

Chemistry 334

Examination #1

September 27, 2004

Professor Charonnat

Name: _____

Be certain that your examination has six (6) pages including this one.

Put your name on **each** page of this examination booklet.

By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.

Molecular models are allowed for this examination. Calculators are unnecessary and are not allowed.

Name: _____

1. (25 points)

Circle the number that corresponds to the correct answer for each of the following five (5) questions.

A. What type of reaction typically occurs at the allylic position of an alkene?

1. addition
2. elimination
3. substitution

B. How many conformations of 1,3-butadiene are conjugated?

1. one
2. two
3. three

C. Alkoxymercuration/demercuration of alkenes forms ethers. This transformation involves the opening of a cyclic mercurinium ion with an alcohol molecule. The mechanism of this process follows

1. an S_N1 pathway
2. an S_N2 pathway
3. an S_N2 pathway with S_N1 character

D. The first step in an electrophilic aromatic substitution has

1. an early transition state
2. a late transition state
3. neither

E. The first step in a Birch reduction forms

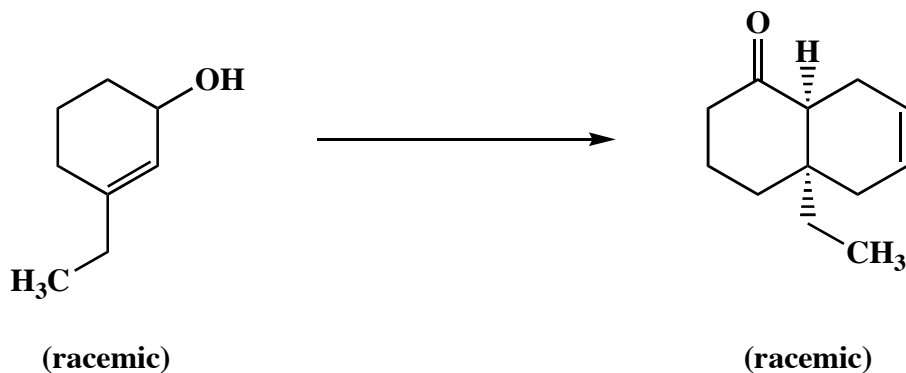
1. a neutral radical
2. an anion
3. a radical anion

Name: _____

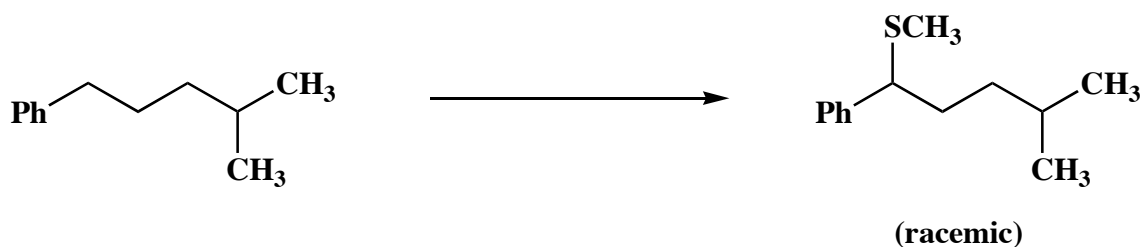
2. (25 points)

Draw the specific reagent(s) necessary to effect the following three (3) transformations. If more than one reaction is involved in an answer, be certain to distinguish the individual steps clearly.

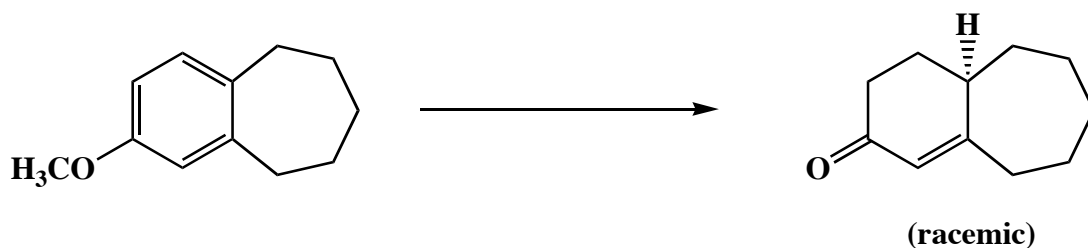
A.



B.

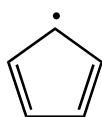


C.



3. (15 points)

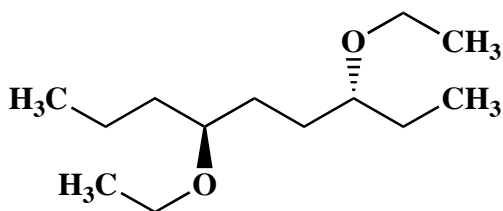
Classify each of the following three (3) species as aromatic, antiaromatic, or nonaromatic (neither aromatic nor antiaromatic).



