

Chemistry 334
Final Examination

December 8, 2004

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.

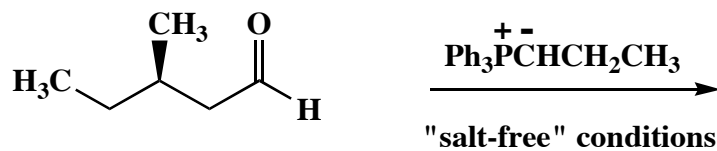
Molecular models are allowed for this examination. All electronic devices, including calculators, are unnecessary and are not allowed.

Name: _____

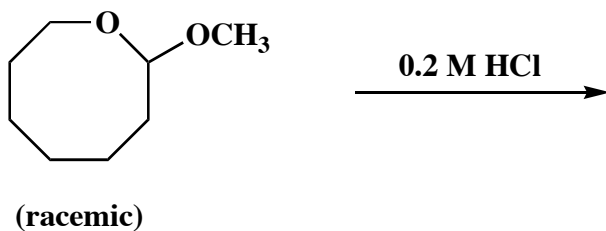
1. (25 points)

Draw the structure of the expected major organic product for each of the following five (5) questions. Clearly specify stereochemistry, if relevant.

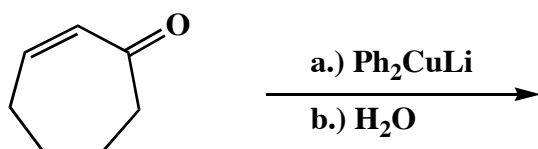
A.



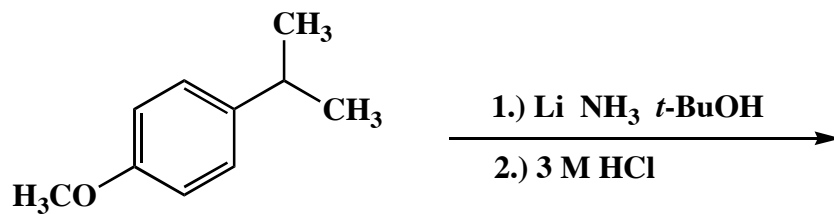
B.



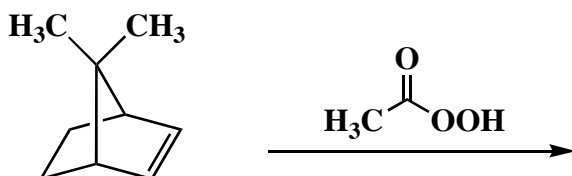
C.



D.



E.

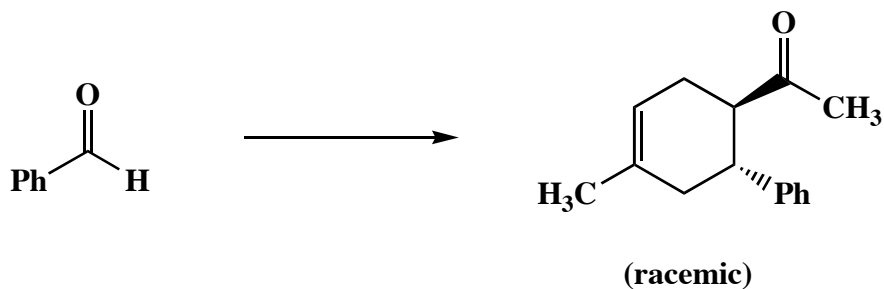


Name: _____

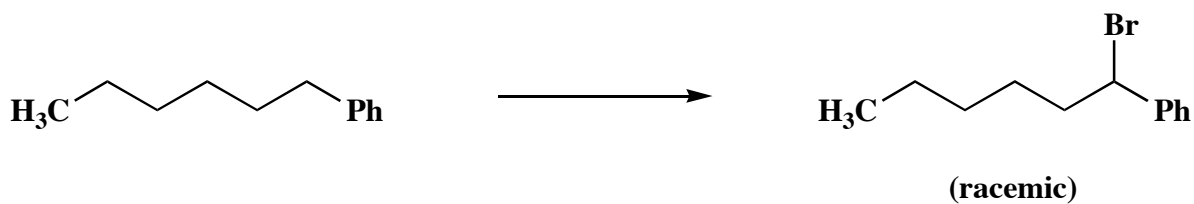
2. (25 points)

Draw the specific reagent(s) necessary to effect the transformation shown for each of the following three (3) questions. If more than one step is required, be certain to specify each step separately.

