

Chemistry 334  
Final Examination

December 14, 2005

Professor Charonnat

Name: \_\_\_\_\_

Be certain that your examination has twelve (12) 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.

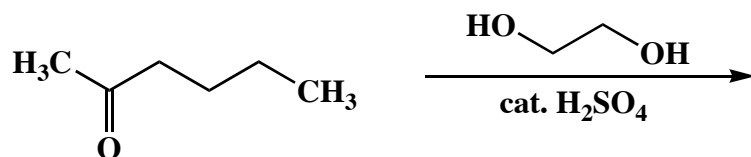
Molecular models are allowed for this examination. All electronic devices, including calculators, are unnecessary and are not allowed.

Name: \_\_\_\_\_

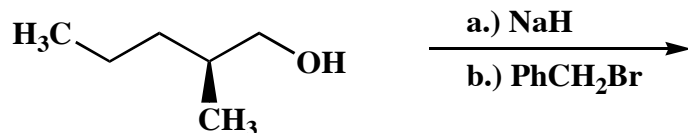
1. (50 points)

Draw the structure of the expected major organic product for each of the following ten (10) questions. Clearly specify stereochemistry, if relevant.

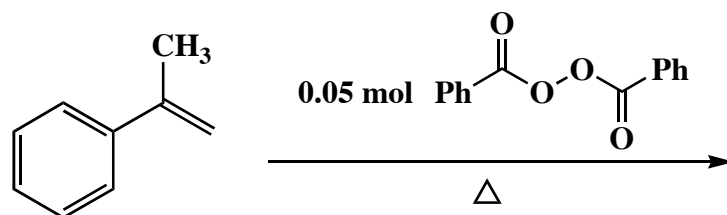
A.



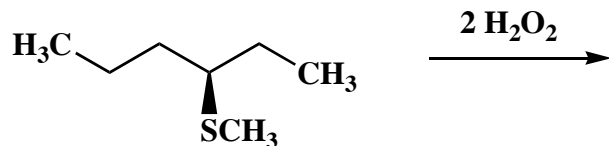
B.



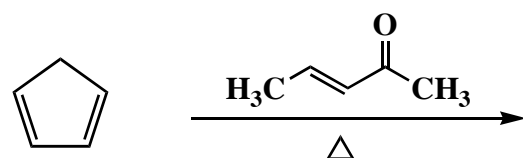
C.



D.



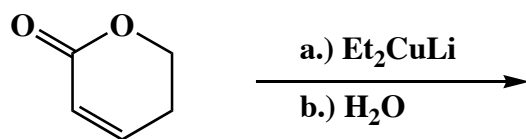
E.



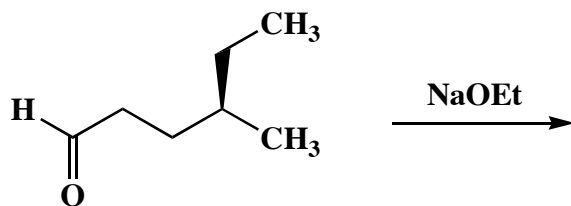
Name: \_\_\_\_\_

1. (continued)

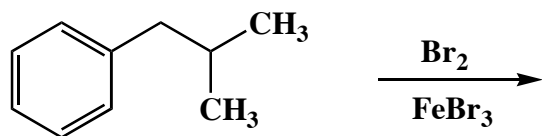
F.



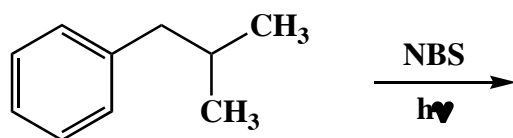
G.



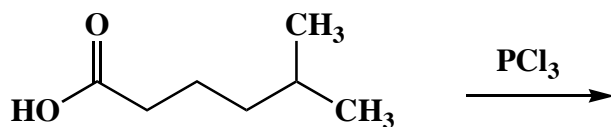
H.



