

Chemistry 334

Final Examination

December 14, 1994

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.

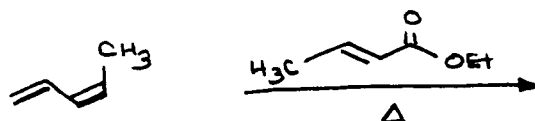
By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.

Name: _____

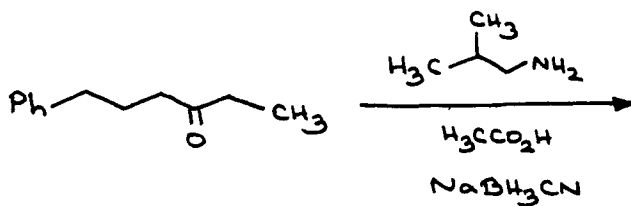
1. (25 points)

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

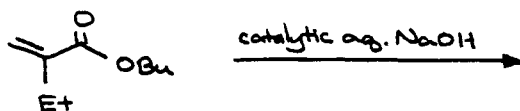
A.



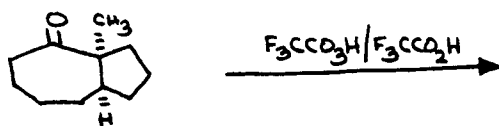
B.



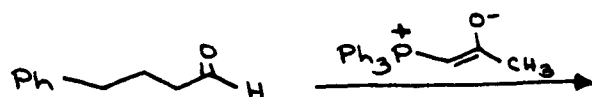
C.



D.



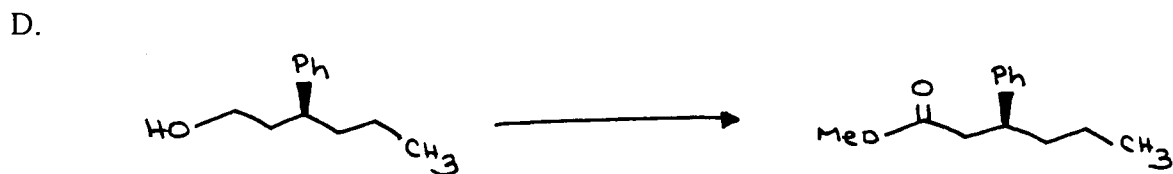
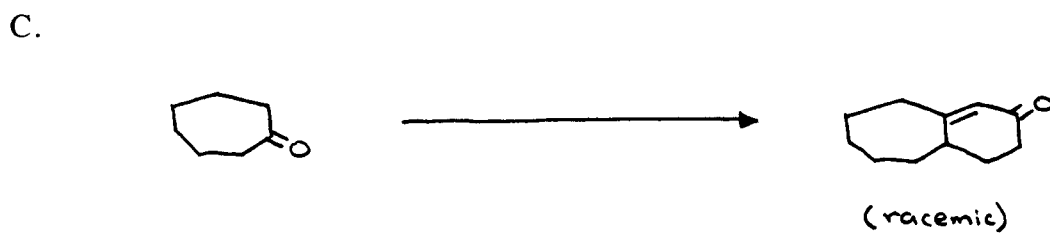
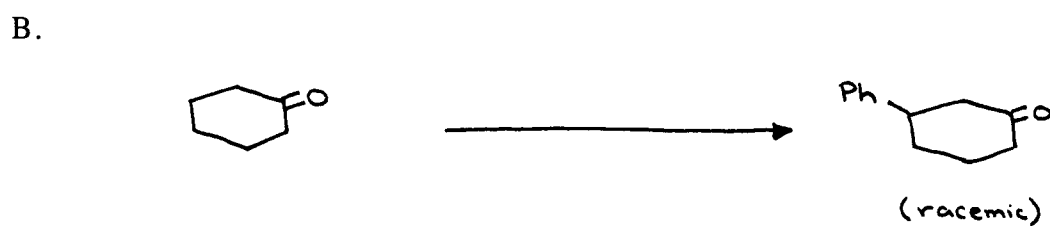
E.



