

Chemistry 334

Examination #2

November 2, 2009

Professor Charonnat

Name: _____

Be certain that your examination has five (5) 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.

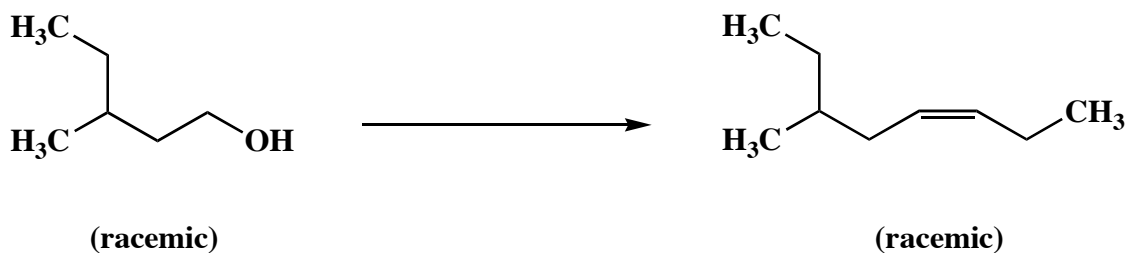
Molecular models are allowed for this examination. All electronic devices, including calculators, are unnecessary and are not allowed.

Name: _____

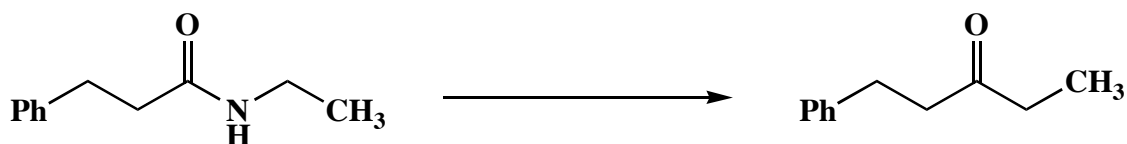
1. (30 points)

Draw the specific reagent(s) necessary to effect the following three (3) transformations. If more than one reaction is involved in an answer, be certain to distinguish the individual steps clearly.

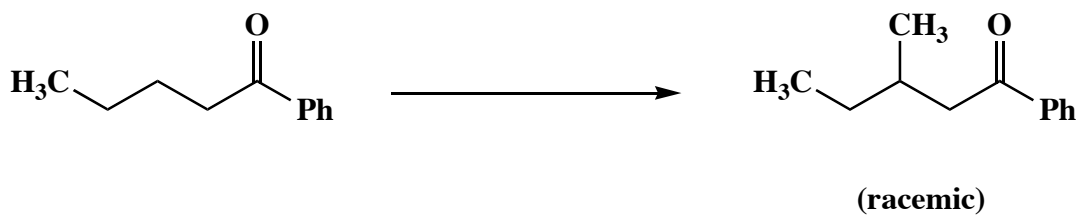
A.



B.

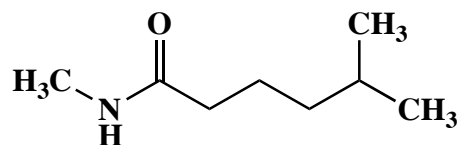


C.



2. (10 points)

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



Name: _____

3. (25 points)

Circle the number that corresponds to the correct answer for each of the following five (5) questions.

A. The reaction of hexanoic acid with thionyl chloride to afford the corresponding acid chloride occurs

1. reversibly, with a favorable equilibrium constant
2. reversibly, with an unfavorable equilibrium constant
3. irreversibly

B. The reaction of butanoyl chloride with ethanol and pyridine occurs via a

1. one-step mechanism
2. two-step mechanism
3. three-step mechanism

C. Which class of carbonyl compounds is more electrophilic?

1. esters
2. acid anhydrides
3. ketones

D. Butanenitrile is at

1. a lower oxidation level than butanoic acid
2. the same oxidation level as butanoic acid
3. a higher oxidation level than butanoic acid

E. Acid-catalyzed ketone enolization occurs

1. via a protonation-deprotonation sequence
2. via a deprotonation-protonation sequence
3. in one primary mechanistic step

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4. (20 points)

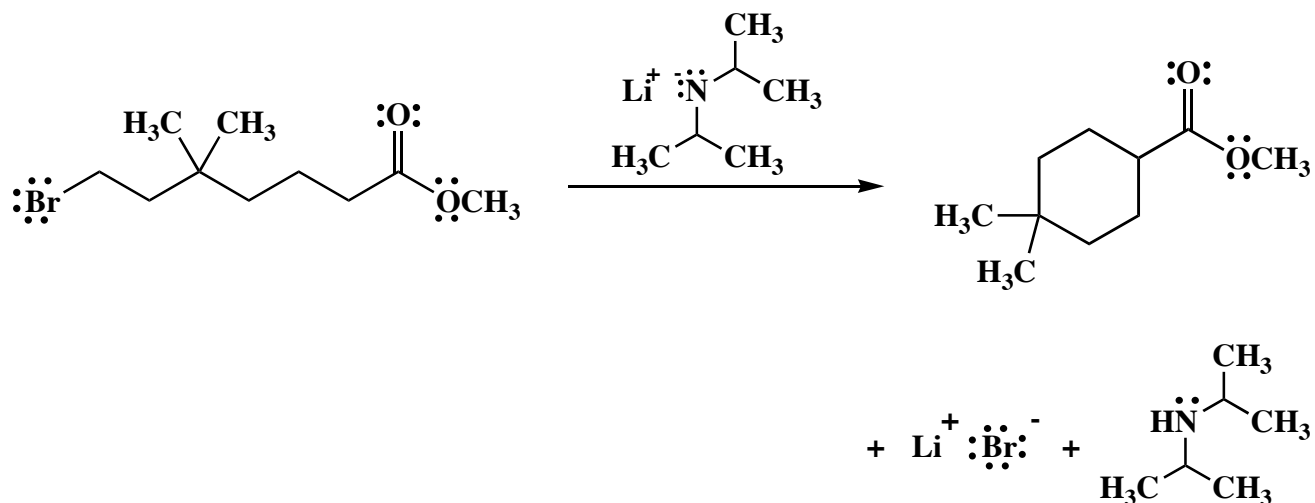
A. Without referring to chemical shift values, explain how one could use ^1H NMR spectroscopy to distinguish between pentanal and pentanoic acid.

B. Explain why the mildly acidic, acid-catalyzed reaction of cyclopentanone with dimethylamine $[(\text{H}_3\text{C})_2\text{NH}]$ affords an enamine, not an imine. Draw a partial mechanism to illustrate your answer.

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5. (15 points)

Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Denote all intermediates, lone pairs, nonzero formal charges, countercharges, and reversibility or nonreversibility. Explain why the cyclic product that is shown is formed, not the acyclic product formed by coupling of two molecules of the starting material.



Congratulations!

1	/30
2	/10
3	/25
4	/20
5	/15
<hr/> Total:	<hr/> /100