Hour Exam #3 (AM)
Chemistry 343
Professor Gellman
5 December 2011

Last Name *Answer*

First Name *Key*

General Instructions:

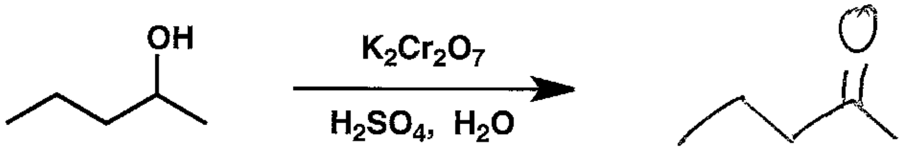
(i) Use scratch paper at back of exam to work out answers; final answers must be recorded at the proper place on the exam itself for credit. Models are allowed.

(ii) Print your name on each page.

(iii) Please keep your paper covered and your eyes on your own work. Misconduct will lead to failure in the course.

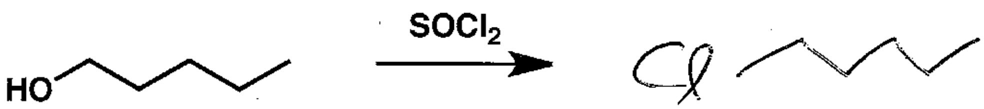
1. (22 points) Show the major product(s) expected from the reactions below.

(a)



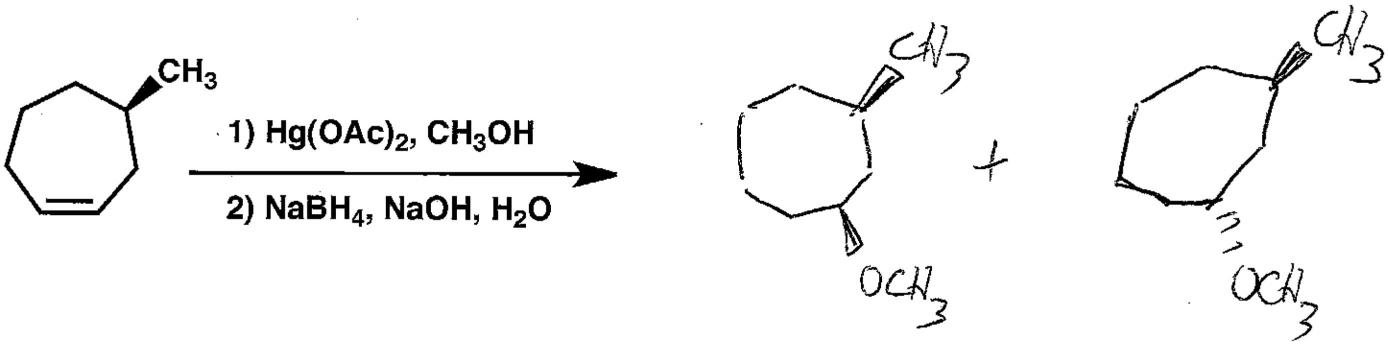
+6

(b)

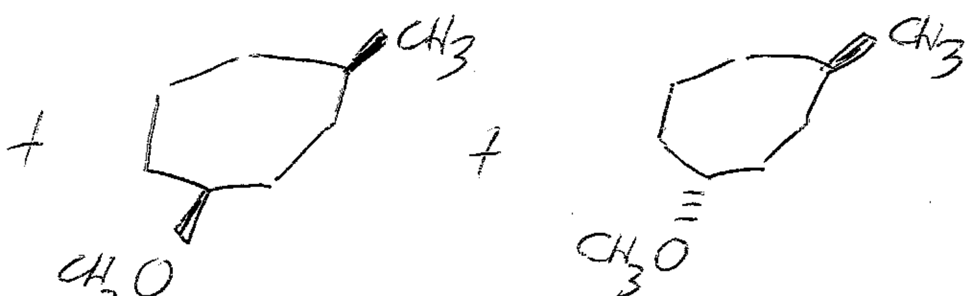


+6

(c)