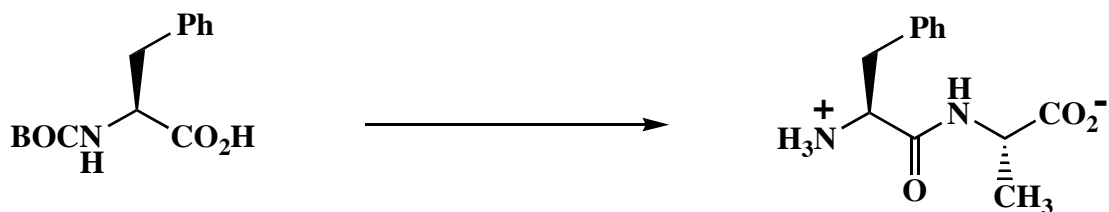
A.



B.



C.



Name: _____

3. (25 points)

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

A. Nylon-6,6 is

1. an addition copolymer
2. an addition homopolymer
3. a condensation copolymer
4. a condensation homopolymer

B. Which of the following statements is true?

1. trichloroacetic acid and trifluoroacetic acid have identical pKa values
2. trifluoroacetic acid is a stronger acid than trichloroacetic acid
3. trichloroacetic acid is a stronger acid than trifluoroacetic acid

C. D-Fructose and D-glucose can be interconverted by

1. a carbonyl transposition reaction
2. a retro aldol reaction
3. a redox reaction

D. Electrophilic aromatic bromination of ethyl benzoate occurs primarily at the

1. ortho positions
2. meta positions
3. para position

E. When 4-methylpentan-2-one is exposed to lithium diisopropylamide, deprotonation occurs at

1. C1
2. C2
3. C3
3. C4

Name: _____

4. (25 points)

Draw the structure of a specific example for each of the following twelve (12) categories.

A. any monoterpene:

B. any conjugated triene:

C. any isolated triene:

D. any nonreducing disaccharide:

E. any reducing disaccharide:

F. any prostaglandin:

G. any steroid:

H. any seco steroid:

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

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

K. any naturally-occurring essential α -amino acid:

L. any naturally-occurring nonessential α -amino acid:

Name: _____

5. (40 points)

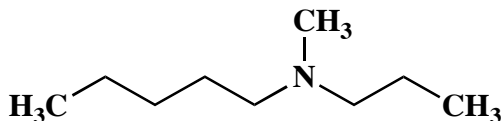
Answer the following four (4) questions precisely, succinctly and with correct grammar.

A. Describe the chemical basis for allosteric control of enzymes by positive effectors.

B. Why do naturally-occurring fatty acids contain an even number of carbon atoms?

C. How does aspirin diminish inflammation?

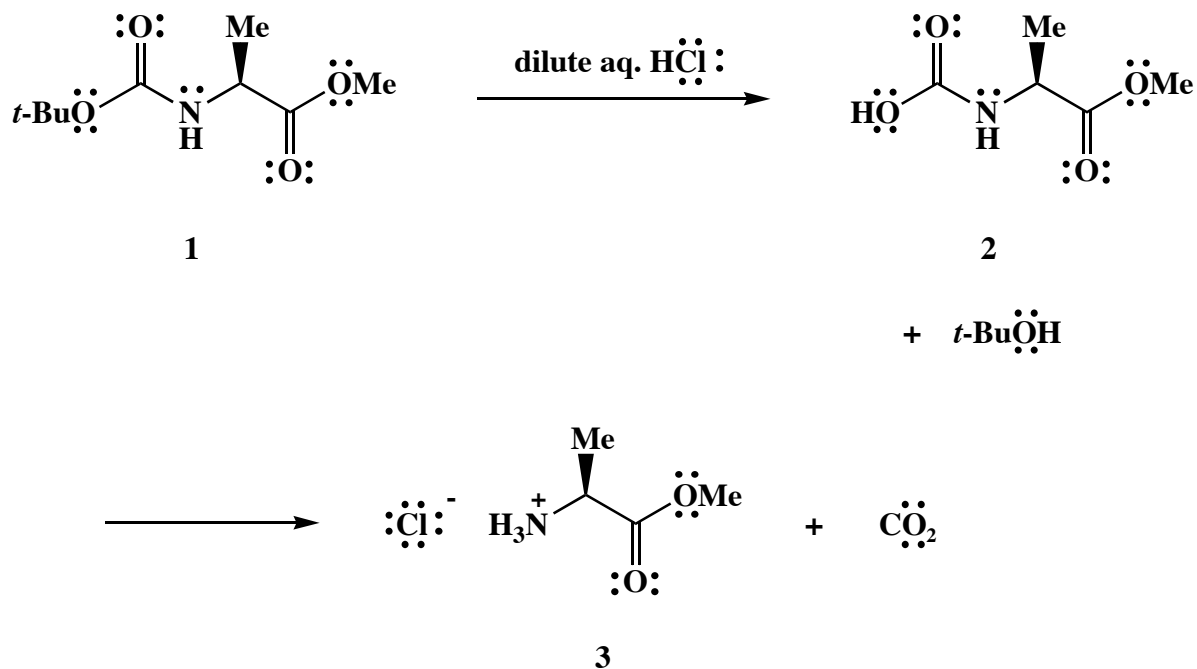
D. Is the following tertiary amine optically active? Describe your reasoning clearly.



