

Last Name Answer

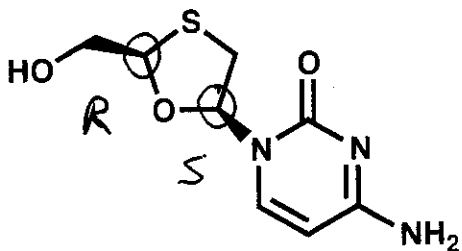
First Name Key

General Instructions:

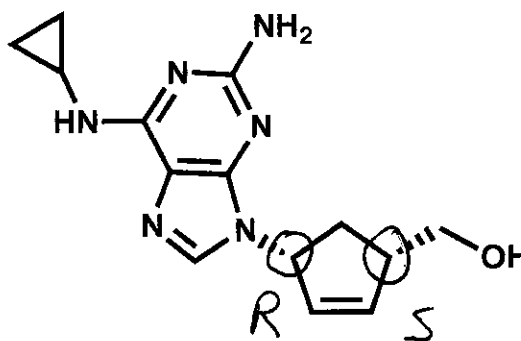
- (i) Use scratch paper at back of exam to work out answers; final answers must be recorded at the proper place on the exam itself for credit.
- (ii) Print your name on each page.
- (iii) Please keep your paper covered and your eyes on your own work. Misconduct will lead to failure in the course.

1. (15 points) Shown below are three drugs used to treat HIV infection. Each molecule inhibits the viral enzyme reverse transcriptase.

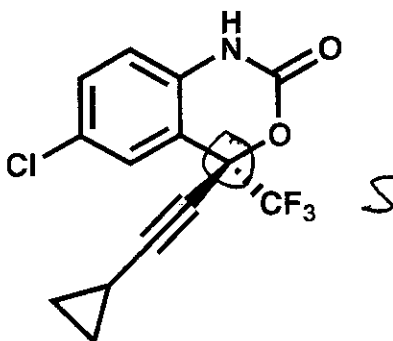
For each molecule, CIRCLE each asymmetric carbon, and assign the configuration (R or S).



Lamivudine



Abacavir



Efavirenz

+ 2 for each
correct circle

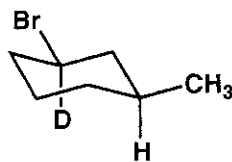
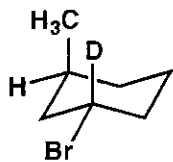
+1 for each correct
assignment

Name _____

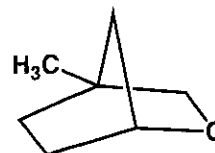
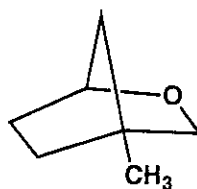
2. (16 points) For each pair of structures below, indicate (on the line below the pair) the relationship between the molecules (at room temperature), choosing from the following possibilities.

Identical
Enantiomer
Diastereomer
Constitutional isomer
Non-isomeric

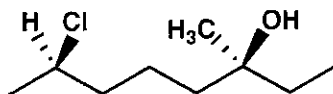
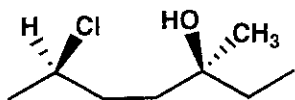
+ 4 each



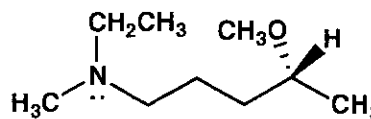
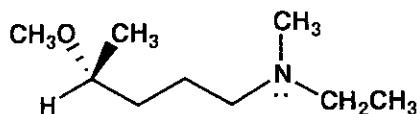
Diastereomers



