

Hour Exam #2  
Chemistry 343 (PM)  
Professor Gellman  
31 October 2012

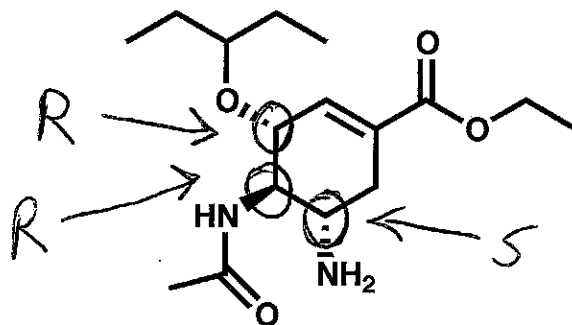
Last Name Answer

First Name Key (corr.)

**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.
- (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.

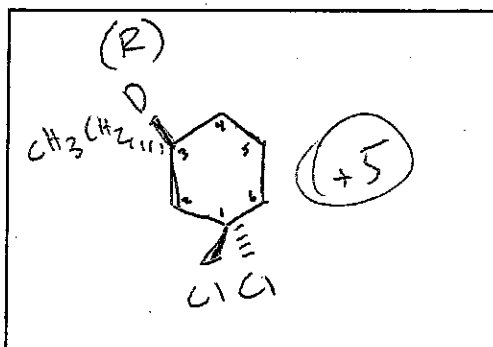
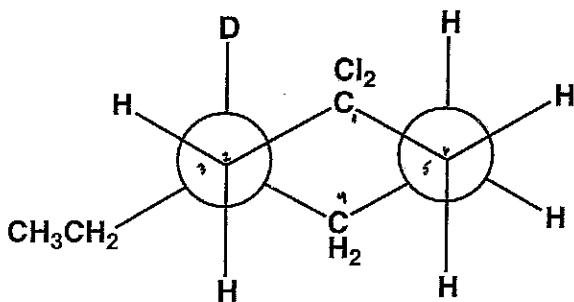
1. (9 points) Shown below is the drug Oseltamir, which is used to treat influenza. CIRCLE each  $sp^3$  stereogenic center (chiral center), and assign the configuration (R or S).



+1 for correct circle

+2 for correct R/S

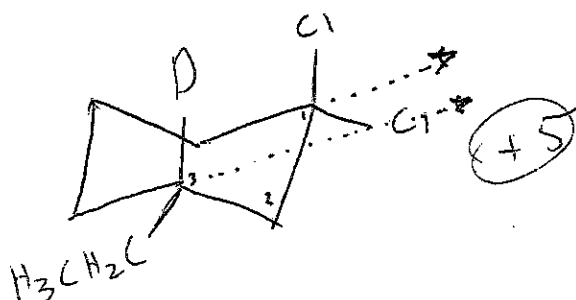
2. (23 points) Answer the questions pertaining to the Newman projection shown below.



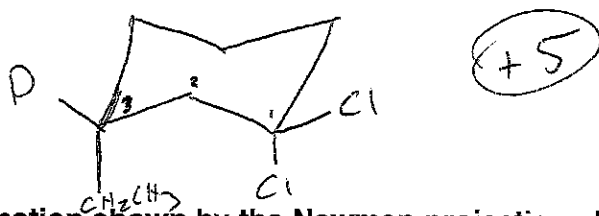
- 2 enantiomers  
- 1 not showing wedge/dash for Cl  
- structural isomer

(a) In the box, draw the "hexagon" version of this molecule, with wedges and dashes to show non-hydrogen substituent positions.

(b) Below, draw the chair conformation that corresponds to the Newman projection.



