

Chemistry 116 Sec. A (8:00-8:50)
Exam No. 3
“Reactivity of Alkynes, Arenes, Polyalkenes, and Free Radicals”
November 10, 2000

Instructions: You have until 8:55 a.m. to complete the exam. At that time, I will request that all remaining test takers cease writing, turn their exams over, and pass them to their rightmost isle. If you finish before 8:50 a.m. you may turn in the exam at the front of the room prior to leaving. If you finish within 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)

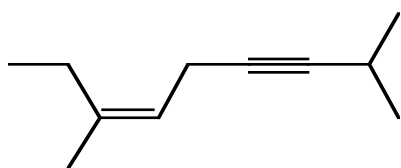
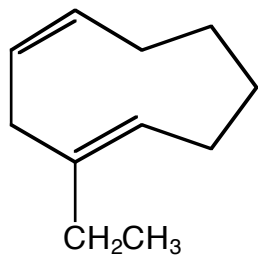
abide by the instructions above. On my honor, I have neither given nor accepted any help during this exam.

Signature: _____

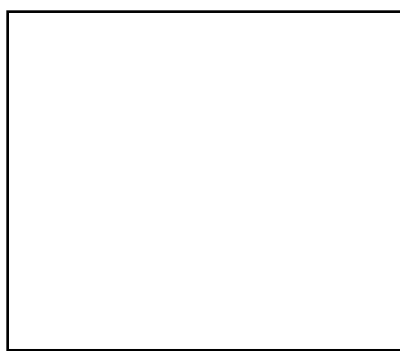
College: _____

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

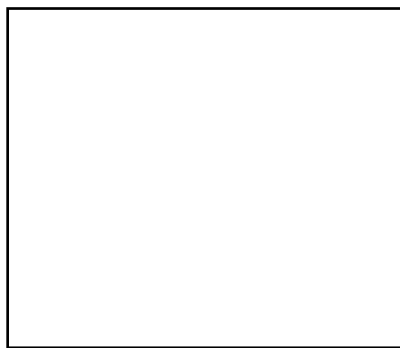
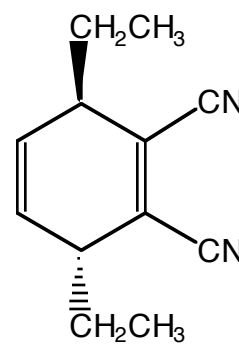
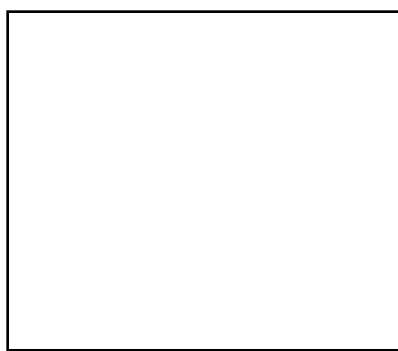
1. Provide an unambiguous name (IUPAC or common) for each of the following molecules. (12 points)



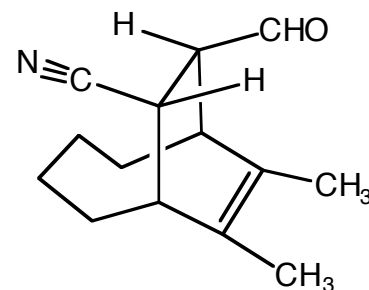
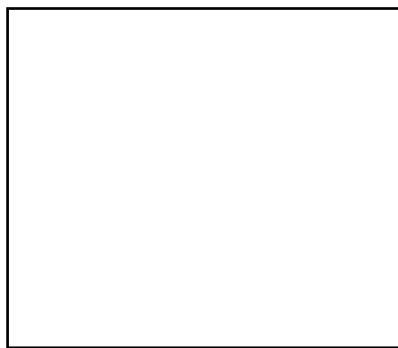
2. The following compounds can each be made from a Diels-Alder reaction. Show the starting materials necessary to achieve the reaction. (12 points)



