

Chemistry 116 Sec. A (8:00-8:50)
Exam No. 4
“Polyenes, Free Radical Halogenation, and Substitution”
December 7, 2001

Instructions: You will have 50 min. to complete the exam. At the 50 min. mark, I will request that all remaining test takers cease writing, turn their exams over, and pass them to their rightmost isle. If you finish within 45 min. you may turn in the exam at the front of the room prior to leaving. If you finish in the final 5 min. of class, please turn your exam over and remain seated until I call for the remaining exams to be turned in. *In fairness to all, anyone still working on the exam after “time” is called will receive a grade of zero!*

Be sure to read the instructions for each question. It may be helpful to skim the entire exam and solve the easier questions first.

Exam Agreement: I, _____, have read and agree to
(Please print)
abide by the instructions above. On my honor, I have neither given
nor accepted any help during this exam.

Signature: _____

College: _____

YOU MUST PLACE YOUR ANSWERS IN THE SPACE PROVIDED. I WILL NOT GRADE ANYTHING WRITTEN ON THE BACKSIDES OF THE EXAM OR ON THE SCRATCH PAPER.

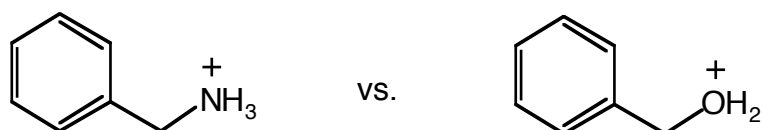
**DO NOT OPEN THIS EXAM UNTIL
INSTRUCTED TO DO SO**

1. For each pair of structures shown below, circle the one that best fits the description and provide an explanation for your selection. *Note:* All of the explanations will require illustrations to receive full credit. (24 points)

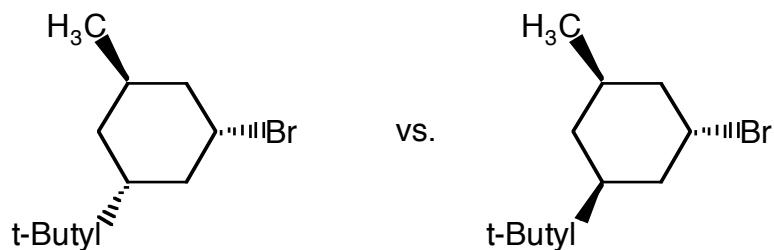
Gives the faster S_N2 reaction in a polar protic solvent



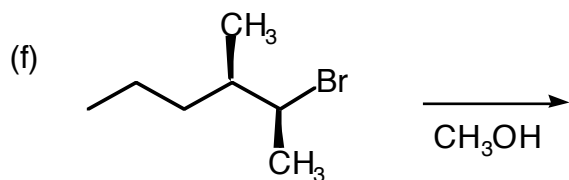
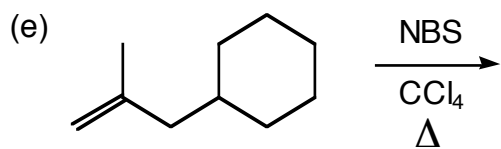
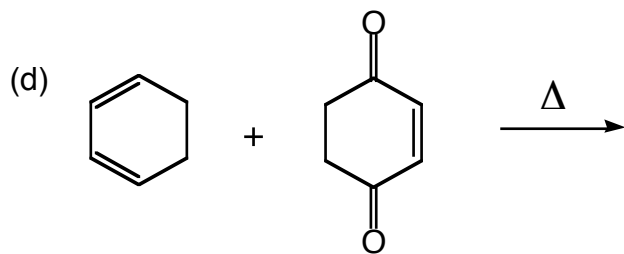
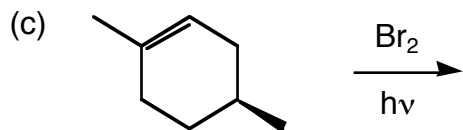
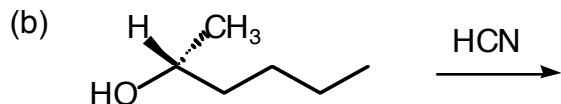
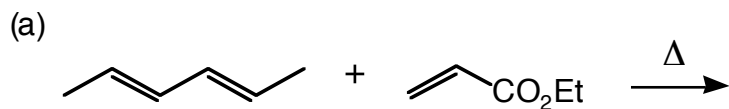
Gives the faster S_N1 reaction?



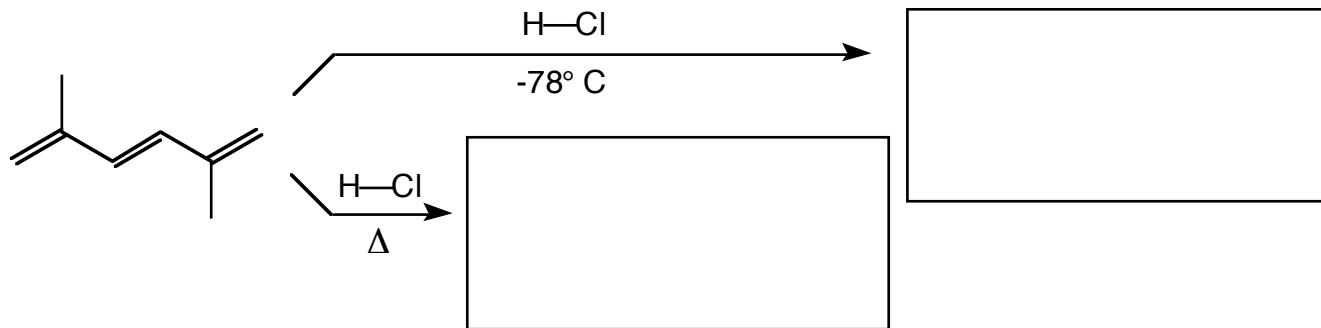
Gives the faster S_N2 reaction? *Hint: consider the most stable conformation of each ring.*



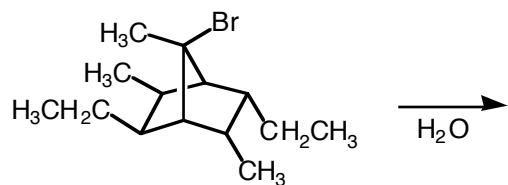
2. Predict the major organic product of each of the following reactions. (36 points)



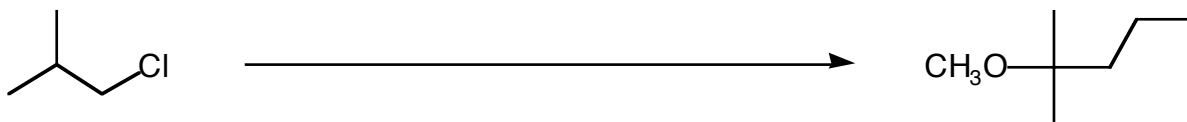
3. Determine the kinetic and thermodynamic products of the following reactions. Provide a mechanism that shows all *relevant* resonance structures and briefly explain why the products are favored. (12 pts)



4. The following substitution reaction occurs via an $\text{S}_{\text{N}}1$ pathway. However, unlike most $\text{S}_{\text{N}}1$ reactions, a racemic mixture is *not* formed. Instead, one enantiomer predominates. Predict this product and use pictures *and* words to explain this phenomenon. (8 points)



5. Provide a synthesis for each of the following transformations. You must show the products of each step for full credit. (20 points)



Grading Summary

Page	Point Value	Points Earned
2	24	
3	36	
4	20	
5	20	
	Total Score =	