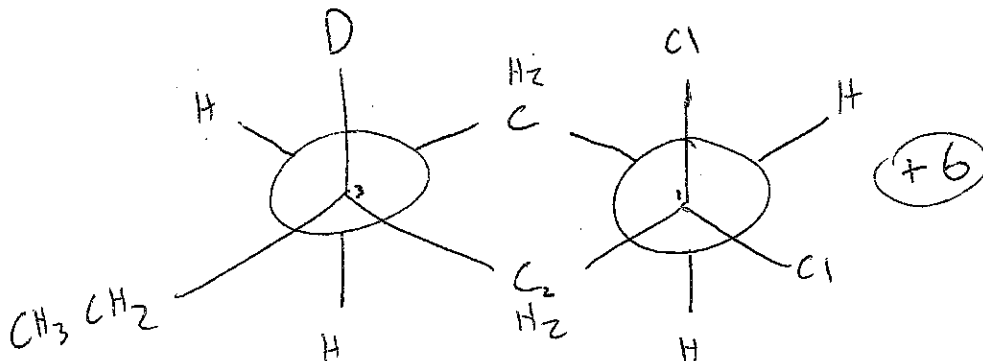
(c) Below, draw the other chair conformation available to this molecule.



(d) Is the conformation shown by the Newman projection above the most stable of the two possible conformations? (Circle the appropriate answer below.)

YES      NO      +2

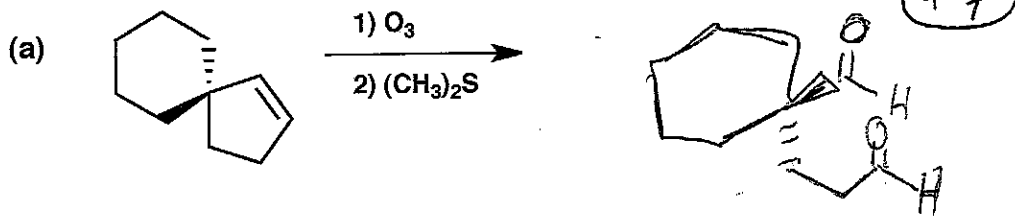
(e) Draw a Newman projection from a perspective that shows that axial/equatorial positions of ALL of the non-hydrogen substituents on the ring.



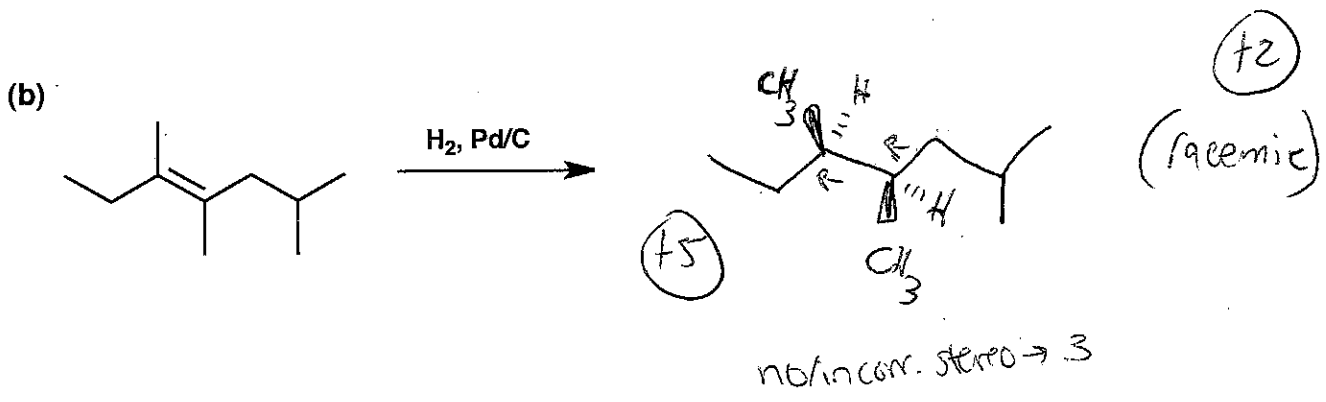
- 2 if enantiomers  
- 5 for switching (b+c) i.e. axial/equatorial  
- 2 "unparallel" lines  
• full credit (b/c) if consistent w/ (a)  
• no credit if ax/eq cannot be determined

• Full credit possible for enantiomer if -2 previous.  
• no credit if ax/eq not shown on non-H substituents