Enantiomers

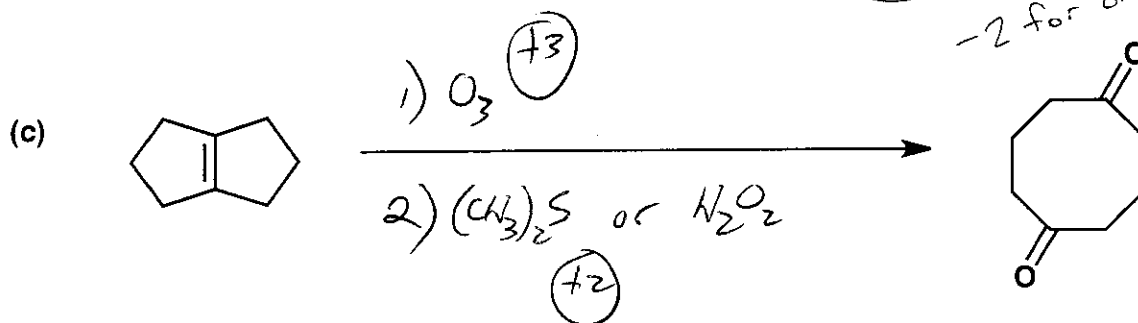
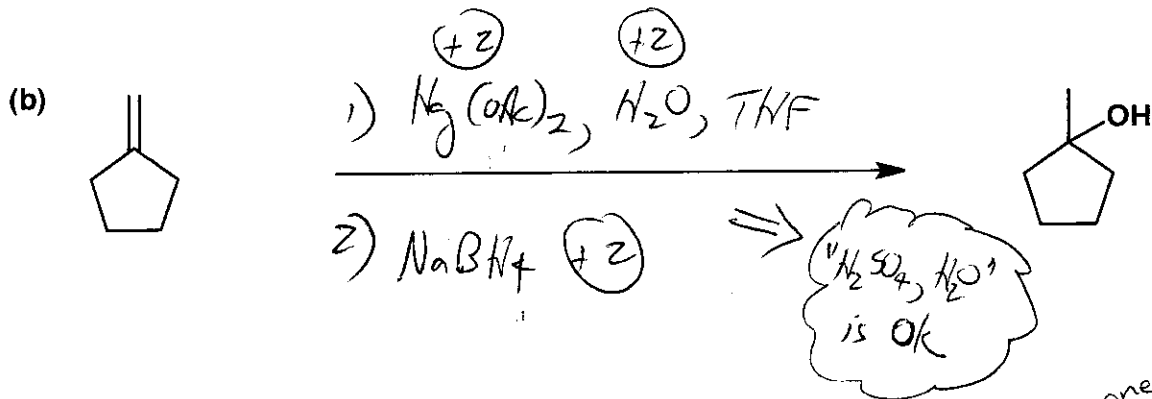
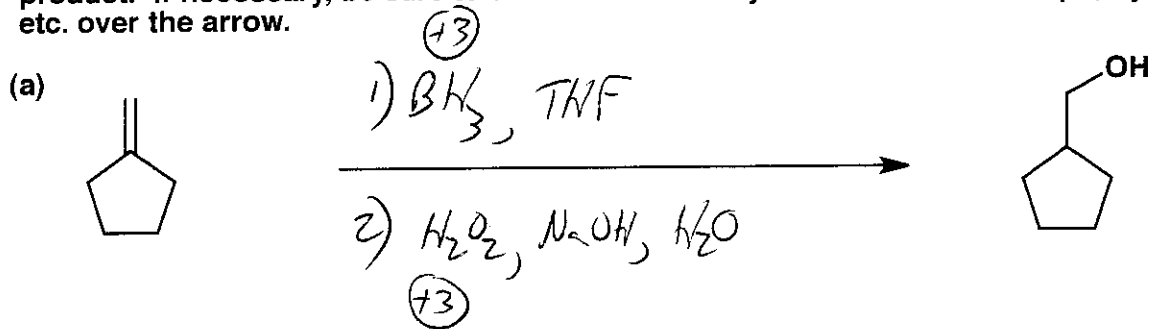


Non-isomeric

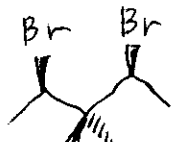
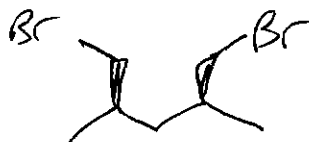
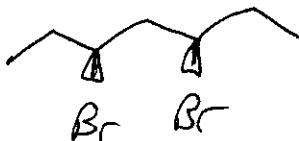
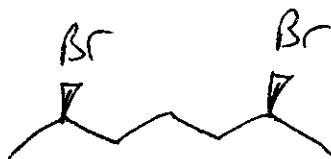


Identical

3. (17 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.



