

Chemistry 325
Summer, 2008
Examination #2
Thursday, July 3, 2008

The time limit for this examination is 50 minutes. The maximum score possible for this examination is 100 points. You may use molecular models.

REMOVE THIS SHEET BEFORE YOU TURN IN YOUR EXAM AND USE IT FOR SCRATCH PAPER.

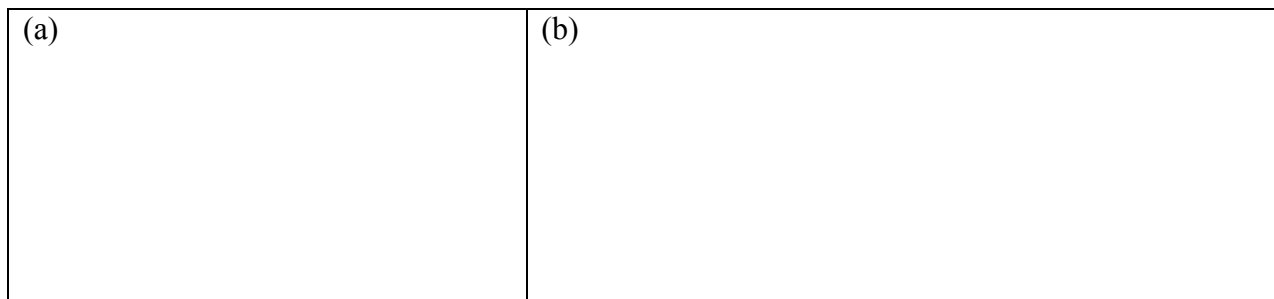
NAME: _____

SECTION I. Nomenclature [15 pts]

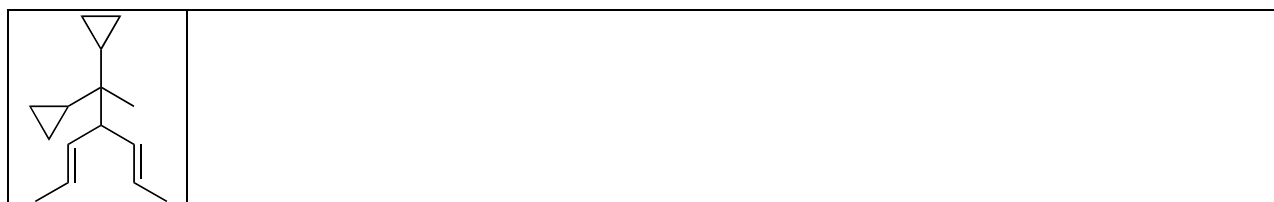
1. Draw the structures of the following compounds [5 pts each]:

(a) 1,3,6-cyclooctatriene.

(b) (2*E*,5*E*)-4-*tert*-butylhepta-2,5-diene.

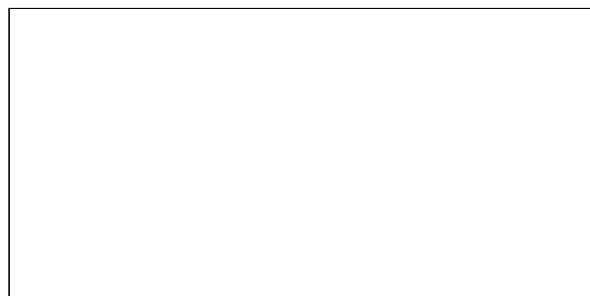


2. Write a correct name for the following compound [5 pts]:

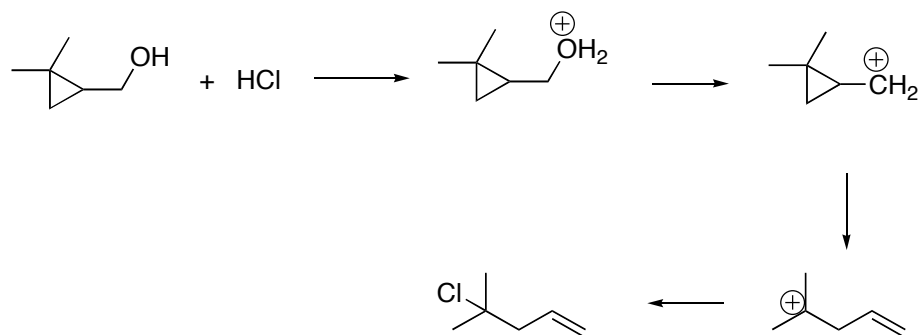


SECTION II. Reactions and Theory [85 pts]

3. [10 pts.] Draw the lowest energy conformation of *E*-1-chloro-1,3-dimethylcyclohexane.