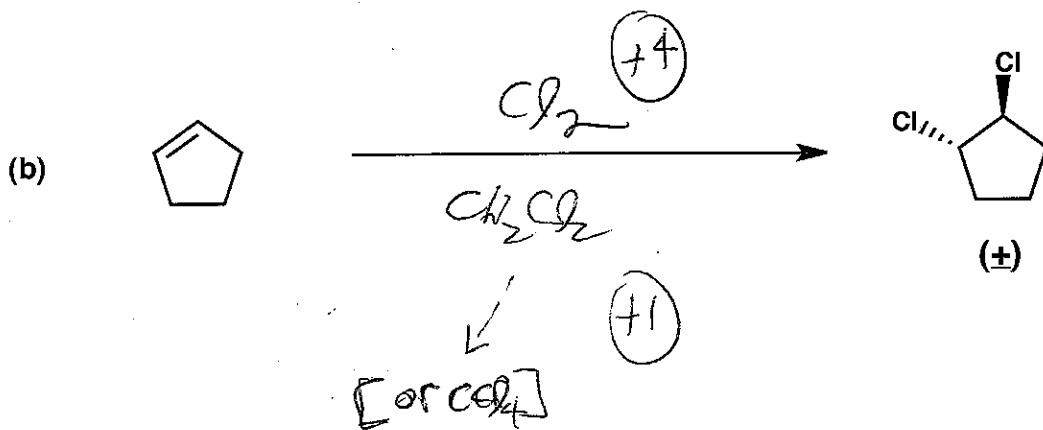
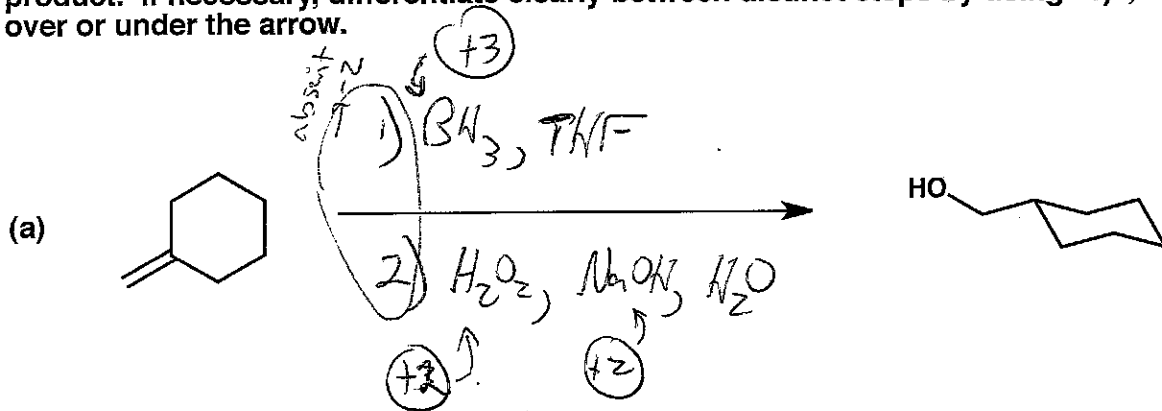
3. (14 points) Show the major product(s) expected from the reactions below.



