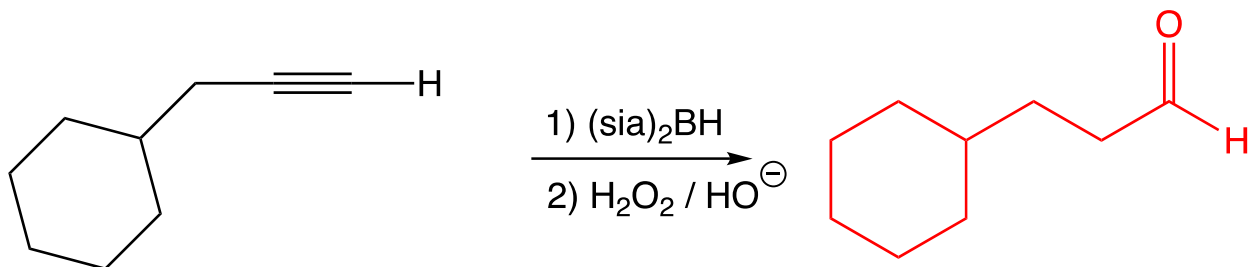


Racemic

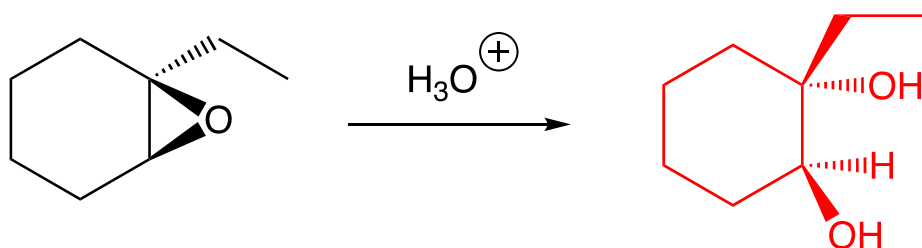
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



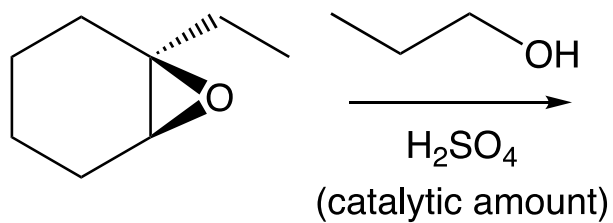
16 ?



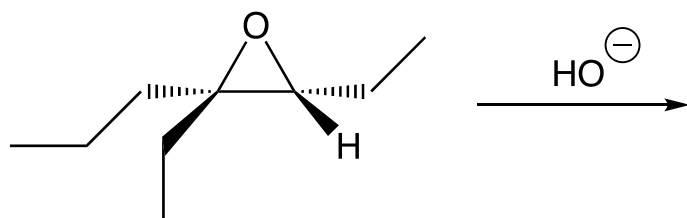
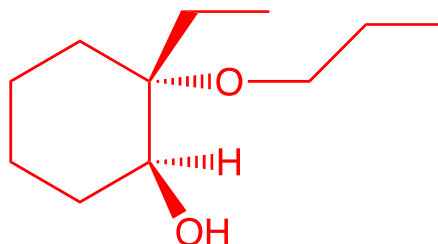
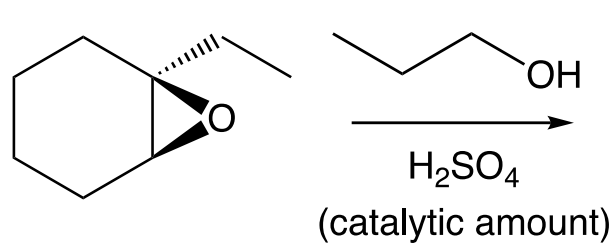
17 ?



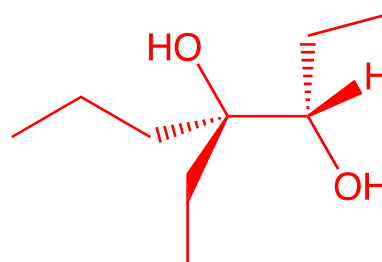
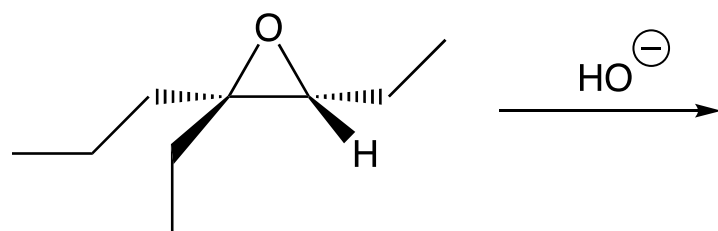
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



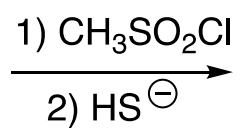
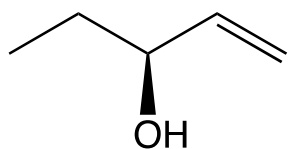
18 ?