I.



J.

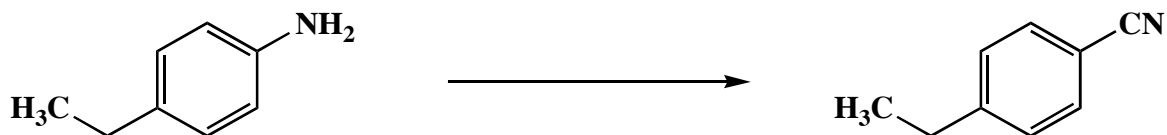


Name: \_\_\_\_\_

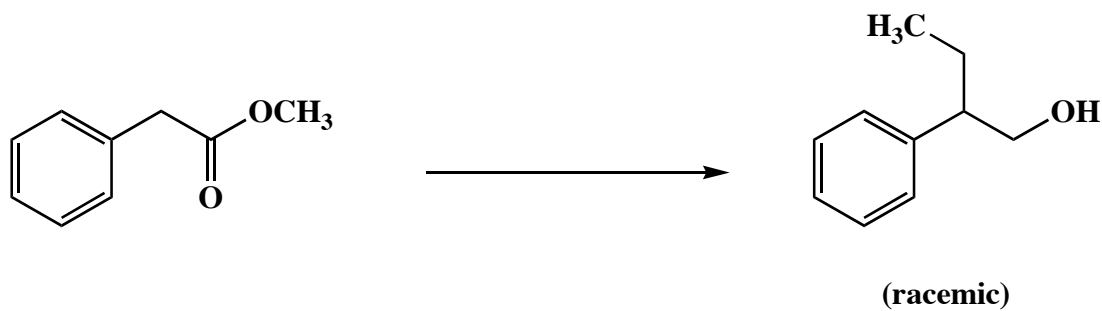
2. (30 points)

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.

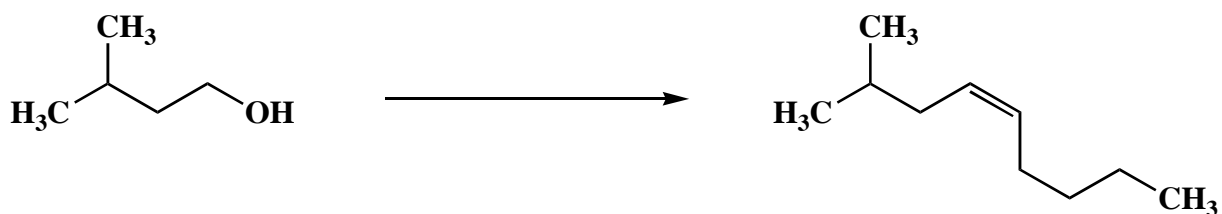
A.



B.



C.



Name: \_\_\_\_\_

3. (25 points)

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

A. A  $\beta$ -bend is an example of

1. repetitive secondary protein structure
2. nonrepetitive secondary protein structure
3. repetitive tertiary protein structure
4. nonrepetitive tertiary protein structure

B. The Merrifield peptide synthesis is useful primarily because it

1. minimizes losses due to transfers
2. is a linear synthesis
3. uses common reagents
4. increases the reaction rates for each transformation

C. The critical step in one of Evans' syntheses of optically active  $\alpha$ -amino acids involves the reaction of a boron enolate with a brominating agent. This transformation is an example of

1. a nucleophilic addition
2. an elimination
3. a condensation
4. an  $\alpha$ -substitution

D. Nicotinamide adenine dinucleotide phosphate (NADPH) is used in fatty acid biosynthesis as

1. an oxidant
2. a reductant
3. an acid catalyst
4. a base catalyst

E. The prostaglandin G and H series are particularly unstable because they contain

1. anhydride groups
2. ester groups
3. peroxide groups
4. disulfide groups

Name: \_\_\_\_\_

4. (25 points)

