

Chemistry 333

Final Examination

May 18, 1998

Professor Charonnat

Name: _____

Be certain that your examination has ten (10) pages including this one.

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

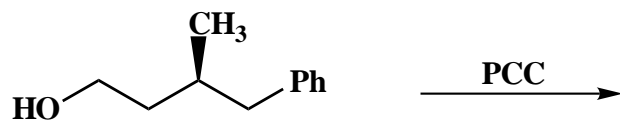
By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.

Name: _____

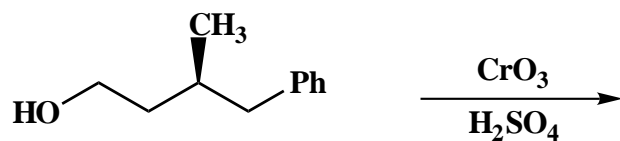
1. (50 points)

For each of the following ten (10) questions draw the structure of the expected major organic product. If relevant, explicitly specify absolute and/or relative stereochemistry.

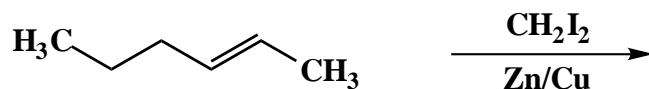
A.



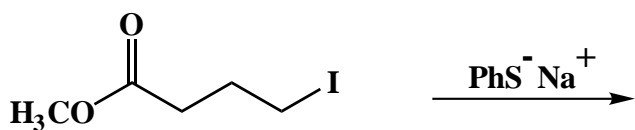
B.



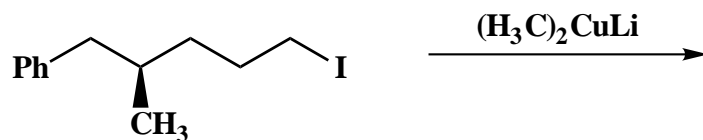
C.



D.



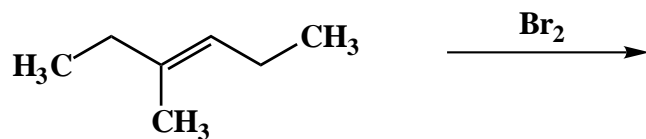
E.



Name: _____

1. (cont.)

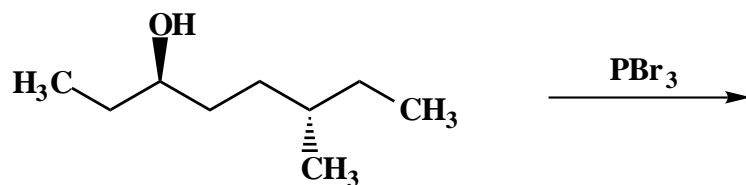
F.



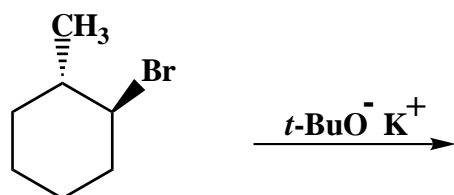
G.



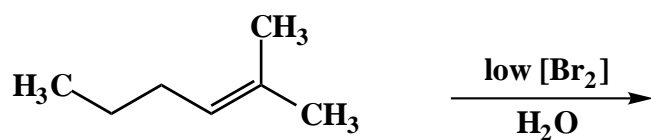
H.



I.



J.



Name: _____

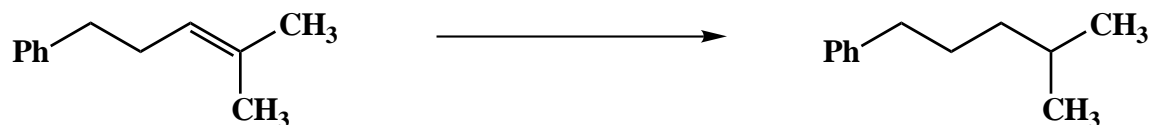
2. (50 points)

For each of the following ten (10) questions draw the specific reagent(s) necessary to effect the transformation shown. If more than one reaction is involved in an answer, be certain to distinguish the individual steps clearly.