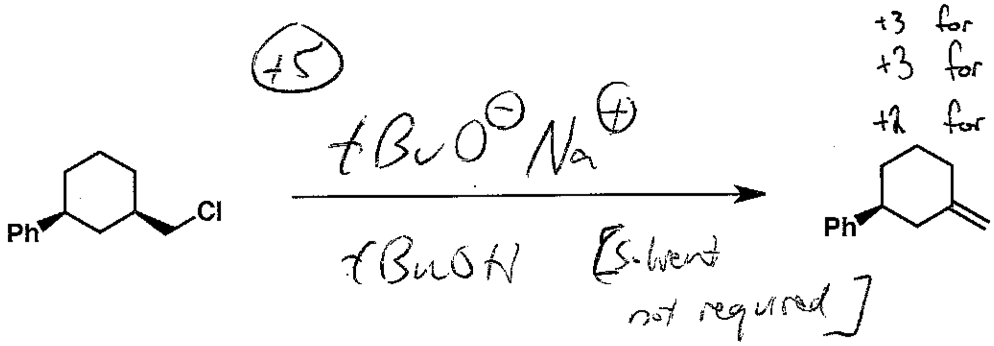
+4 for one;
+2 for each additional



Name ________________

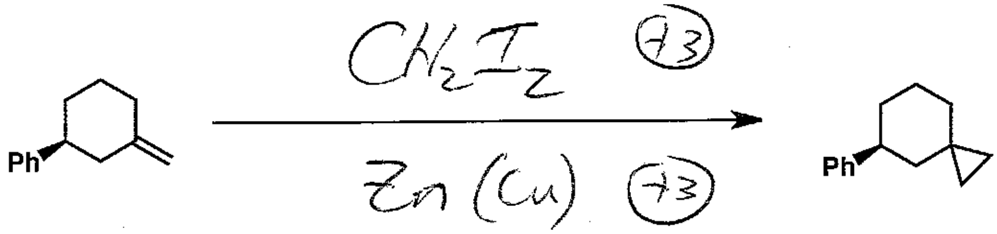
2. (22 points) Show the reagents required to convert the starting molecule to the indicated product. If necessary, be sure to differentiate clearly between distinct steps, by using "1)", "2)", etc. over the arrow.

(a)



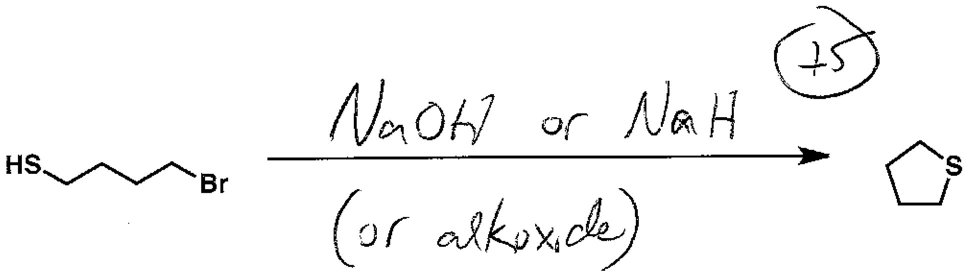
+3 for no charge
+3 for other alkoxide
+2 for NaH

(b)



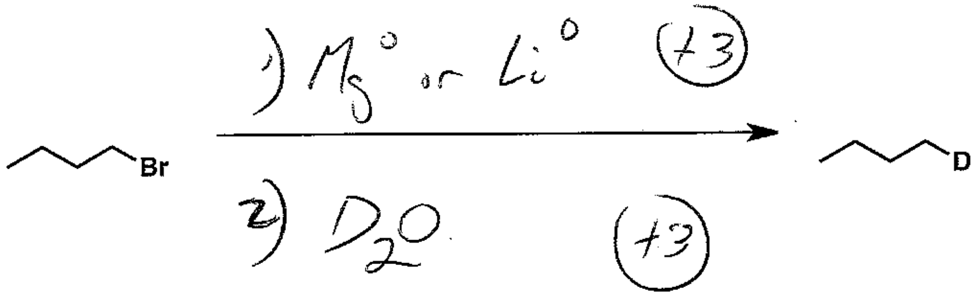
+2 for carbene

(c)



+3 for acid then base

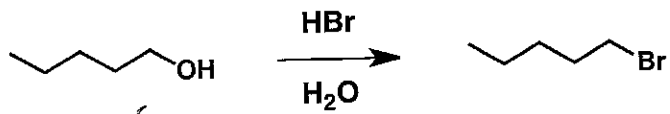
(d)