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

A. any condensation copolymer:

B. any diterpene:

C. any resonance-stabilized carbocation:

D. any resonance-destabilized species:

E. any prostaglandin:

F. any disachharide:

G. any glycerophospholipid:

H. any steroid:

I. the  $\alpha$ -anomer of any ketohexose:

J. any naturally-occurring wax:

K. any naturally-occurring essential  $\alpha$ -amino acid:

L. any naturally-occurring acidic  $\alpha$ -amino acid:

Name: \_\_\_\_\_

5. (20 points)

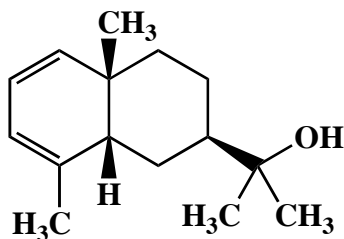
Answer the following two (2) questions precisely, succinctly and with correct grammar.

A. Explain how feedback inhibition of enzyme-catalyzed biosynthetic pathways occurs.  
Draw a generalized reaction scheme to illustrate your answer.

B. Explain the polarity requirements for a globular protein to be stable in a membrane bilayer.  
Draw a rough diagram to illustrate your answer.

6. (10 points)

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

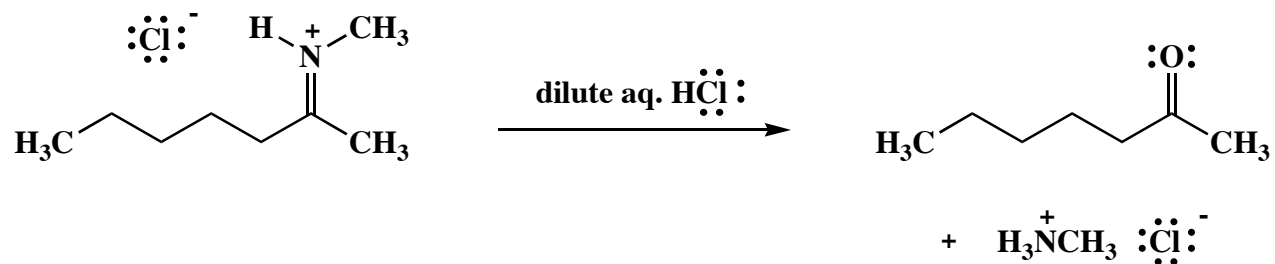


**occidentalol**

Name: \_\_\_\_\_

7. (20 points)

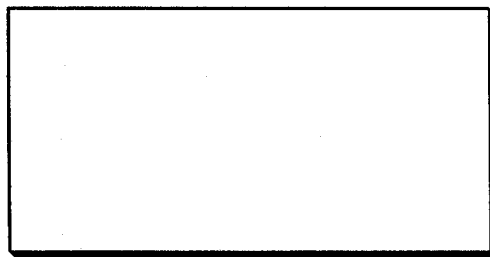
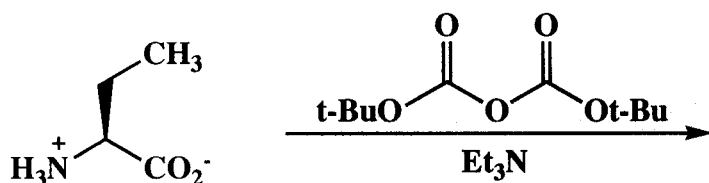
Use the curved-arrow notation to draw the mechanism of the following reaction. Show all intermediates and denote all unshared electrons, formal charges and countercharges where appropriate.