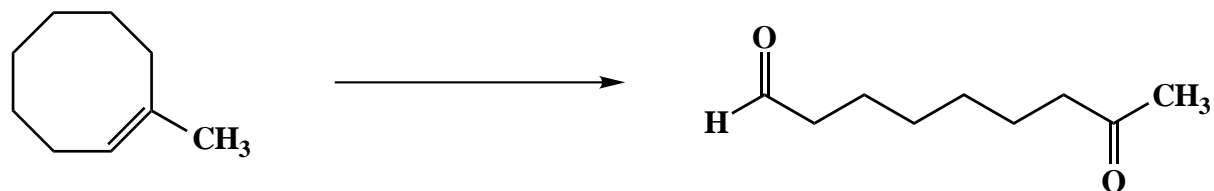
A.



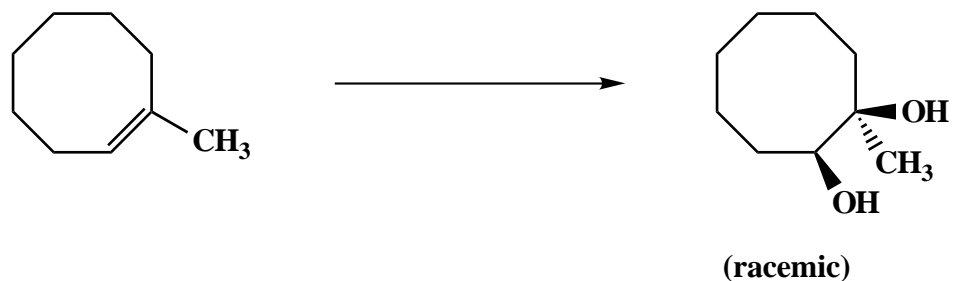
B.



C.



D.



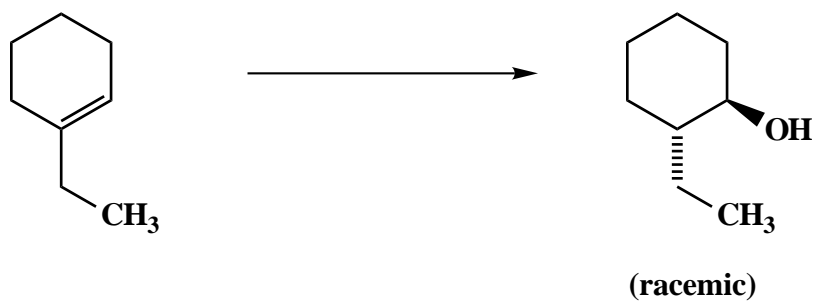
E.



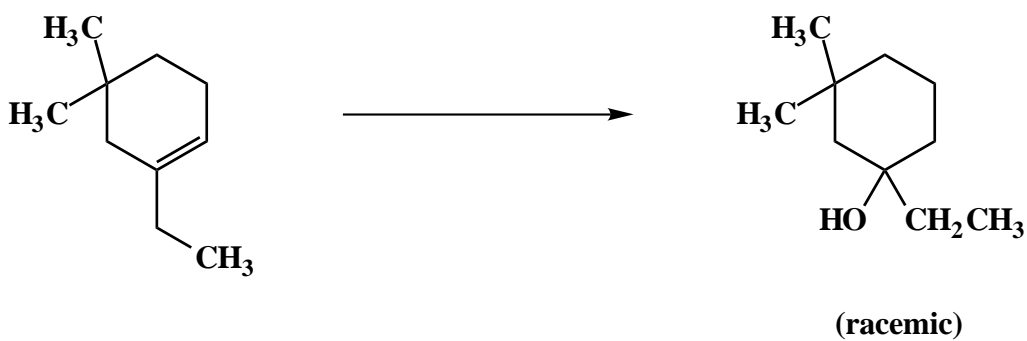
Name: _____

2. (cont.)

F.



G.



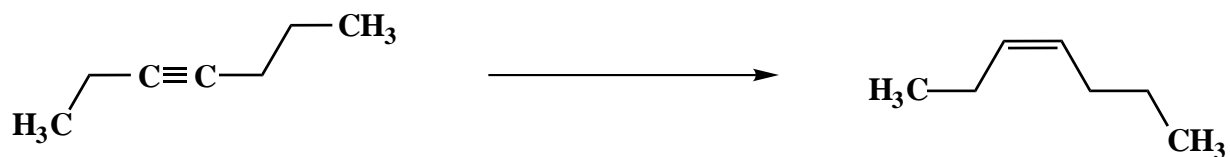
H.