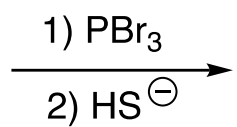
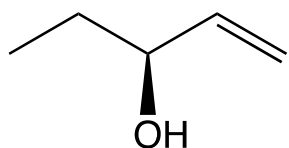
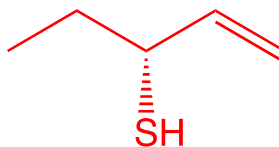
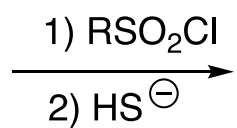
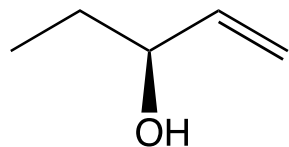
19 ?



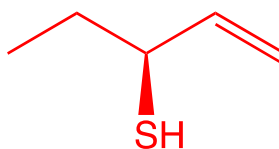
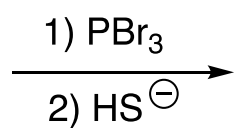
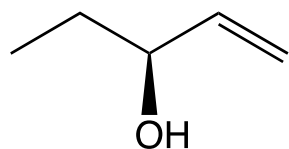
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



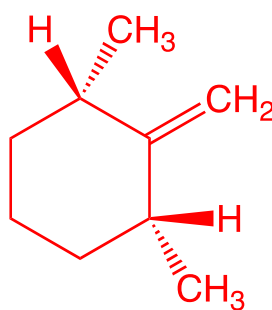
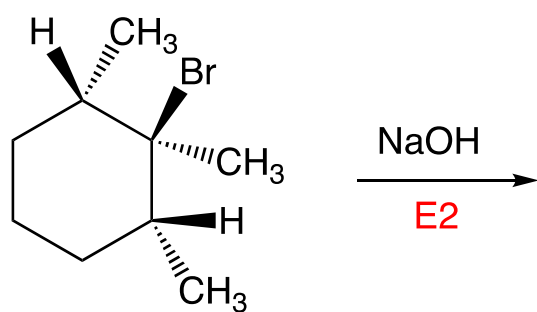
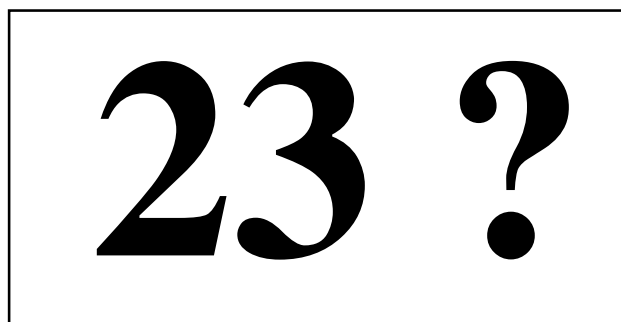
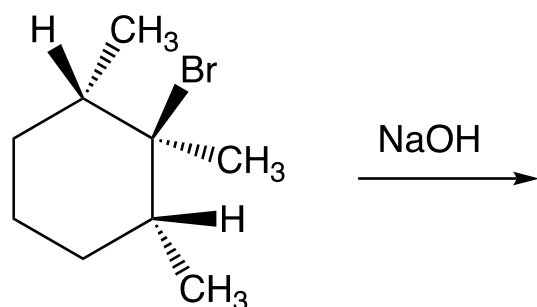
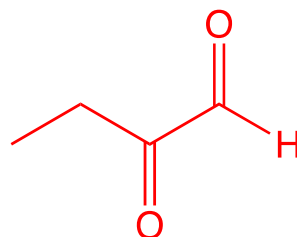
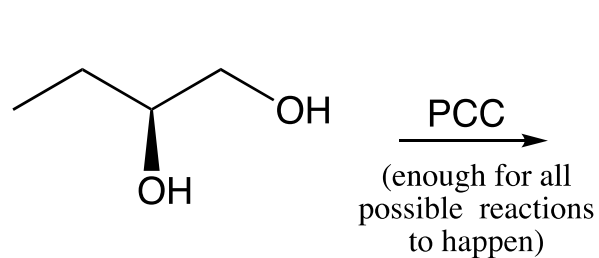
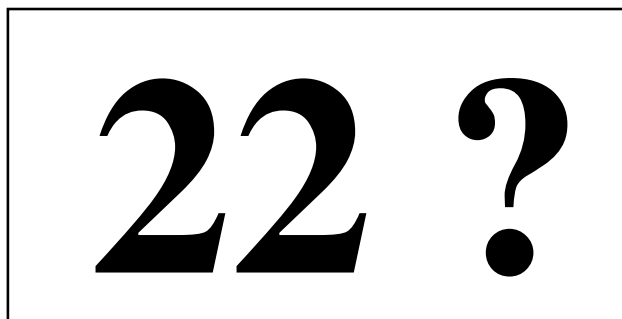
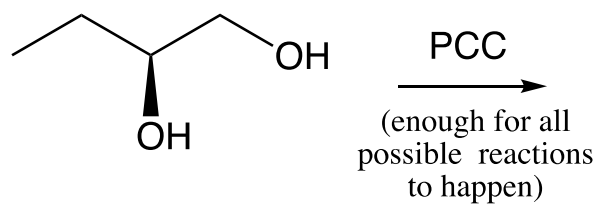
20 ?