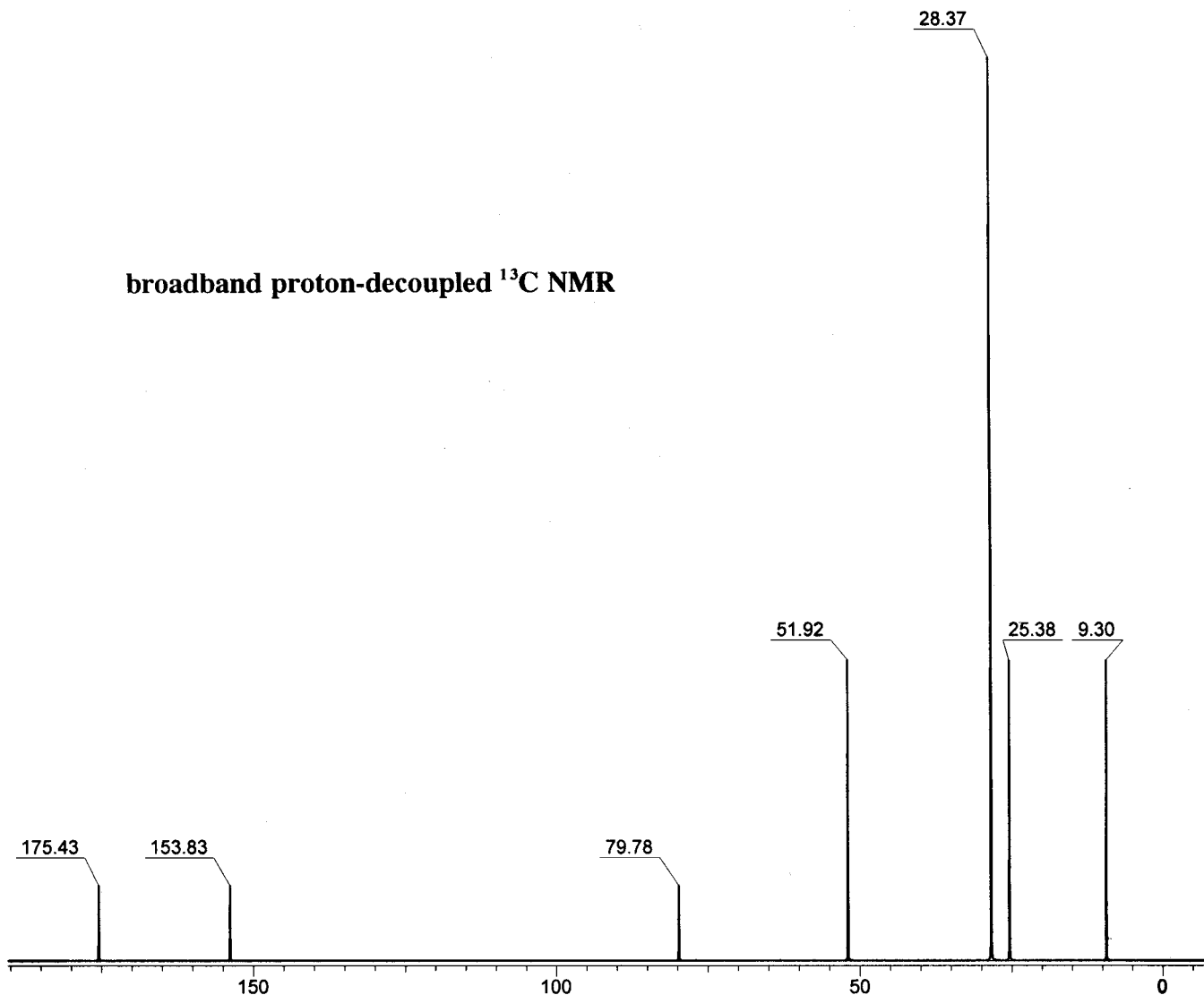
Name: \_\_\_\_\_

8. (20 points)

Draw the major organic product that is formed from the following reaction. The broadband proton-decoupled  $^{13}\text{C}$  NMR, DEPT 90 and DEPT 135 spectra of the product are shown below. Use the spectroscopic data to identify this compound. Make clear assignments of all resonances to explain your reasoning. (A  $^{13}\text{C}$  NMR correlation table is included on page 12.)