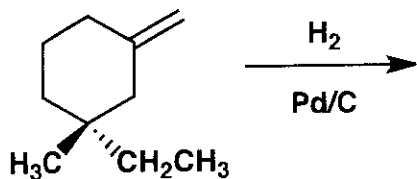
4. (12 points) Draw three meso molecules with the formula $\text{C}_7\text{H}_{14}\text{Br}_2$.



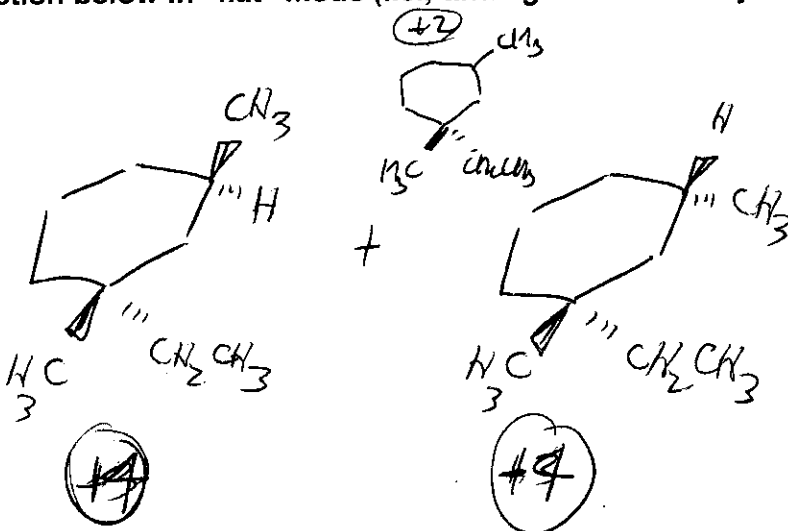
+ 4 each

5. (24 points)

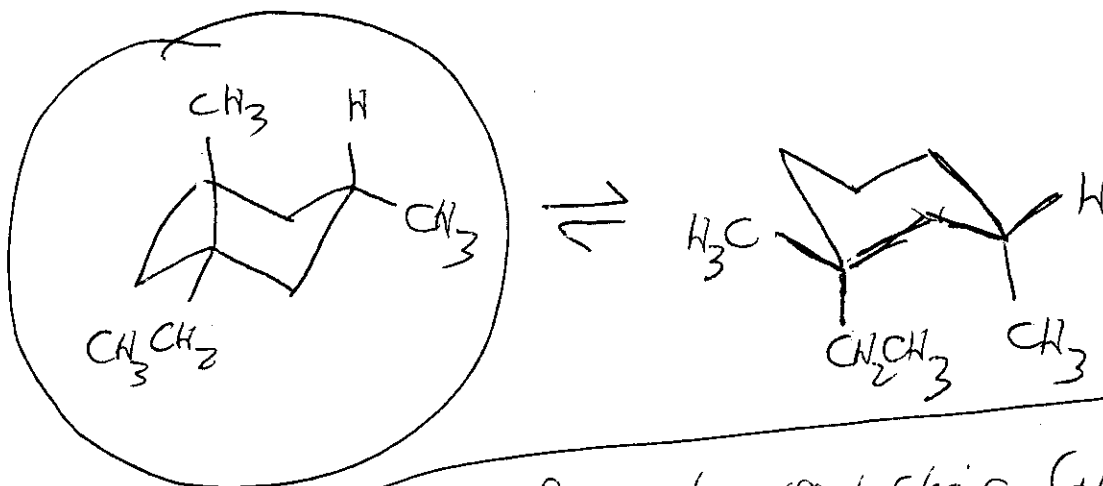
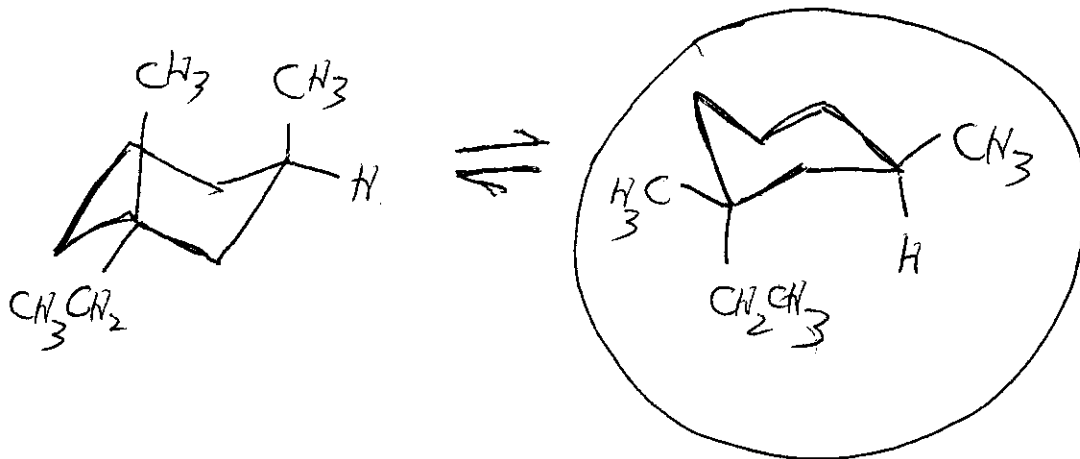
(a) Draw all products expected from the reaction below in "flat" mode (i.e., analogous to the way the starting material is drawn).