21 ?



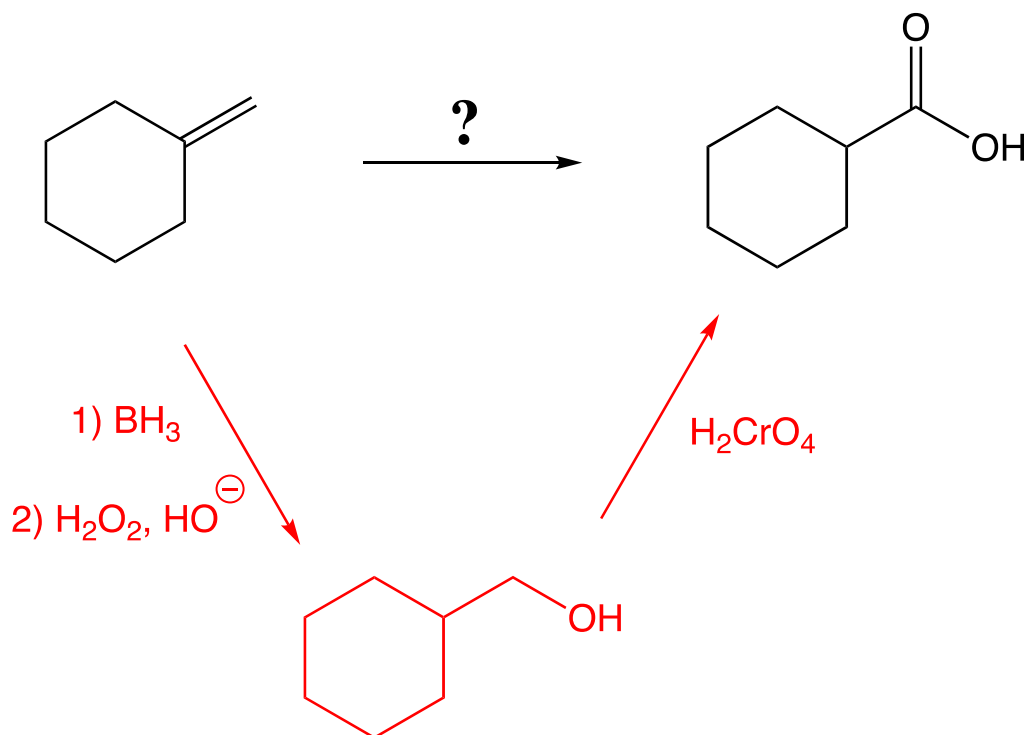
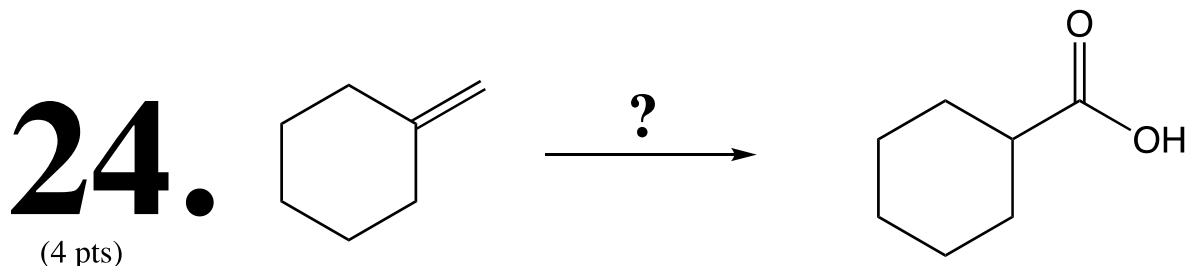
Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page



Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

Questions 24 – 28 are synthesis questions worth a total of 50 points.