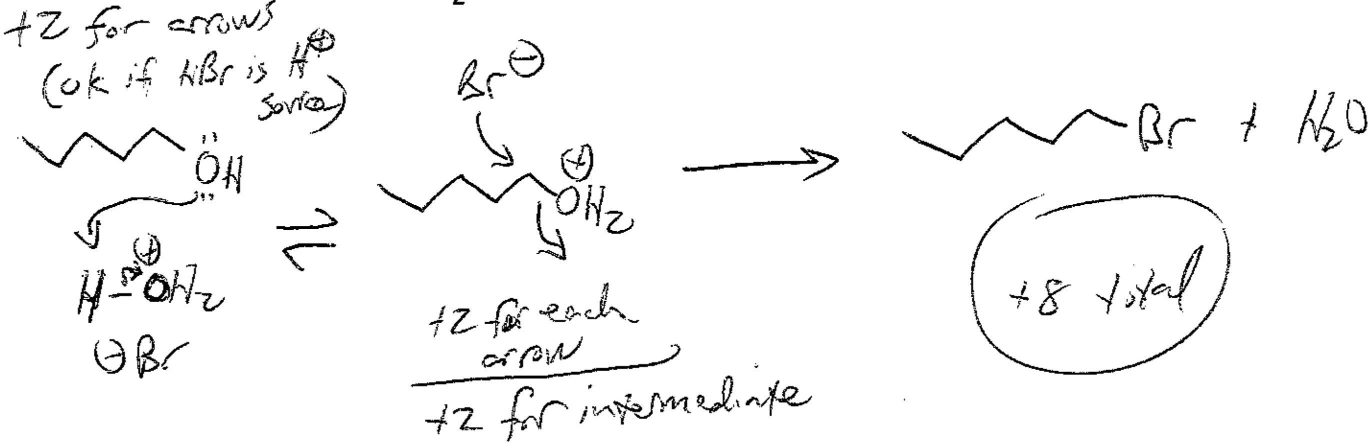


Name ____________________

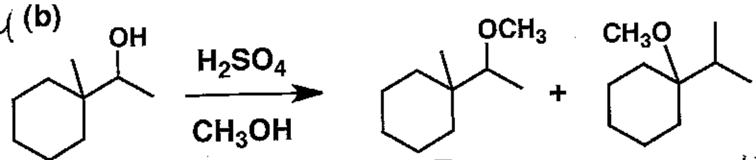
3. **(22 points) Provide a mechanism (curved arrows) for each of the reactions shown below.**

