

S2019 Organic Chemistry I
Exam 2

Name (print):

Name (Sign):

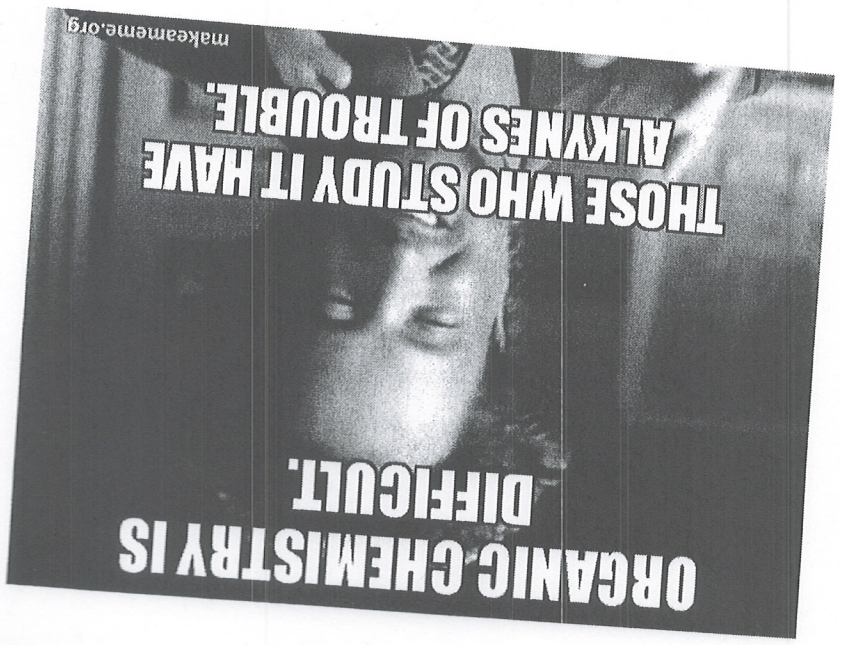
Recitation Instructor:

Instructions

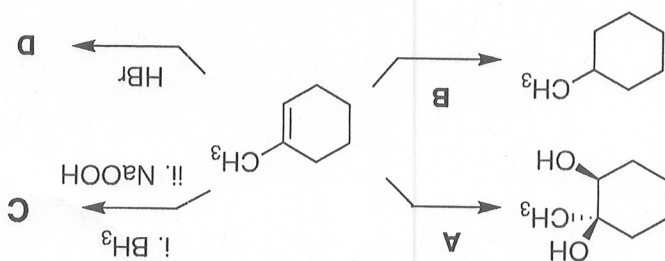
1. Keep the exam closed until you are instructed to begin.
2. The exam consists of 6 question sections. The first thing you should do is make sure that no pages are missing. If a page is missing, notify a proctor immediately.
3. You will have 1:15 to complete the exam, at which time pencils must be put down. Budget your time wisely.
4. Make sure to show all of your work, and make it clear what your thought process was. Answers should fit in the space provided. If you need to use the back of the sheet of paper, you must make note of it in the space allotted for credit.

Breakdown

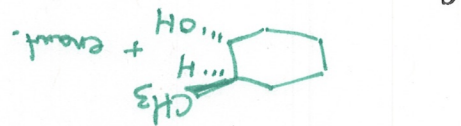
1.	—	/ 20
2.	—	/ 15
3.	—	/ 30
4.	—	/ 10
5.	—	/ 15
6.	—	/ 10
total	—	/ 100



1) Reactions, Part A. (20 points, 5 each). Referring to the following scheme, place the reagent (a,b) and product (c,d) for the following reactions in the spaces below



A. $1. \text{OsO}_4, 2. \text{NaHSO}_3$



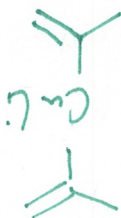
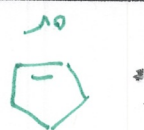
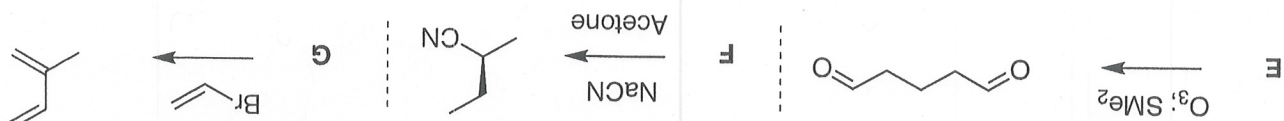
D.