broadband proton-decoupled  $^{13}\text{C}$  NMR

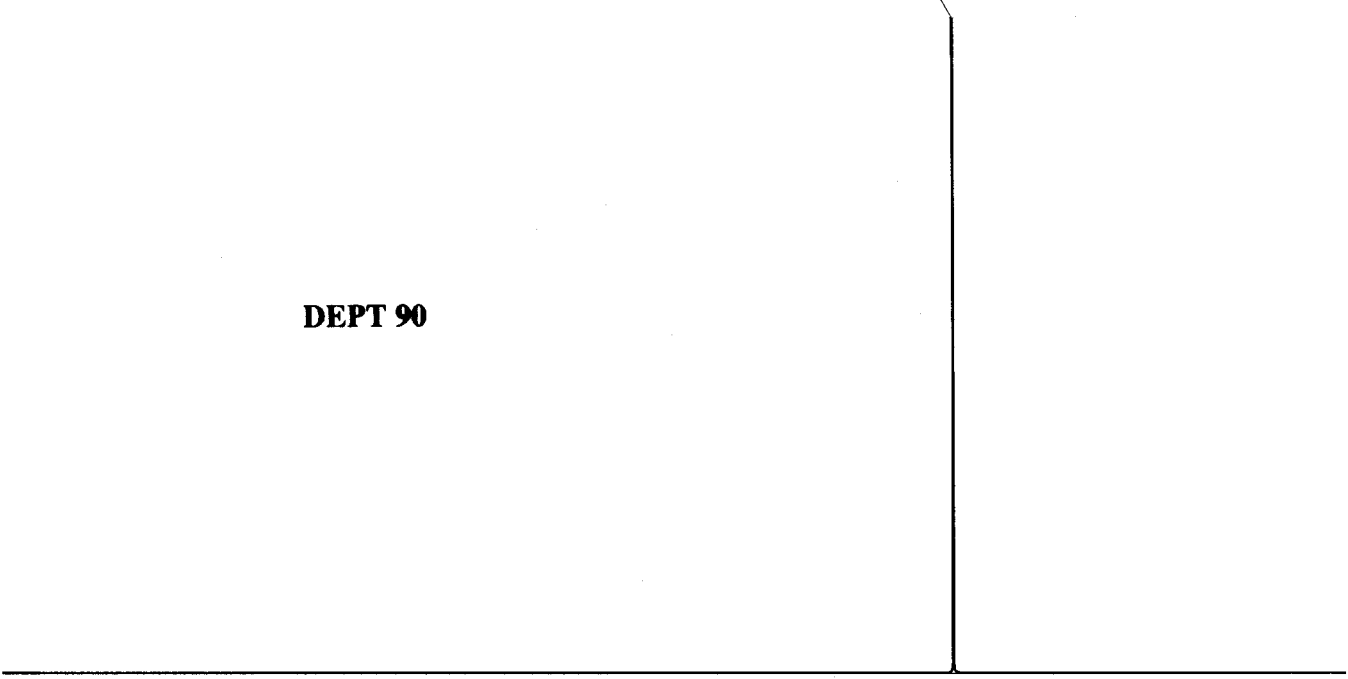


Name: \_\_\_\_\_

8. (continued)