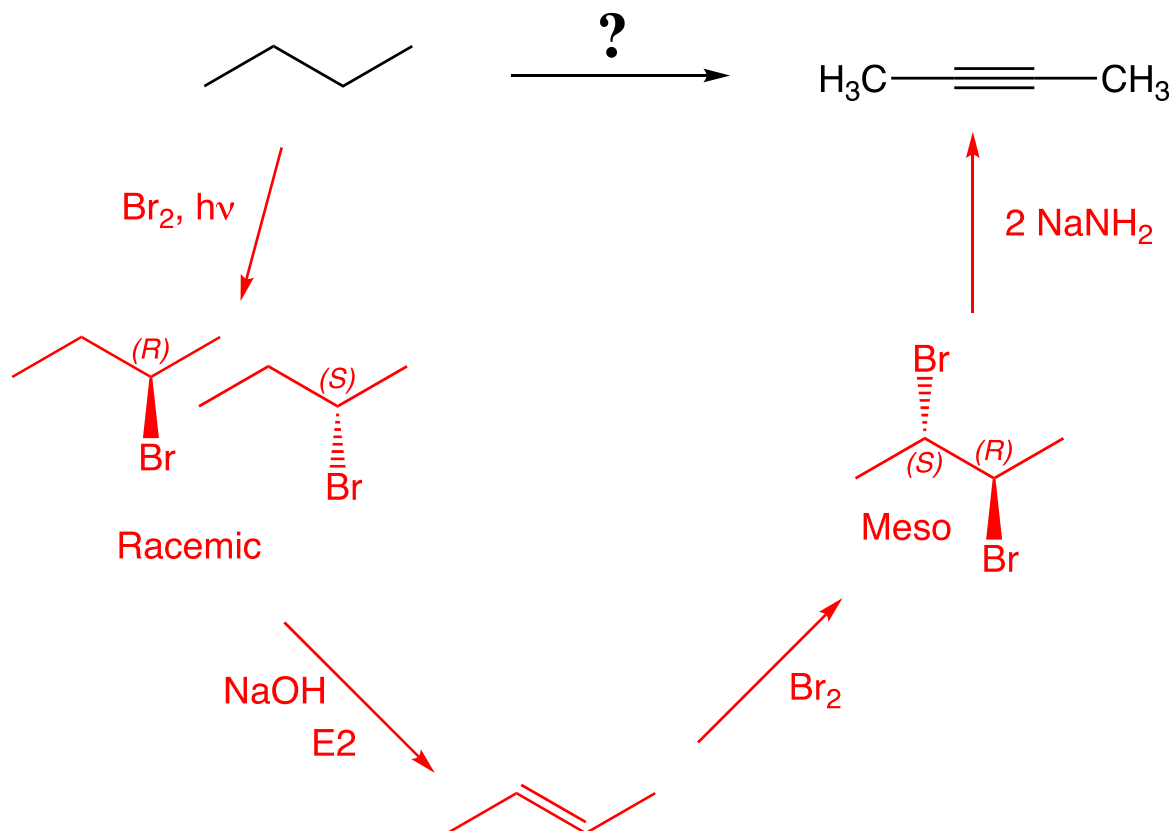
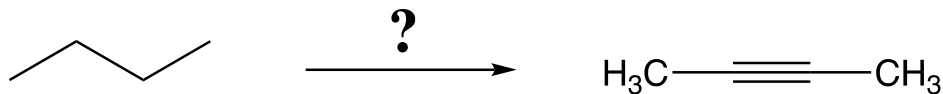
You need to show how the starting material(s) can be converted into the product(s) shown. You may use any reactions we have learned provided that the product(s) you draw for each step is/are the predominant one(s). Show all the reagents you need. Show each molecule synthesized along the way and be sure to pay attention to the regiochemistry and stereochemistry preferences for each reaction. You **must draw all stereoisomers formed, and use wedges and dashes to indicate chirality** at each chiral center. Write 'racemic' when appropriate. **All the carbons of the product must come from carbons of the starting material(s).**



Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

25.