I.



J.

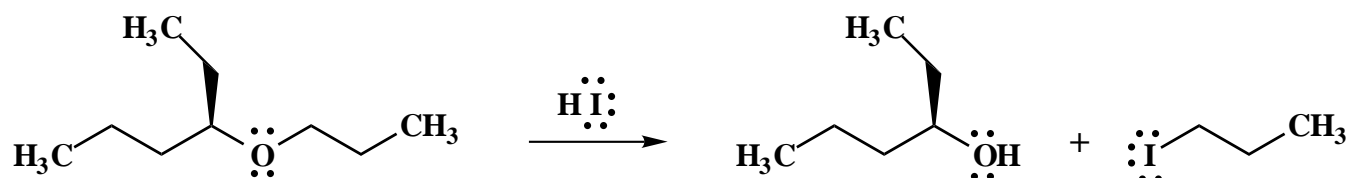


Name: _____

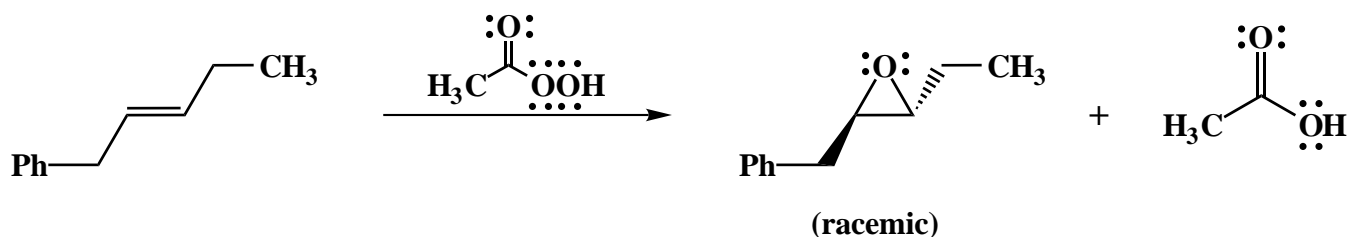
3. (25 points)

Draw mechanisms for each of the following two (2) reactions, using the curved-arrow notation to indicate the reorganization of electron density. Show all intermediates and denote all unshared electrons, formal charges and countercharges where appropriate. Clearly denote reversibility or irreversibility for each primary mechanistic step. Describe why a racemic mixture is obtained in the reaction in Part B.

A.



B.



Name: _____

4. (30 points)

Answer the following two (2) questions precisely, succinctly and with correct grammar.

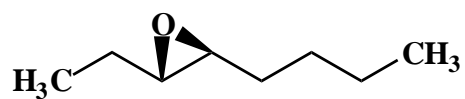
A. Why is there a small M+1 peak in the mass spectrum of an organic compound?

B. Why is the signal-to-noise ratio better for a given sample when its ^1H NMR spectrum is obtained at a higher external magnetic field strength?

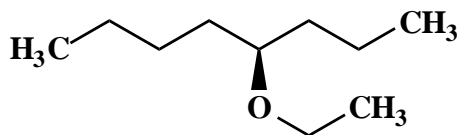
5. (20 points)

Use IUPAC nomenclature to write systematic names for each of the following two (2) compounds.

A.



B.



Name: _____

6. (25 points)

The infrared, ^1H NMR and ^{13}C NMR (broadband ^1H decoupled) spectra of compound A ($\text{C}_5\text{H}_{11}\text{Br}$) are shown below. Clearly assign all the resonances that you can identify with certainty and draw the structure of compound A. (Correlation tables are included separately.)

The infrared spectrum is unavailable due to copyright considerations.

Name: _____

6. (continued)

The ^1H NMR and ^{13}C NMR spectra are unavailable due to copyright considerations.

Name: _____

6. (continued)

Infrared absorption assignments:

wave number (cm ⁻¹)	functional group	type of vibration (stretch or bend)
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¹H NMR assignments:

chemical shift (ppm)	assignment	explanation of multiplicity
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¹³C NMR assignments:

chemical shift (ppm)	assignment	explanation of multiplicity
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structure of compound A:

Congratulations!

1	/50
2	/50
3	/25
4	/30
5	/20
6	/25
<hr/>	
Total:	/200