

Chemistry 334

Examination #2

November 2, 1998

Professor Charonnat

Name: _____

Be certain that your examination has seven (7) pages including this one.

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

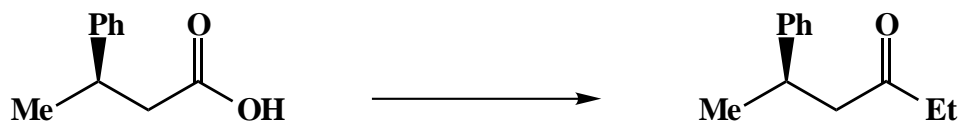
By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.

Name: _____

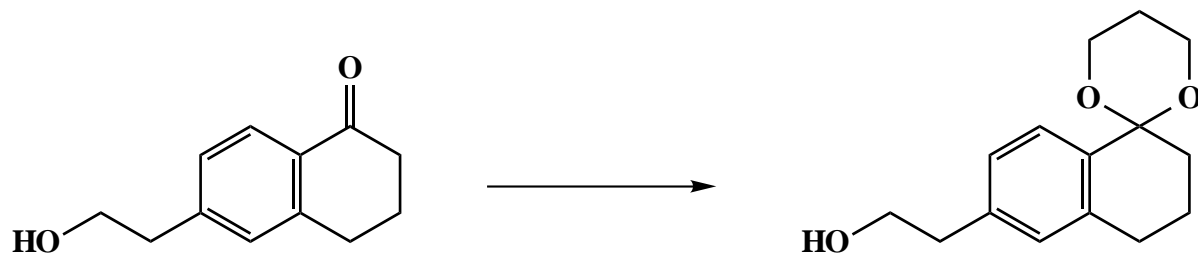
1. (25 points)

For each of the following five (5) questions, draw the 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.

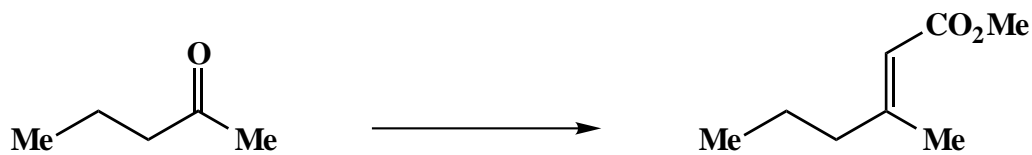
A.



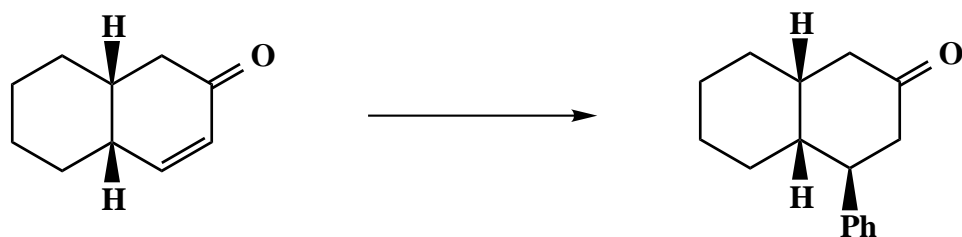
B.



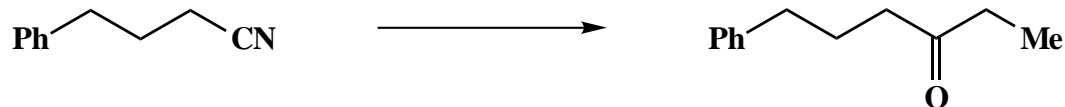
C.



D.



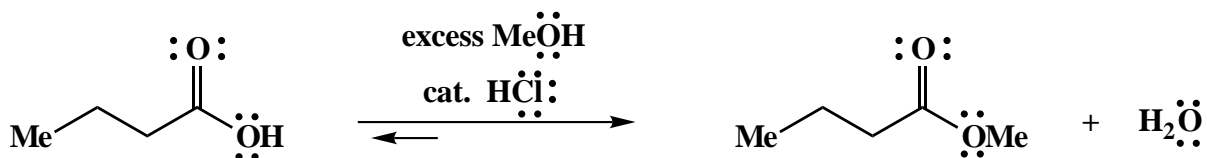
E.



Name: _____

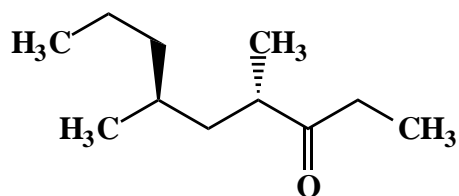
2. (25 points)

Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show **all** intermediates and denote **all** lone pair electrons, formal charges and countercharges where appropriate.



3. (10 points)

Use IUPAC nomenclature to write the systematic name of the following carbonyl compound.



Name: _____

4. (20 points)

For each of the following five (5) questions, circle the number that corresponds to the correct answer.

A. Amides are the least reactive carboxylic acid derivative due to:

1. inductive removal of electron density from the carbonyl carbon by the electronegative nitrogen
2. steric hindrance
3. resonance delocalization of the nitrogen's lone pair into the carbonyl group

B. Acid anhydrides react with Grignard reagents under controlled conditions to afford:

1. aldehydes
2. ketones
3. esters

C. A primary alcohol can be converted to the corresponding aldehyde with:

1. potassium dichromate
2. Jones reagent
3. pyridinium chlorochromate

D. Ester hydrolysis with aqueous potassium hydroxide occurs via:

1. addition of hydroxide followed by elimination of alkoxide
2. elimination of alkoxide followed by addition of hydroxide
3. S_N2 displacement of the alkoxide by hydroxide

E. Imine formation requires an aldehyde (or ketone), a primary amine and a weak acid.
If a strong acid is used instead, then

1. no imine formation occurs
2. the reaction rate is slower, but measurable
3. the reaction rate is faster

Name: _____

5. (20 points)

The infrared, ^1H NMR and ^{13}C NMR (broadband ^1H decoupled) spectra of compound A ($\text{C}_4\text{H}_8\text{O}_2$) 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: _____

5. (continued)

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

Name: _____

5. (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	/25
2	/25
3	/10
4	/20
5	/20
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Total:	/100