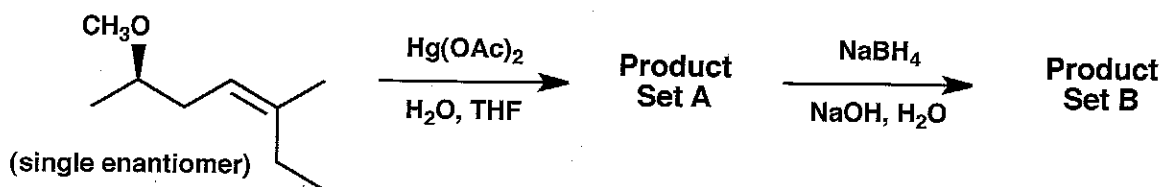
-3 leave out



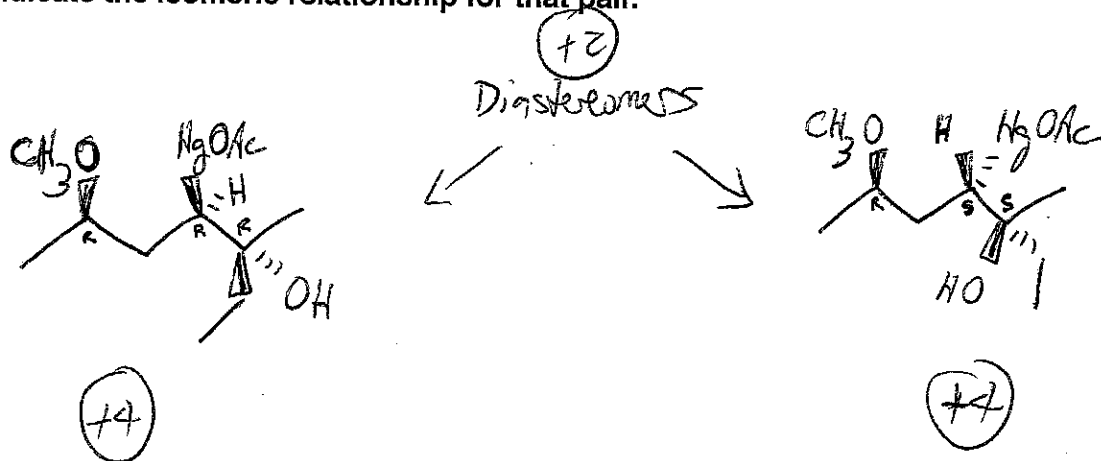
4. (12 points) Show the reagents required to convert the starting molecule to the indicated product. If necessary, differentiate clearly between distinct steps by using "1)", "2)", etc. over or under the arrow.



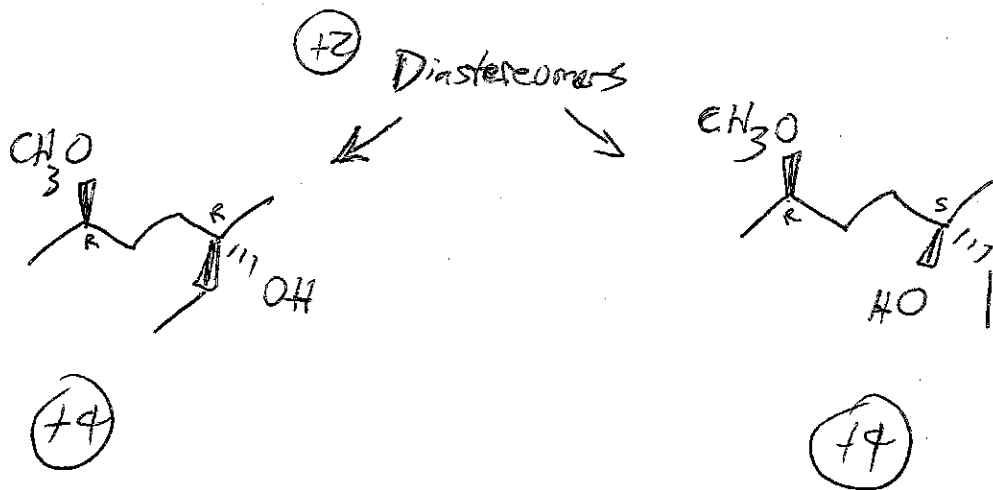
5. (20 points) Answer the questions pertaining to the reactions shown below.



(a) Draw ALL members of Product Set A. Draw a line between each pair of products and indicate the isomeric relationship for that pair.

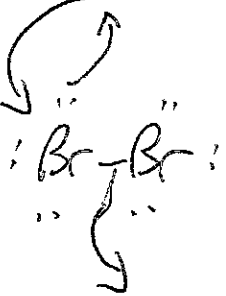
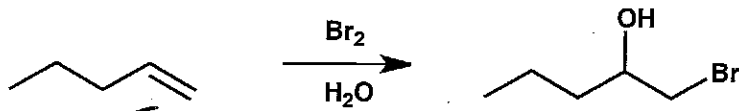


(b) Draw ALL members of Product Set B. Draw a line between each pair of products and indicate the isomeric relationship for that pair.