**DEPT 90**

51.92



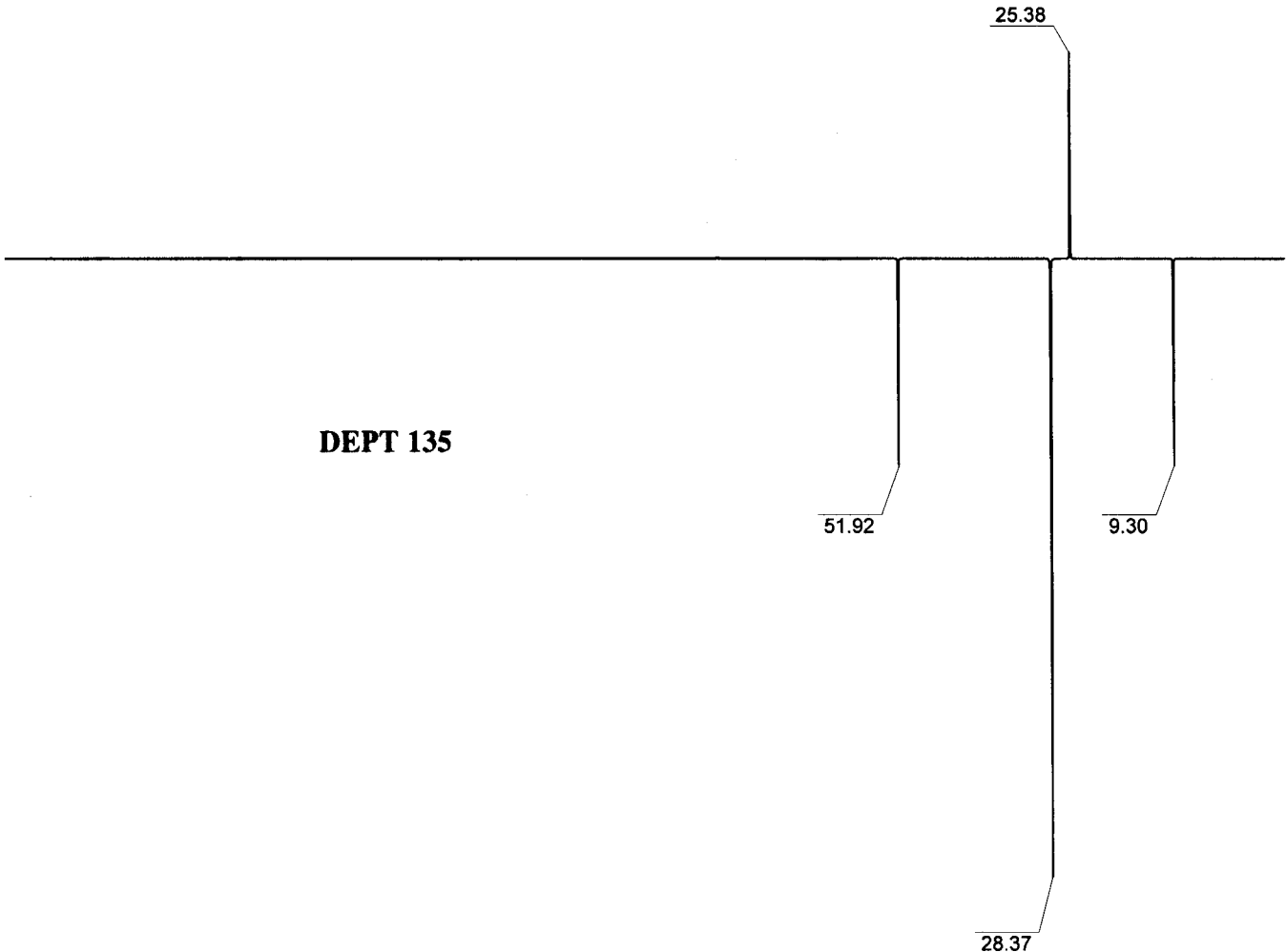
25.38

**DEPT 135**

51.92

9.30

28.37



Name: \_\_\_\_\_

8. (continued)

**$^{13}\text{C}$  NMR assignments:**

<b>chemical shift</b>	<b>assignment</b>	<b>DEPT 90 appearance</b>	<b>DEPT 135 appearance</b>
-----------------------	-------------------	---------------------------	----------------------------

**Congratulations!**

1	/50
2	/30
3	/25
4	/25
5	/20
6	/10
7	/20
8	/20
<hr/>	
Total:	/200

**course grade: \_\_\_\_\_**