

Chemistry 333

Final Examination

December 17, 2018

Professor Charonnat

Name: _____

Be certain that your examination has nine (9) 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.

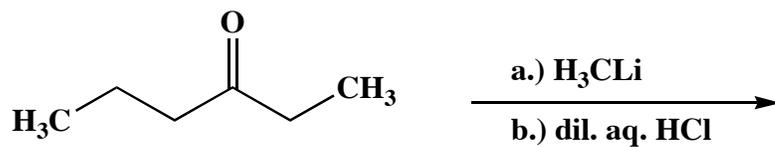
Molecular models are allowed for this examination. All electronic devices, including calculators and cell phones, are unnecessary and are not allowed.

Name: _____

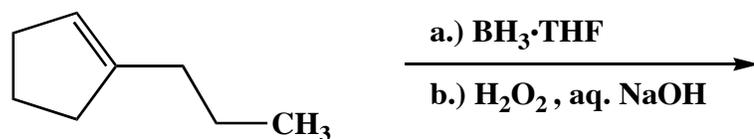
1. (25 points)

Draw the structure of the expected major organic product for each of the following five (5) questions. Specify stereochemistry, if relevant.

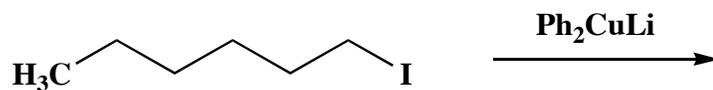
A.



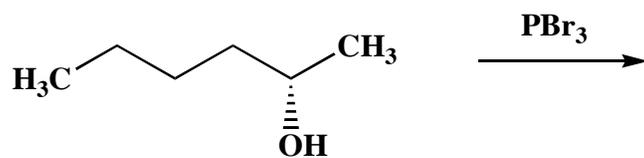
B.



C.



D.



E.

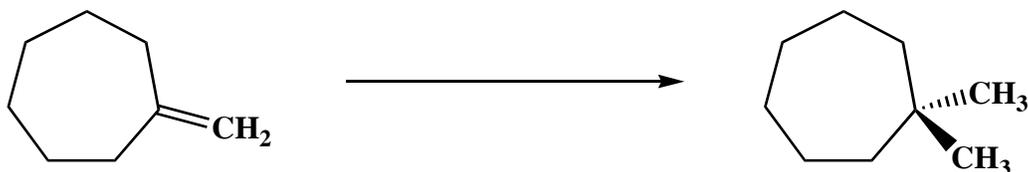


Name: _____

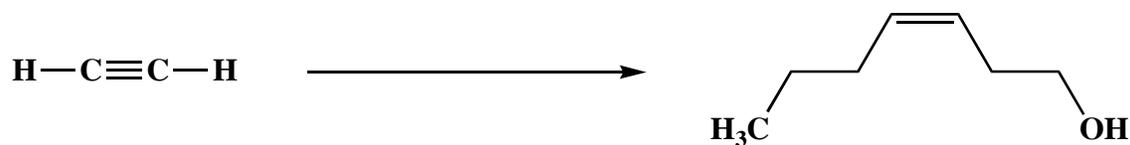
2. (25 points)

Write the specific reagents necessary to accomplish the transformation shown for both of the following questions. More than one reaction is involved in each question. Be certain to distinguish the individual steps clearly. Include stoichiometric coefficients of reagents, as well.

A.

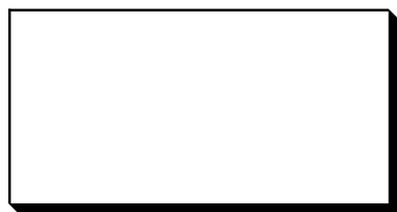
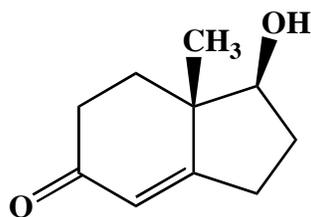


B.