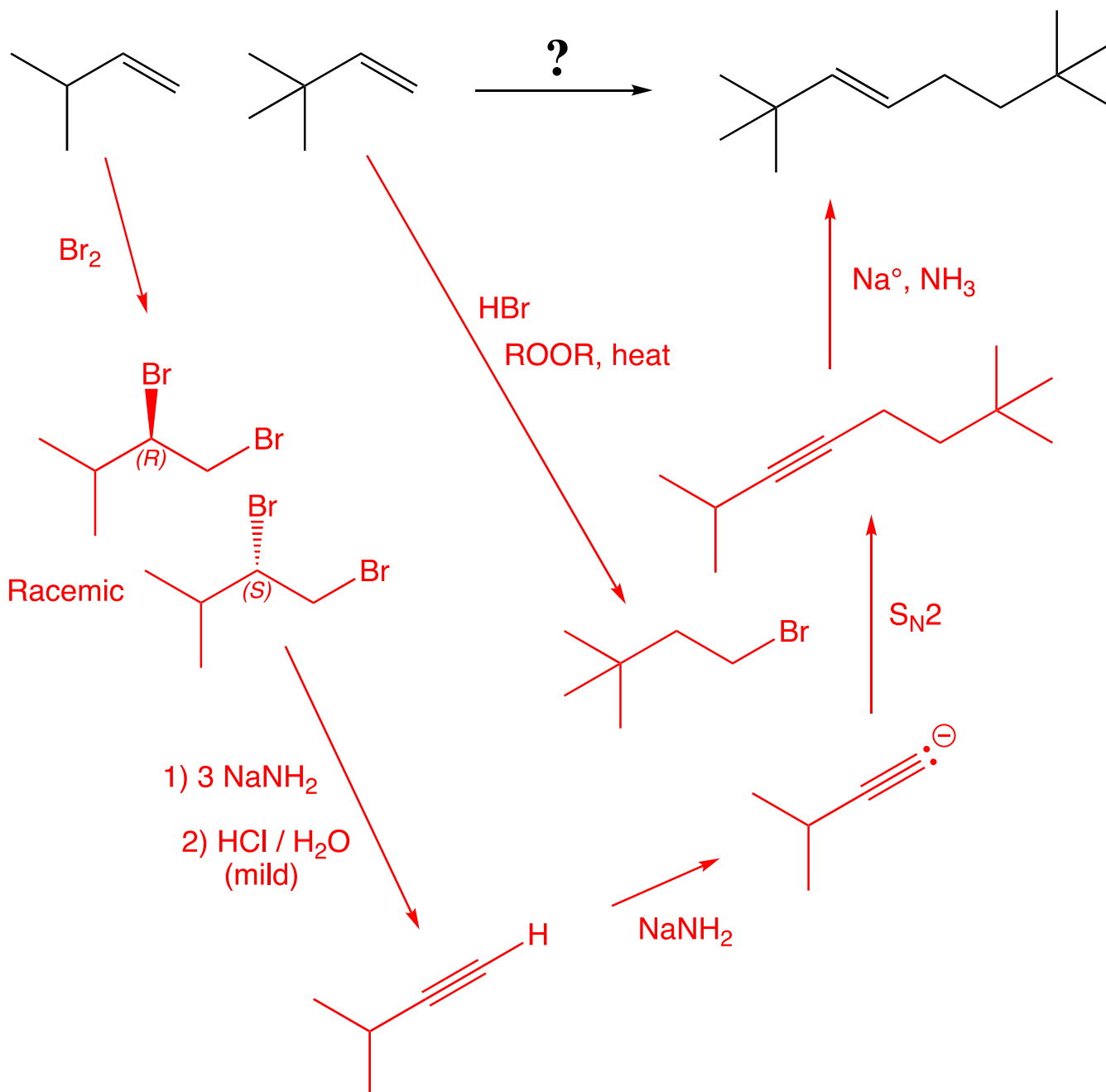
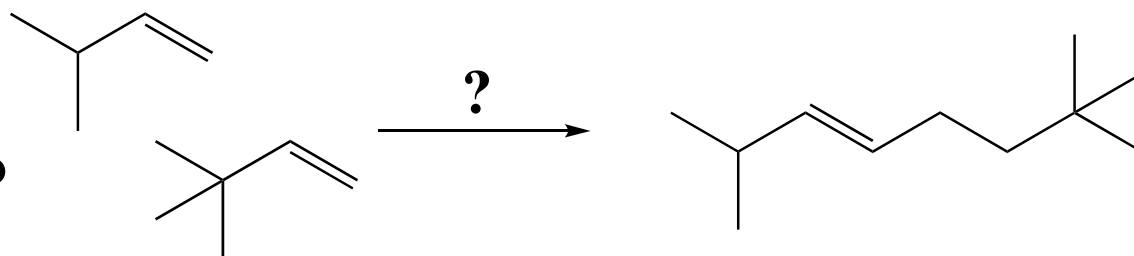
(10 pts)



Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

26.