Name: _____

2. (25 points)

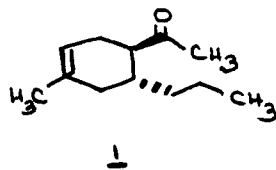
For each of the following five (5) questions denote the reagent or reagents necessary to effect the transformation shown. More than one step may be required in each case.



Name: _____

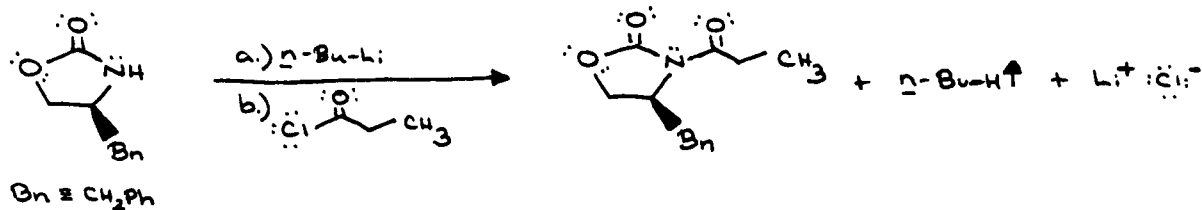
3. (25 points)

Design a synthesis of a racemic mixture of the α,β -unsaturated ketone **1** from acetic acid. Use any inorganic and organic reagents that you deem necessary. Draw clearly **all** reagents and isolable synthetic intermediate compounds. (**N.B.** Do **not** draw mechanisms for each synthetic transformation!)



4. (25 points)

Draw the mechanism of the following transformation, using the curved-arrow notation to indicate the reorganization of electron density. Show **all** intermediates and denote **all** lone pairs, formal charges and countercharges. Draw **all** important resonance structures where appropriate.



Name: _____

5. (25 points)

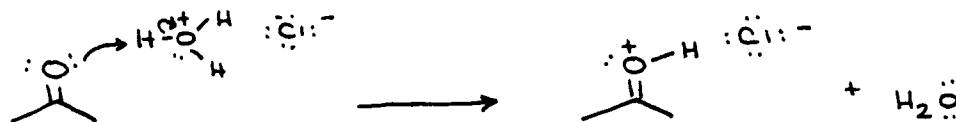
A. What experimental evidence proved that lysozyme's glutamic acid 35 residue is essential for the enzyme to catalyze hydrolysis of bacterial cell wall polysaccharides?

B. What is meant by the term, "primary structure," of proteins? Do all proteins have primary structure? Why or why not?

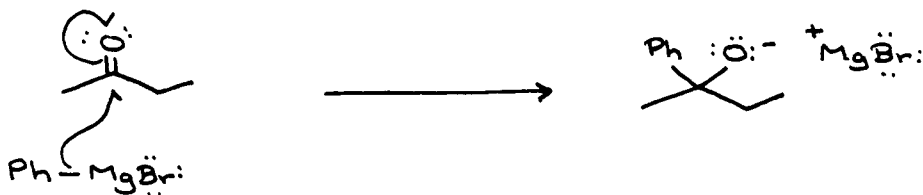
6. (20 points)

For each of the following two (2) questions concisely state why the primary mechanistic step shown does not occur. Draw what would actually happen instead.

A.



B.



Name: _____

7. (30 points)

Draw a specific example of:

A. any prostaglandin:

B. any naturally-occurring phospholipid:

C. any naturally-occurring wax:

D. any naturally-occurring unsaturated fatty acid:

E. any naturally-occurring saturated fatty acid:

F. any nonreducing saccharide:

G. any reducing saccharide:

H. any naturally-occurring basic α -amino acid:

I. any naturally-occurring neutral α -amino acid:

J. any naturally-occurring acidic α -amino acid:

Name: _____

8. (25 points)

The infrared, ^1H NMR and ^{13}C NMR (broadband ^1H decoupled) spectra of compound A ($\text{C}_7\text{H}_{14}\text{O}$) 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. (cont.)

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

Name: _____

8. (cont.)

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