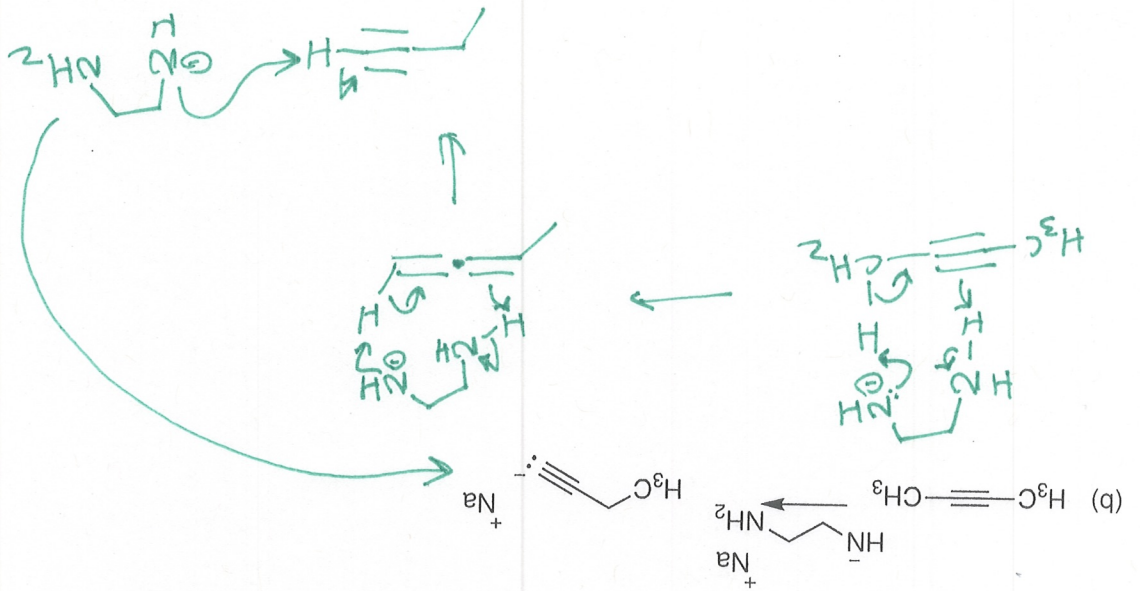
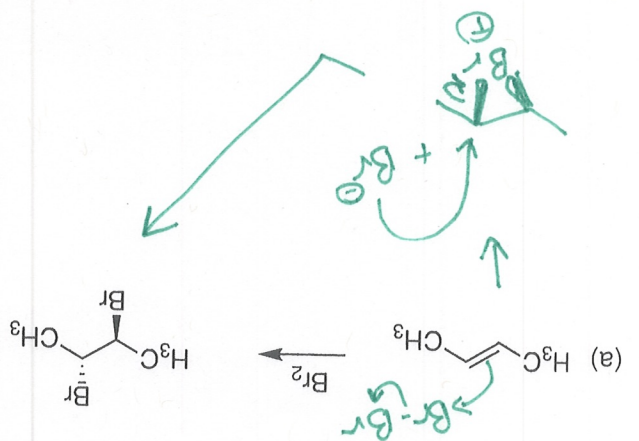
B.

H⁺, Pd/C

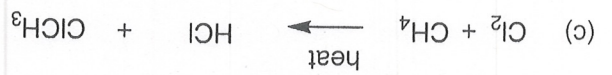
2) Reactions, Part B. (15 points, 5 each). Referring to the following reactions, show the starting materials that would give the products using the reagents shown.



3). Mechanisms. Show the mechanism for the following reactions (30 points, 10 points each)



3). Mechanisms (continued).



initiation:



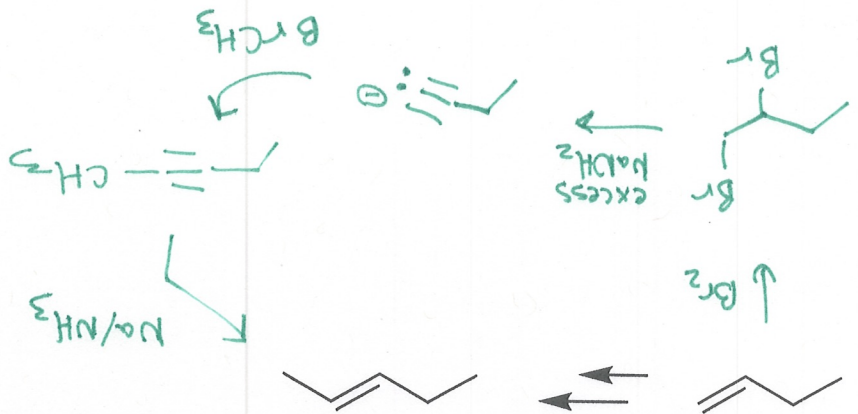
propagation:



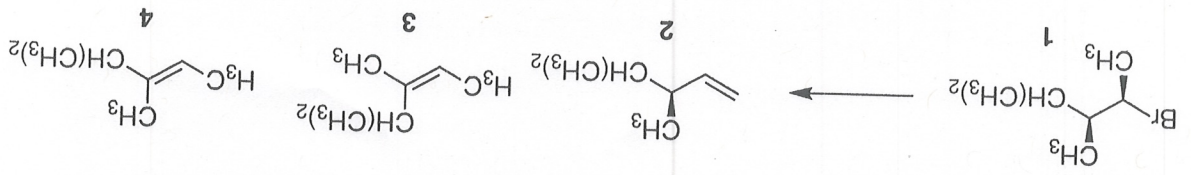
termination:



4). Synthesis (10 points). Propose a series of reactions that could be used to carry out the following interconversion. Make sure to show the products after each step for full credit.



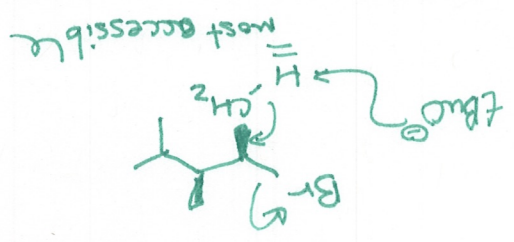
5) **Concept Question.** The following is meant to test your understanding of the selectivity of reactions, both in terms of reagents and your mechanistic understanding of the selectivity of (15 points).



Compound 1 can undergo elimination to generate 2, 3, or 4 as the major product depending on the conditions chosen. Propose conditions for each, and explain why you believe those conditions would provide the compound given. Use structures, including intermediates and transition states, to help explain your answers.

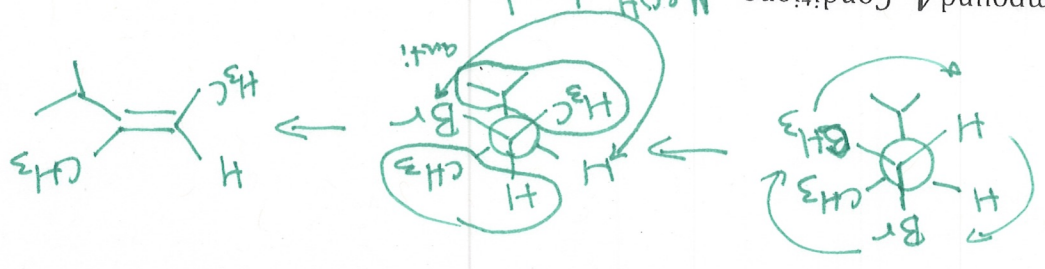
Compound 2. Conditions KOtBu

Reason: Bulky base prefers more sterically accessible proton



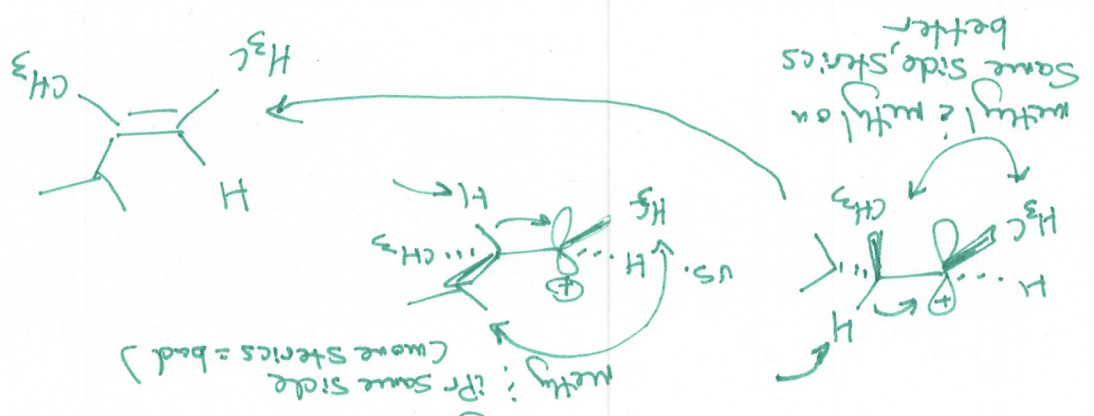
Compound 3. Conditions NaOH

Reason: Small base, Zaitsev's product. Stereoselective due to anti-periplanar orientation of H; Br in ~~S_N~~ E2



Compound 4. Conditions MeOH, heat

Reason: promote E1, will favor thermodynamic product



6) **Challenge:** Here's a representative example of chemistry a good friend of mine, Rendy Kartika, and his lab at LSU are working on. Try to propose a mechanism... I'll start you off to get you going in the right direction. (10 points)