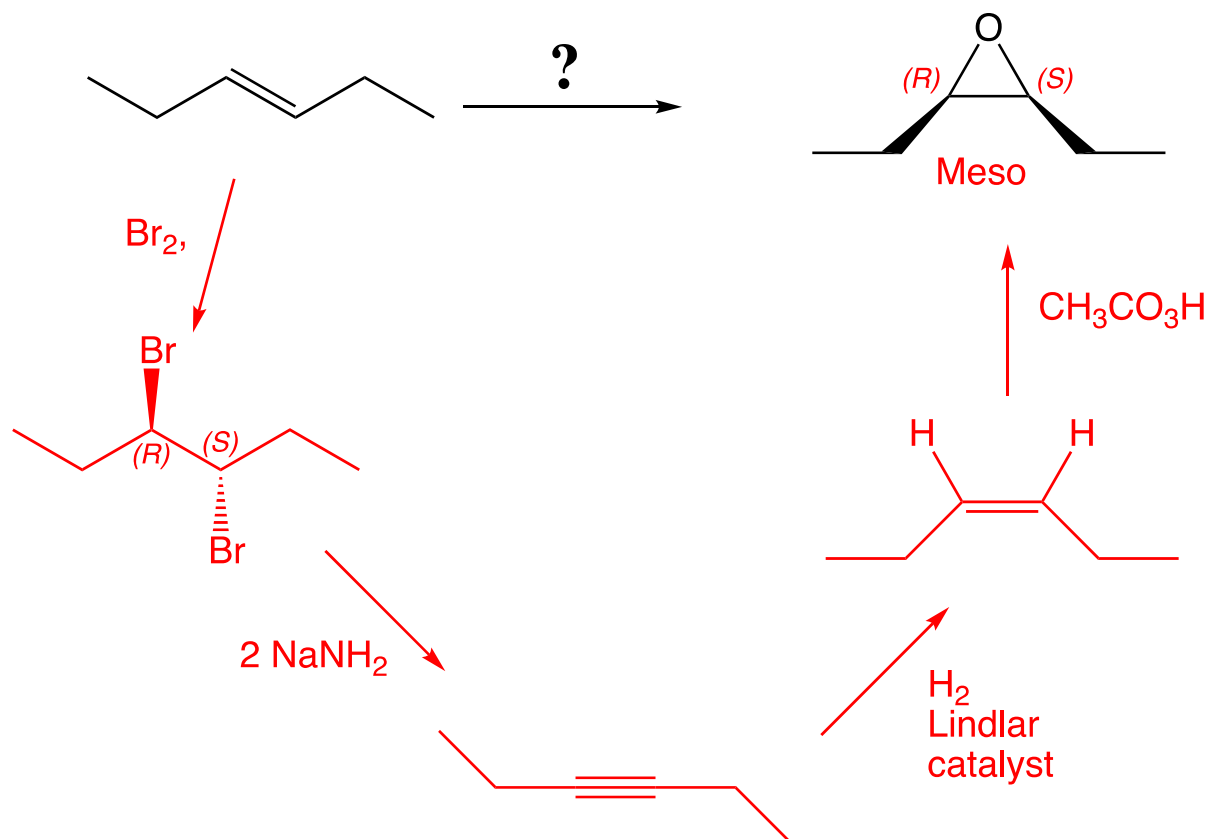
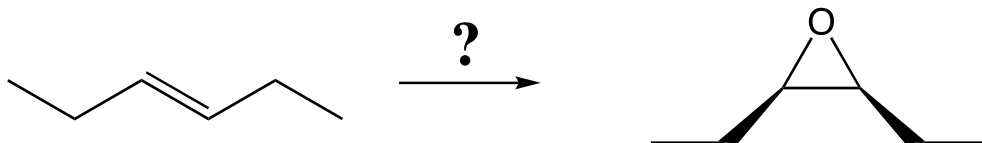
(16 pts)



Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

27.