4. The reaction of the alcohol below proceeds through the sequence of compounds shown to give the unsaturated alkyl chloride as the final product.

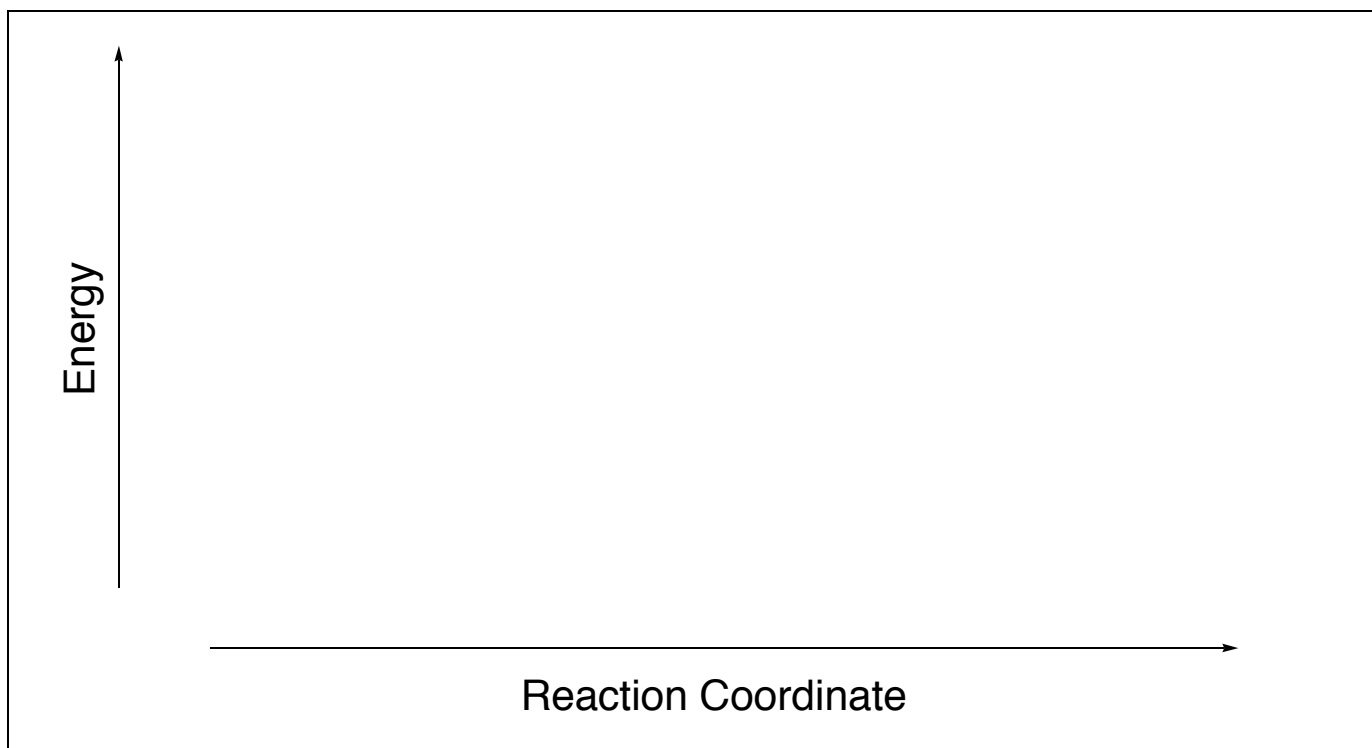


(a) [10 pts.] Complete the diagram above by adding the appropriate curly arrows

(b) [5 pts] What is the highest-energy reactive intermediate in this sequence of reactions? [Hint: a three-membered ring has a relatively high energy content compared to similar compounds without the three-membered ring due to ring strain]



(c) [12 pts.] Draw a fully-labeled reaction potential energy profile (reaction coordinate diagram) for the reaction. Your diagram should show the location and relative energy of every reactive intermediate. PAY PARTICULAR ATTENTION TO THE RELATIVE ENERGIES OF ALL SPECIES INVOLVED