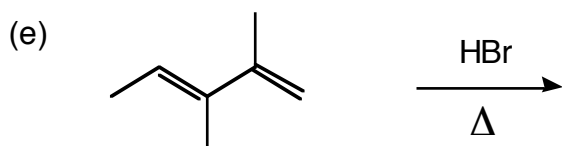
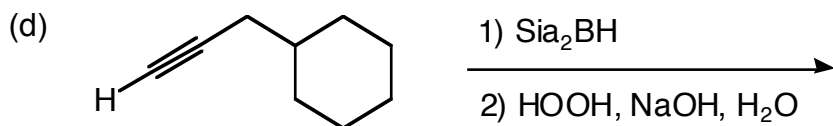
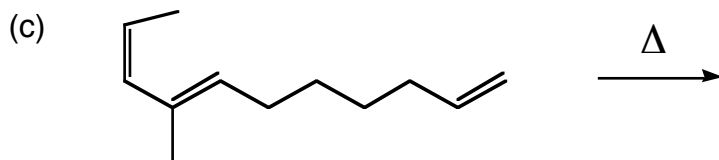
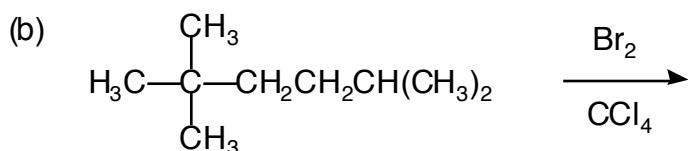
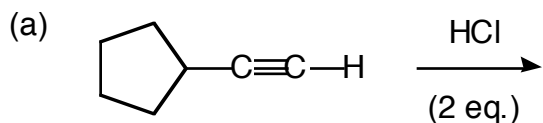
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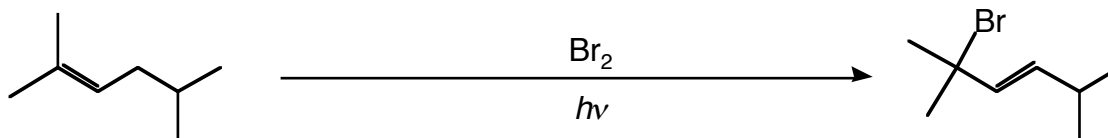
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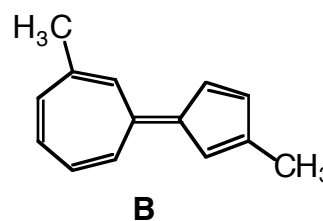
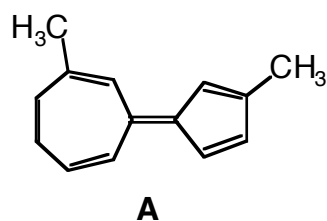
3. Predict the *major* product(s) for each of the following reactions and circle your final answer. Be sure to consider regiochemistry and stereochemistry in your answers. For problems where two or more products are formed in equal amounts, draw *all* of the products and circle each one. (30 points)



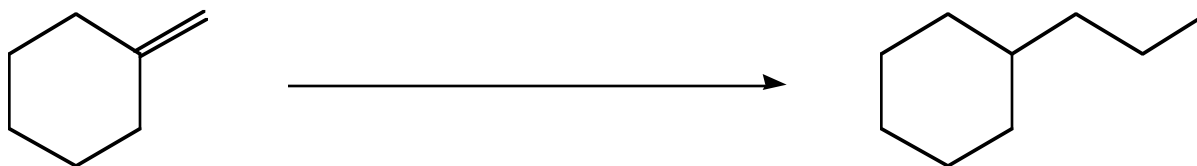
4. Read these instructions carefully before proceeding. Provide a mechanism for the following radical substitution reaction, paying close attention to the following details:
- label the three major steps of the reaction (initiation, propagation, and termination),
 - include any intermediates and their resonance structures in your mechanism,
 - provide at least 2 plausible termination steps
 - explain why the product shown is favored over any other possibilities. (16 points)



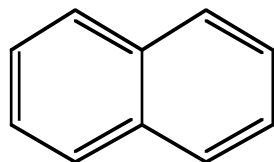
5. A researcher on the East coast synthesizes **A** while a researcher on the West coast synthesizes **B**. Both researchers post the physical properties of their molecules on their web pages. To their surprise, **A** and **B** have exactly the same melting point, boiling point, refractive index, density, and dipole moment. Provide an explanation for these results using pictures & words. (8 points)



6. Propose a synthesis (sequence of reactions) that will accomplish the following transformation. *Be sure to include the products of each step for full credit.* (12 points)



7. As you know, all the carbon-carbon bonds in benzene have the same bond length. In stark contrast to benzene, researchers have found that naphthalene *does not* possess equivalent carbon-carbon bond lengths! Use pictures *and* words to explain this phenomenon. (10 points)



Naphthalene

Grading Summary

Page	Point Value	Points Earned
2	24	
3	30	
4	24	
5	22	
	Total Score =	