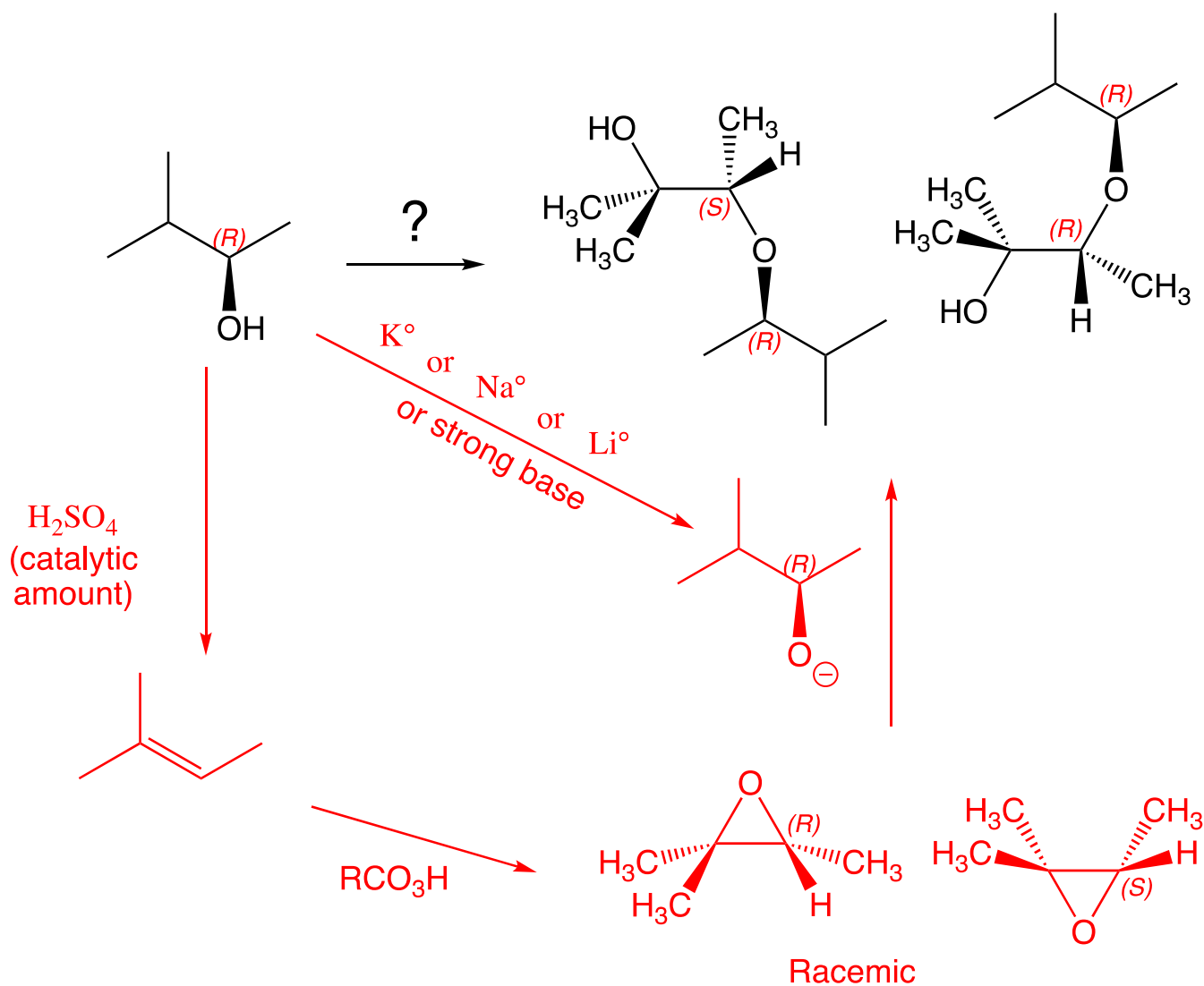
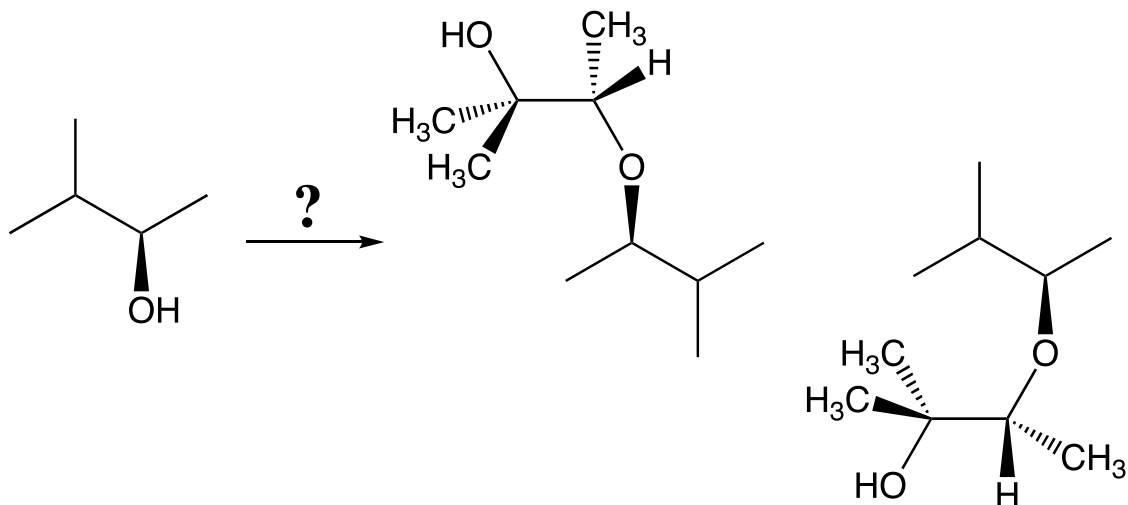
(10 pts)



Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

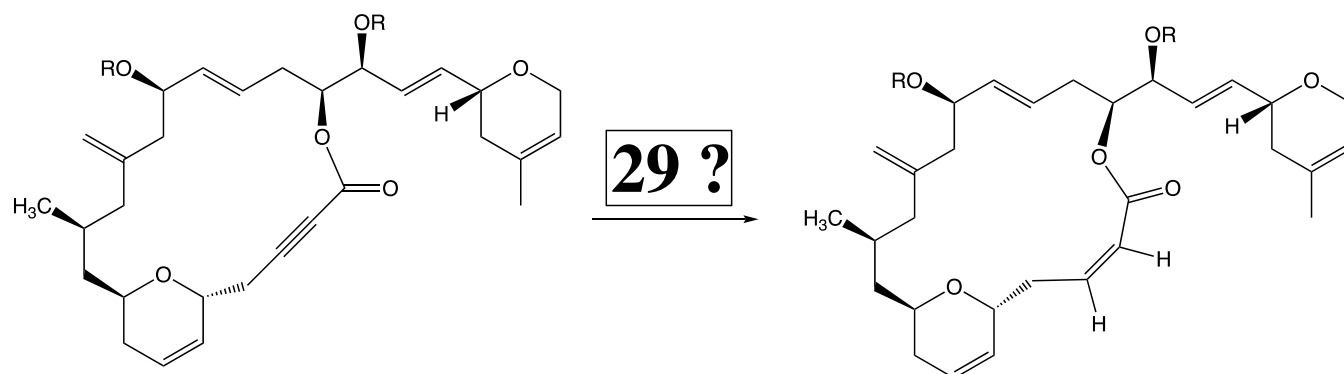
28.

(10 pts)

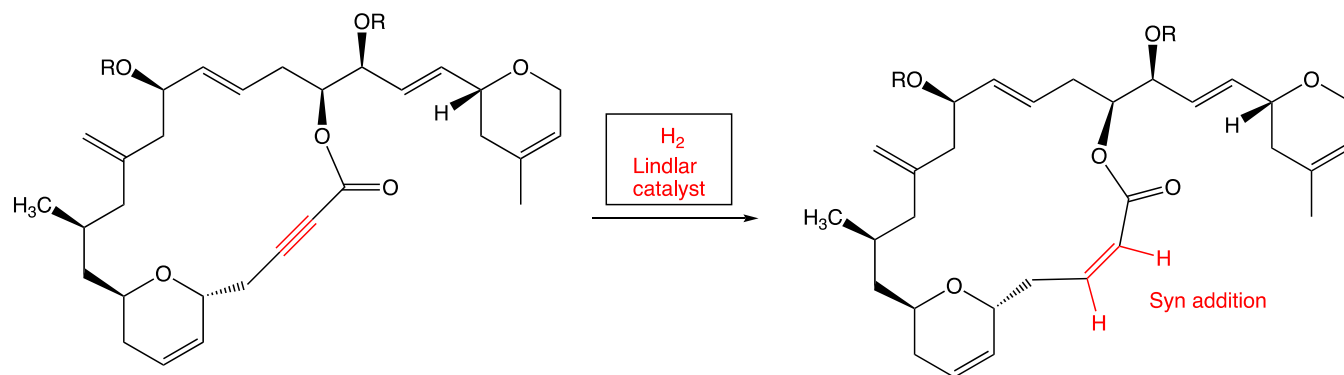


Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

29. Last Question! Chemistry in context, fill in the reagents for this single transformation. (4 points)



Swamy, *et al.*, Tetrahedron Letters, 2018, 59, 419-429



Swamy, *et al.*, Tetrahedron Letters, 2018, 59, 419-429

You have made it! You are at the end of your OChem 1 journey in this strangest of all semesters. You are officially the most incredible group of students I have ever worked with. You have overcome immense personal and technological challenges to focus on your studies, and learn along with us as we tried to deliver the best possible OChem 1 course under our new circumstances. We appreciated your patience, helpful suggestions, and above all else, your powerfully positive attitude despite your individual situations caused by the pandemic.

I have used the same poem in years past, but I think it takes on an entirely new meaning this year. Please take a minute and reflect upon what these powerful words mean for each of you. This pandemic will end next year. We are collectively going to have the once in a life opportunity to hit the “reboot key” when that happens. Now is the time to reimagine how we want to live our lives after COVID-19.

Here is what I want for every one of you:

*“May your wishes all come true.
May you build a ladder to the stars
and climb on every rung.
May you stay forever young.*

Be sure to include (1) your name, (2) your UT EID, and (3) your signature on each uploaded page

*May you grow up to be righteous,
May you grow up to be true,
May you always know the truth
And see the lights surrounding you
May you always be courageous
Stand upright and be strong
May you stay forever young.*

*May your hands always be busy
May your feet always be swift
May you have a strong foundation
When the winds of changes shift
May your heart always be joyful
May your song always be sung.
And may you stay forever young.” Bob Dylan*

Remember to run every chance you get. Staying fit is the best way for you to stay forever young. You, your families, and all of your loved ones will be grateful.

Brent Iverson