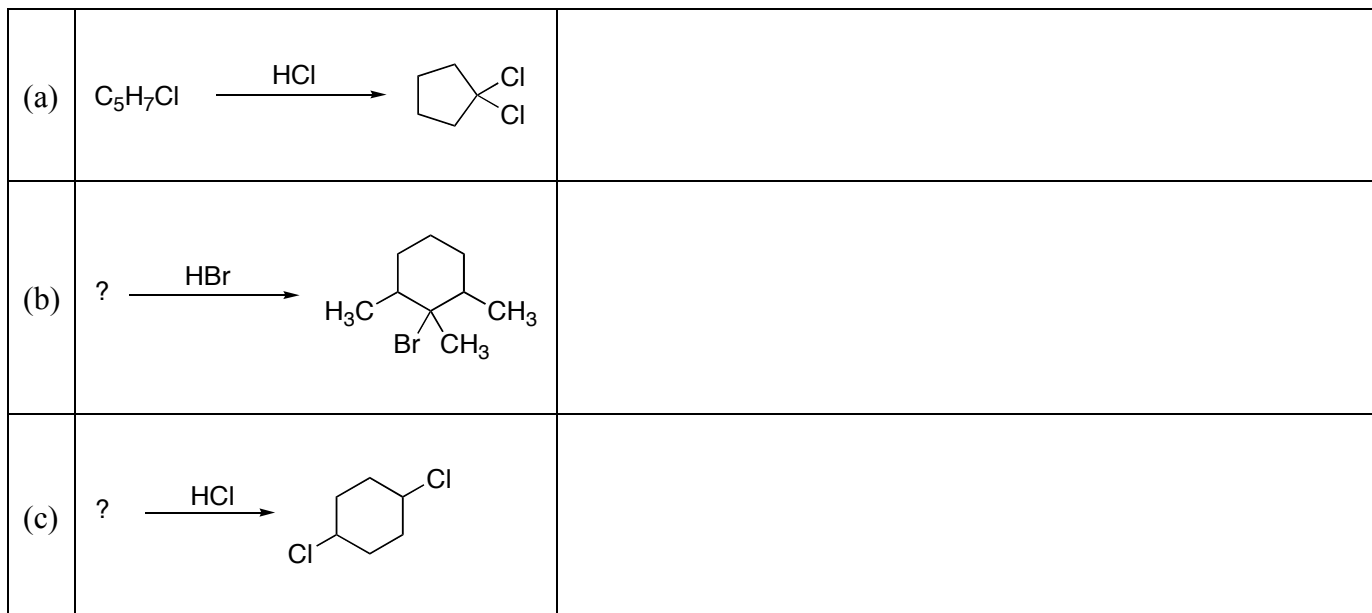


5. [5 pts. each] Complete the following reactions by drawing the structure of the final product.

(a)		
(b)		

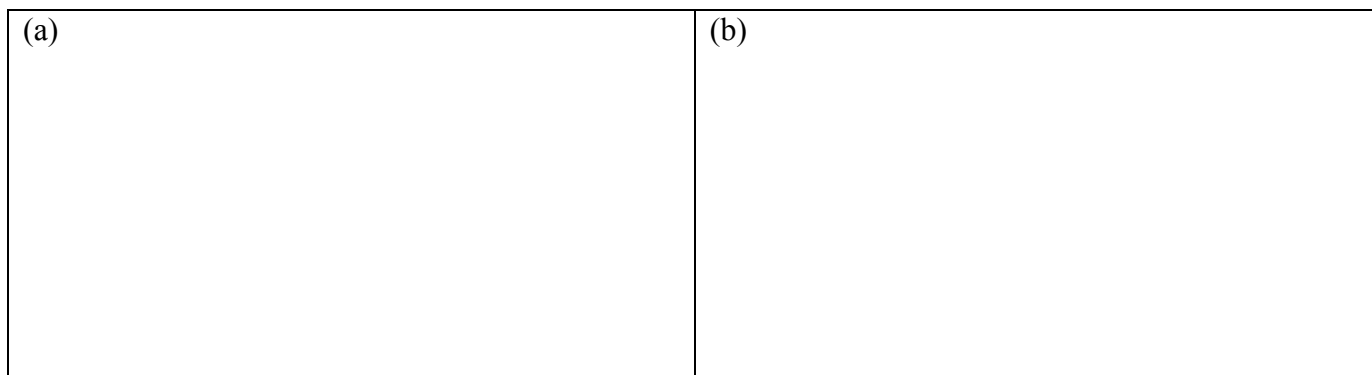


6. [6 pts. each] Complete the following reactions by drawing the structure of the starting alkene or providing the structure of the missing reagent. The molecular formula is given for some missing reactant alkenes.



7. Draw the following Newman Projections [5 pts each; 10 pts] (In this question, you may use the following abbreviations if you need them: Me=methyl; Et=ethyl, Pr=propyl, Bu=butyl)

- (a) the lowest-energy staggered conformation along the 2,3-bond of 3-methylheptane.
 (b) the lowest energy conformation along the 2,3-bond of 3,3-diethylpentane.



8. In the space below, explain why *cis*-1,3-dimethylcyclohexane does not ring flip. [10 pts]