(The starting material is a single enantiomer.)

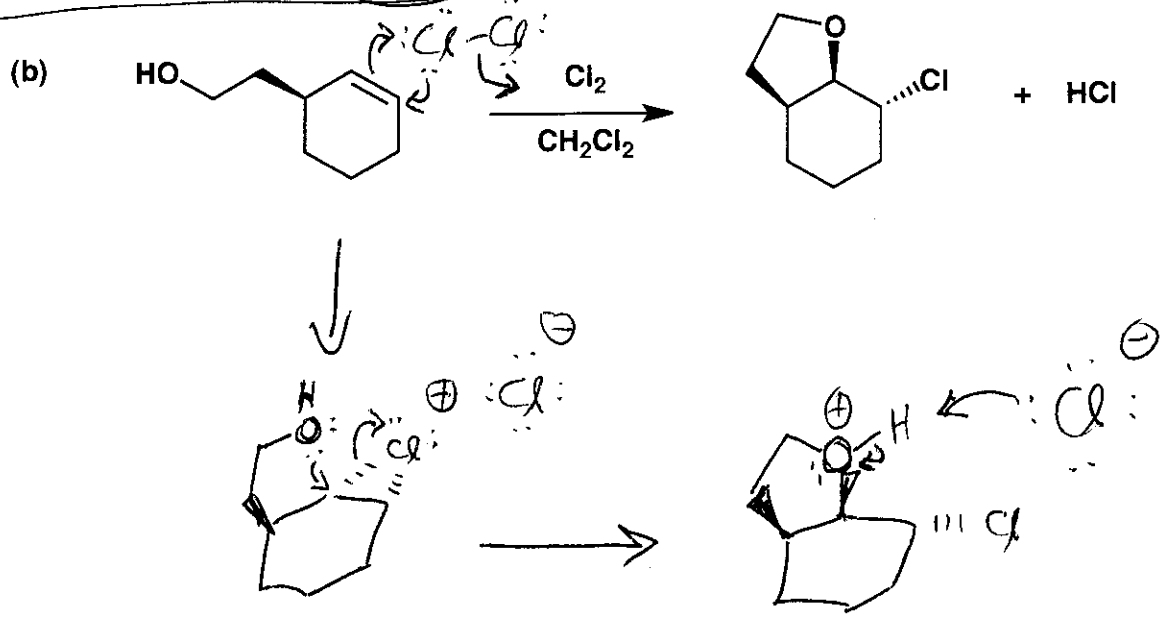
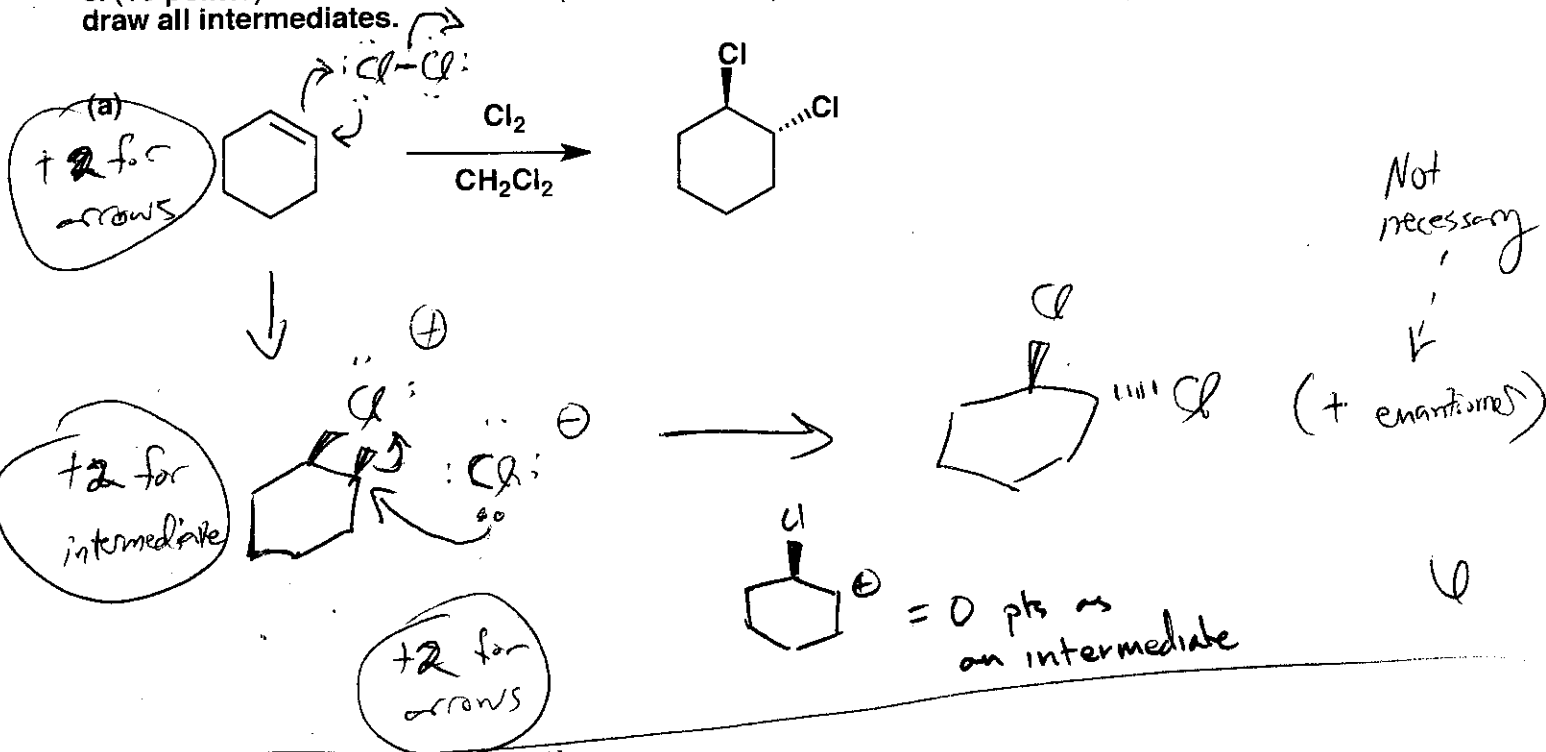


(b) For each product you drew above, draw all chair conformations. For each molecule, CIRCLE the most stable chair conformation.



+3 for each correct chair (+12 total)
 +2 for each correct circle (+4 total)

6. (16 points) Draw a mechanism (curved arrows) for each reaction shown below. Be sure to draw all intermediates.



+2 for each set of arrows (+6 total)

+2 for each intermediate (+4 total)

