

Chemistry 333

Final Examination

December 8, 1997

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.

Name: _____

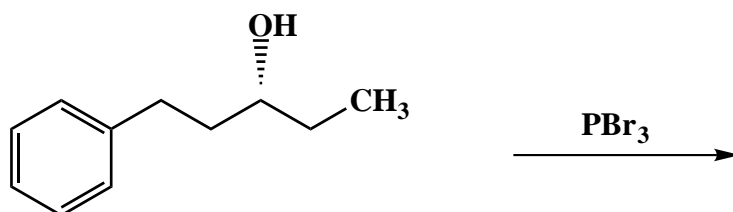
1. (30 points)

For each of the following five (5) questions specify the expected major organic product. If relevant, clearly specify the relative and/or absolute stereochemistry of the product.

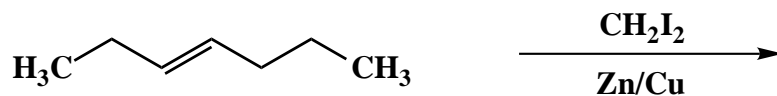
A.



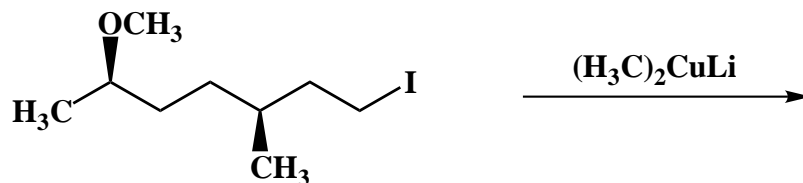
B.



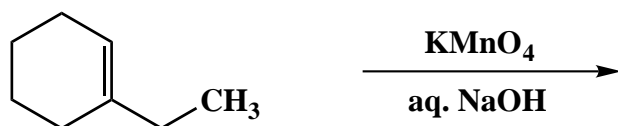
C.



D.



E.



Name: _____

2. (30 points)

A. Give an example of an optically active compound with two stereocenters.

B. Give an example of an optically inactive compound with two stereocenters.

C. Draw the appearance of a heptagon as viewed in Flatland.

D. Give an example of a non-stereoselective reaction.

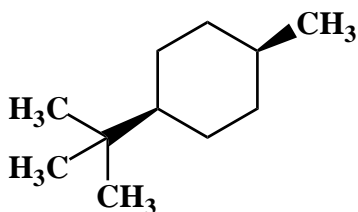
E. Give an example of a partially stereoselective reaction.

F. Give an example of a stereospecific reaction.

Name: _____

4. (25 points)

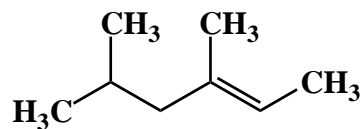
Draw the two possible chair conformations of the following 1,4-disubstituted cyclohexane. Show all 1,3-diaxial interactions for each chair. Circle the lowest energy conformation.



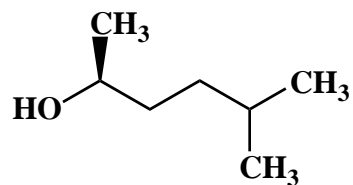
5. (20 points)

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

A.



B.



Name: _____

6. (20 points)

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

A. Why do infrared absorptions span a range of wave numbers instead of occurring only at single wave numbers?

B. Why are ^1H NMR resonances not all singlets?

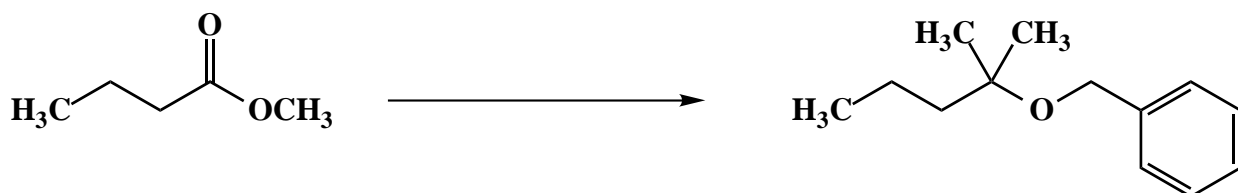
7. (25 points)

Specify appropriate reagents to accomplish the following two (2) transformations. More than one step is required for each conversion.

A.



B.



Name: _____

8. (25 points)

The infrared, ^1H NMR and ^{13}C NMR (broadband ^1H decoupled) spectra of compound A ($\text{C}_4\text{H}_{10}\text{O}$) 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: _____

8. (continued)

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

Name: _____

8. (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! Happy Holidays!

1	/30
2	/30
3	/25
4	/25
5	/20
6	/20
7	/25
8	/25
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Total:	/200