Name: _____

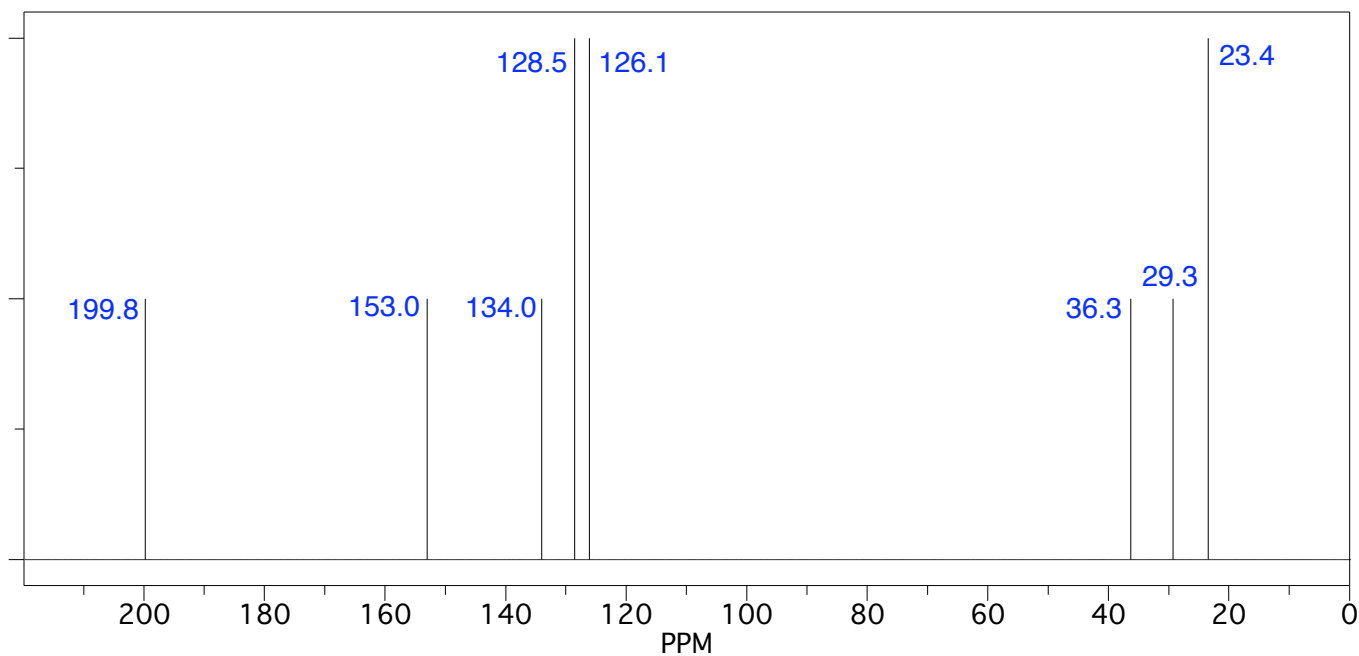
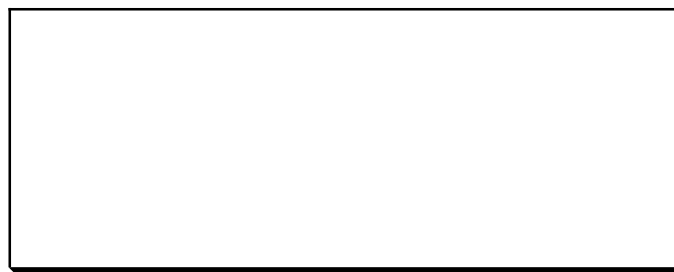
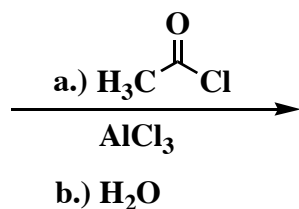
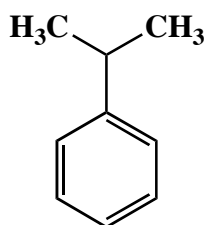
4. (10 points)

Use IUPAC nomenclature to write the systematic name of the following ether.



5. (25 points)

The following reaction affords a number of organic products. Draw each of the expected products. The broadband proton-decoupled ^{13}C NMR spectrum of the major product is shown below. Use the spectroscopic data to identify this compound. Make clear assignments of all resonances to explain your reasoning. Then put a star next to the major product. Finally, describe succinctly why the other compounds that you drew were excluded from consideration. (A ^{13}C NMR correlation table is included on page 6.)



Name: _____

5. (continued)

^{13}C NMR assignments:

chemical shift (ppm)	assignment
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Reasoning to exclude alternative compounds:

Congratulations!

1	/25
2	/25
3	/15
4	/10
5	/25
<hr/> Total:	<hr/> /100