Name: _____

6. (20 points)

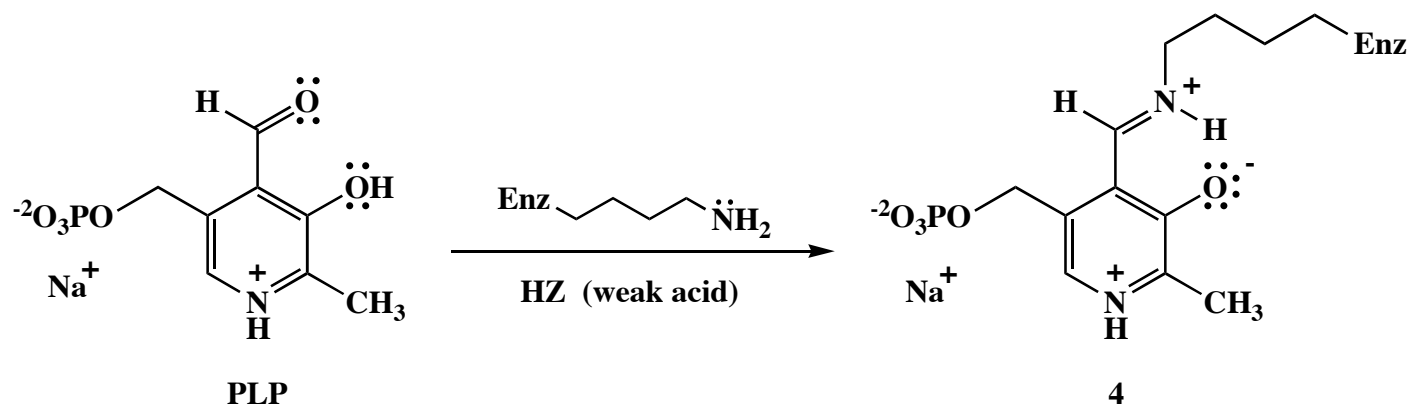
Acidic hydrolysis of the Boc-protected alanine derivative **1** affords the carbamic acid **2** as an unstable intermediate, en route to the corresponding ammonium salt **3**. Use the curved-arrow notation to draw the mechanism for the formation of the ammonium salt **3** from the carbamic acid **2**. Show all intermediates and denote all unshared electrons, formal charges and countercharges.



Name: _____

7. (30 points)

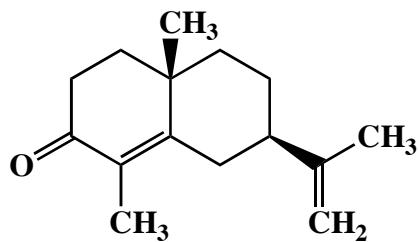
In enzyme-catalyzed transaminations, pyridoxal-5'-phosphate (PLP) initially is attached covalently to an enzyme by reaction with a lysine residue of the enzyme. Use the curved-arrow notation to draw the mechanism for the formation of the iminium ion **4**. Show all intermediates and denote all unshared electrons, formal charges and countercharges.



Name: _____

8. (10 points)

Circle the "isoprene" units in the following terpene. Clearly label the head (h) and tail (t) of each "isoprene" unit.



α -cyperone

Congratulations!

1	/25
2	/25
3	/25
4	/25
5	/40
6	/20
7	/30
8	/10
<hr/> Total:	<hr/> /200

course grade: ____

Name: _____

9. (15 extra credit points)

Draw the mechanism of the following unbalanced reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show all intermediates, unshared electrons, formal charges and countercharges.