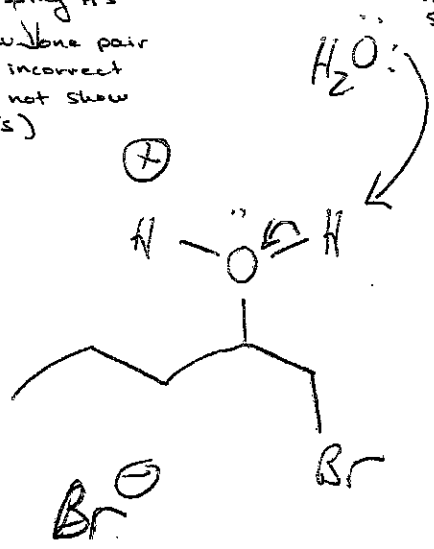
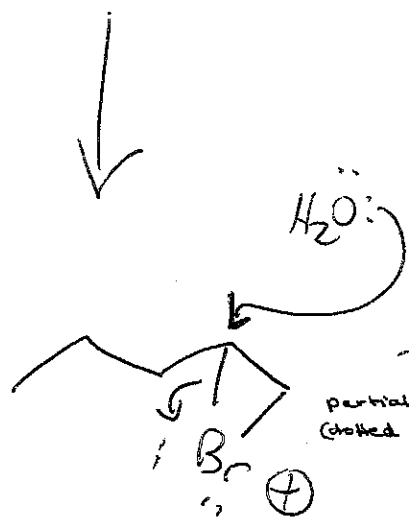
If show  
 4 products in part (b)  
 from 4 products in (a)  
 (2 of which are incorrect)  
 to give identical answers  
 -1 for each  
 identical answers.

6. (12 points) Draw a mechanism (curved arrows) for the reaction shown below. Be sure to draw all intermediates, and to indicate any by-products that may not be shown in the equation.

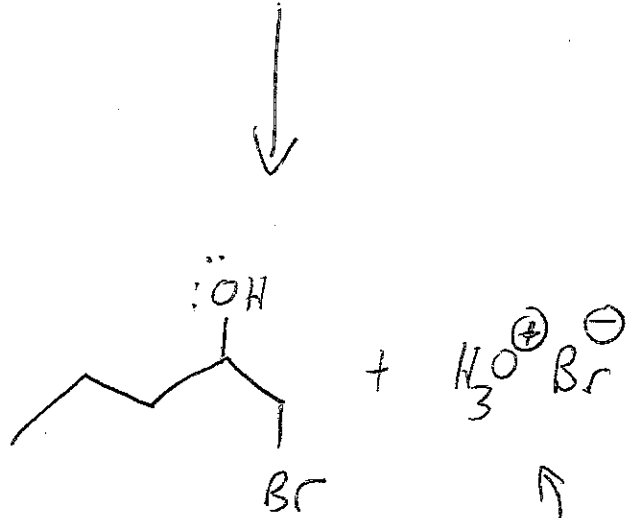


+2 for each correct intermediate (+4 total)  
 -1 pt if missing charge  
 -1 pt if missing H's  
 -1 pt if show lone pair e<sup>-</sup>s and incorrect (ok if do not show any e<sup>-</sup>s)

OK if Br<sup>⊖</sup> remove H<sup>+</sup>, but must show equil.  
 $\text{HBr} + \text{H}_2\text{O} \rightleftharpoons \text{Br}^- + \text{H}_3\text{O}^+$   
 -1 pt if missing



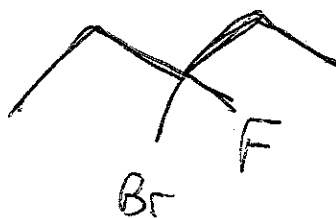
+1 for each correct curved arrow (+7 total)



+1

Last Name \_\_\_\_\_

7. (10 points) Draw all achiral derivatives of n-pentane (i.e., unbranched carbon chain) that have the molecular formula  $C_5H_{10}BrF$ .



(+5)



(+5)

-1 for each incorrect structure