8 **(a)**

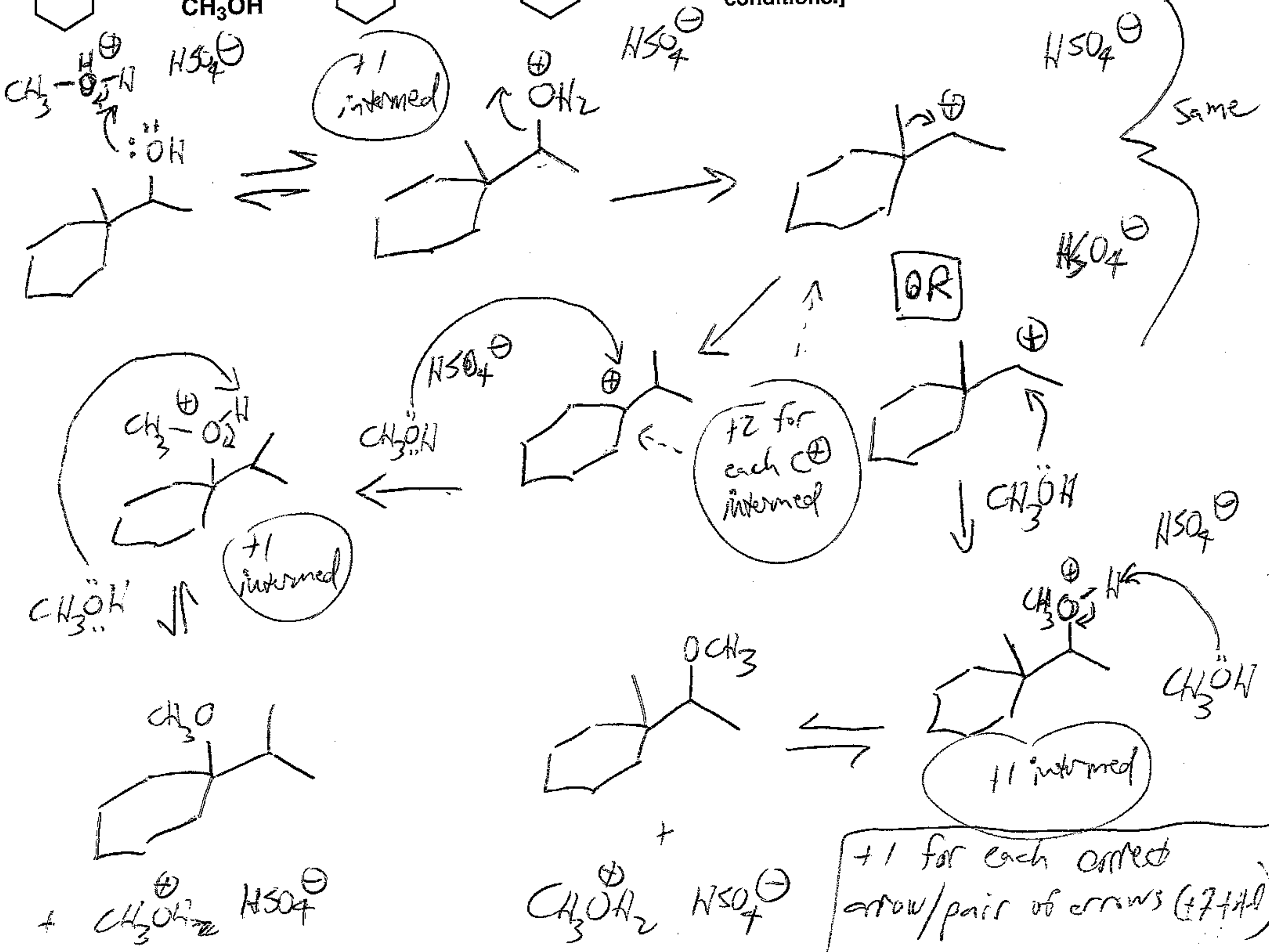




11 **(b)**



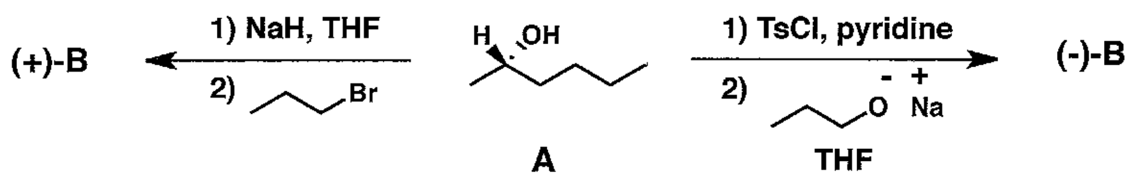
[Note: Your mechanism should account for formation of both organic products. Do not worry about any other products that might be formed under these conditions.]

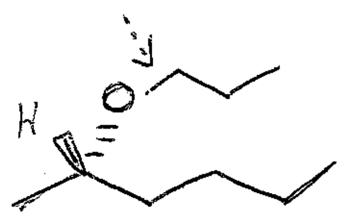


Name ________________

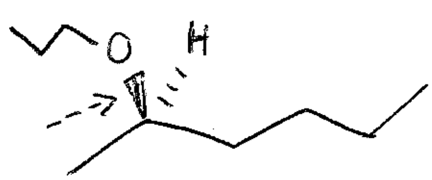
4. (16 points) Molecule A, which is a single enantiomer, can be converted to one enantiomer or the other of B by choosing one or the other of the two-step reaction sequences shown below (do not worry about any other products that might also be formed during any of these reactions). Draw the structures of (+)-B and (-)-B in the appropriate boxes.

For each structure you draw, indicate with an arrow (--->) which bond was formed in the second of the two steps.





(+)-B



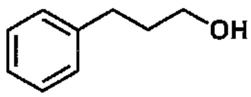
(-)-B

+6 for each correct structure; +2 for each correct -->

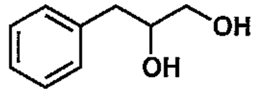
Name ________________

5. **(18 points) Suggest a synthetic route (i.e., a specific sequence of reactions) that would be expected to produce the "target" molecule from the indicated starting material. You may use any other starting materials and reagents in this route. Try to reach the target with the fewest possible reactions, and try to choose reactions that are as selective as possible for one target (rather than a mixture of targets).**

Starting Material



Target



(racemic)