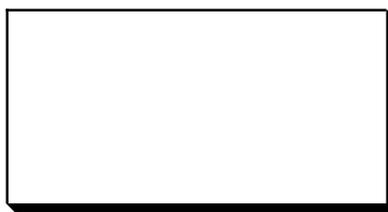


3. (10 points)

Draw the enantiomer of the following bicyclic carbonyl compound. Then draw a regioisomer.



enantiomer



regioisomer

Name: _____

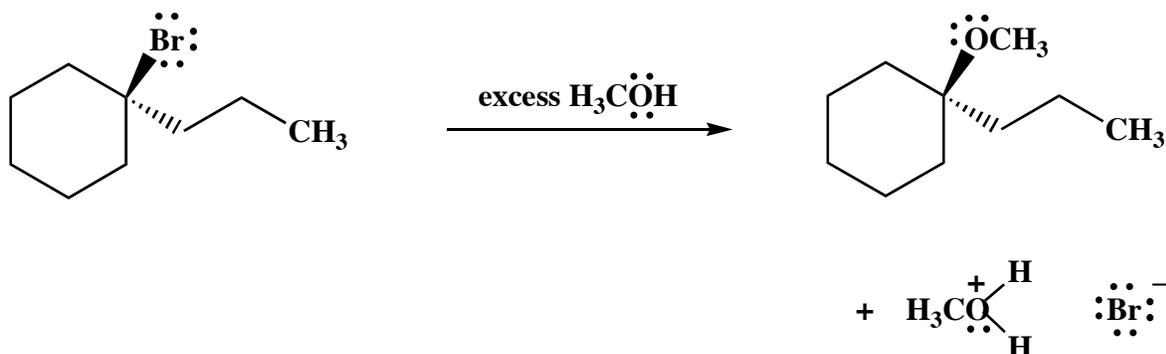
4. (50 points)

These questions are unavailable due to copyright considerations.

Name: _____

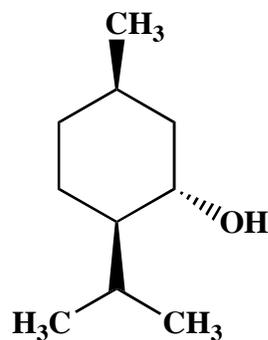
5. (15 points)

Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show all intermediates, lone pairs, nonzero formal charges, countercharges, and reversibility or irreversibility.



6. (15 points)

Draw the most stable chair conformation of isomenthol. Draw carefully positioned intersecting arcs to denote all sources of strain for this conformation.

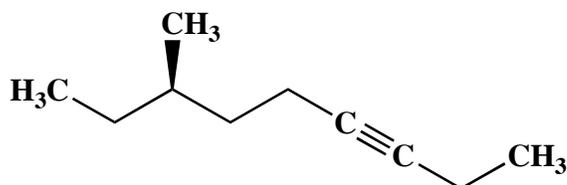


isomenthol

Name: _____

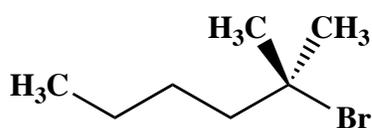
7. (10 points)

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



8. (20 points)

The product from the following reaction shows mass spectral signals at $m/z = 99$, 98 , and 69 . Furthermore, the signal at $m/z = 99$ is approximately 8% the intensity of the signal at $m/z = 98$. The most intense signal in the mass spectrum is the signal at $m/z = 69$. Draw the structure of the product. Analyze the mass spectral data in detail to explain your reasoning.



mass spectral assignments:

m/z

structure

99

98

69

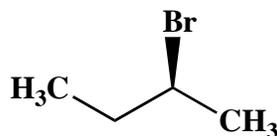
explanation of $m/z = 99$ and $m/z = 98$ relative intensities:

explanation of $m/z = 69$ intensity:

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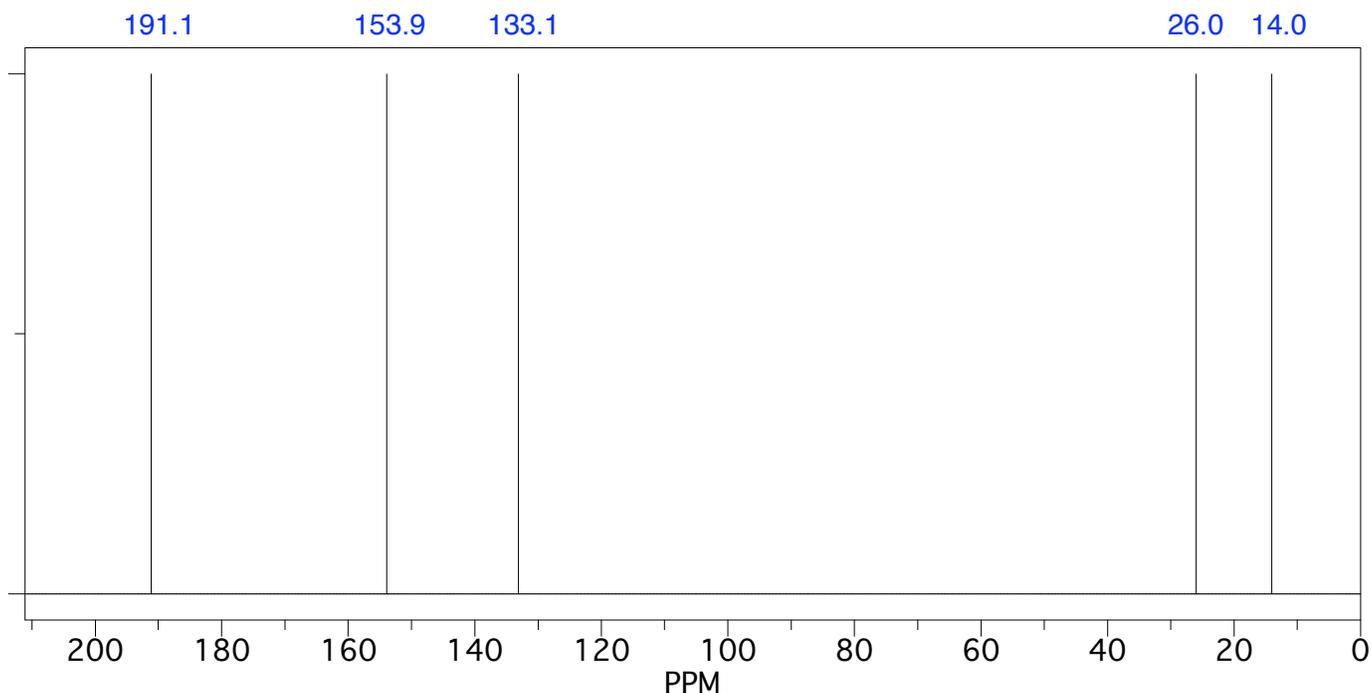
9. (10 points)

Use letters to label all the sets of chemically equivalent protons in the following alkyl bromide.



10. (20 points)

Draw the structure of the major organic product that is formed when the following alcohol is exposed to the Dess-Martin periodinane. Draw this structure in the box at the bottom of the next page. Then use letters to label all the sets of chemically equivalent carbons in this structure. The broadband proton-decoupled ^{13}C NMR spectrum of the product is shown below. DEPT 90 and DEPT 135 data are included in the table on the following page. Use this spectroscopic data to make clear assignments of all the resonances and determine the identity of the product. (A ^{13}C NMR correlation table is included separately.)



Name: _____

10. (continued)

^{13}C NMR assignments:

chemical shift (ppm)	assignment	DEPT 90	DEPT 135	DEPT explanation
191.1		present	up	
153.9		present	up	
133.1		present	up	
26.0		absent	down	
14.0		absent	up	

structure:



Congratulations!

1	/25
2	/25
3	/10
4	/50
5	/15
6	/15
7	/10
8	/20
9	/10
10	/20
<hr/> Total:	<hr/> /200