

Chemistry 334

Final Examination

May 21, 2003

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.

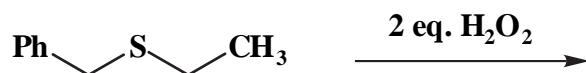
Molecular models are allowed for this examination. Calculators are unnecessary and are not allowed.

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

1. (50 points)

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

A.



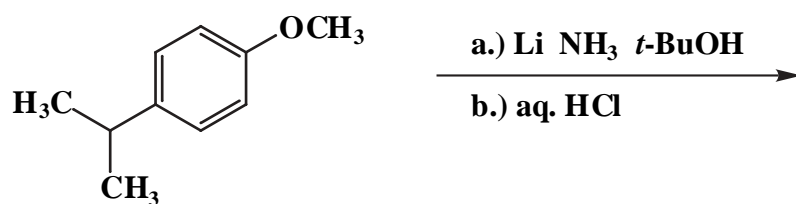
B.



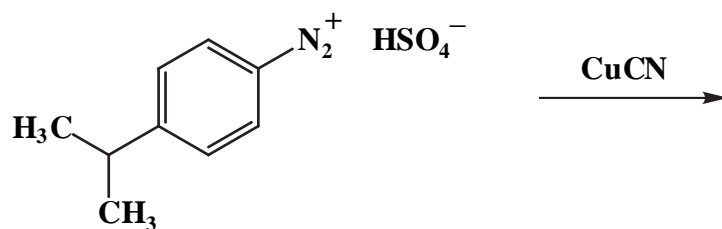
C.



D.



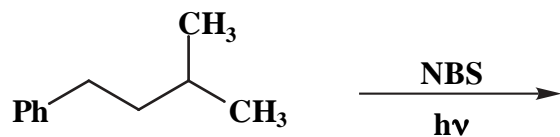
E.



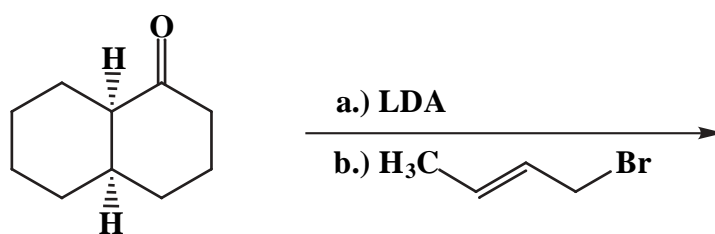
Name: \_\_\_\_\_

1. (cont.)

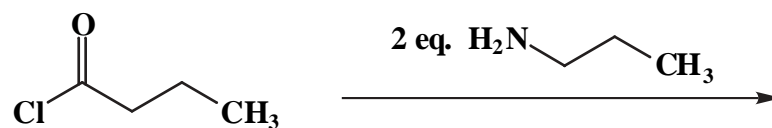
F.



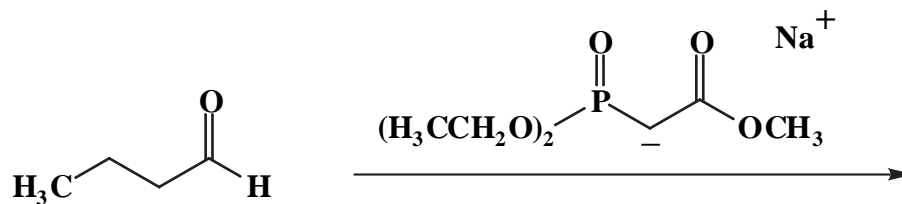
G.



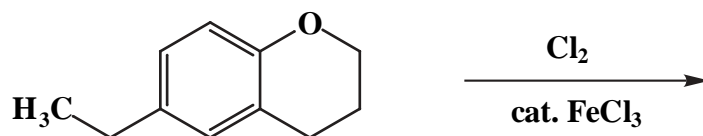
H.



I.



J.

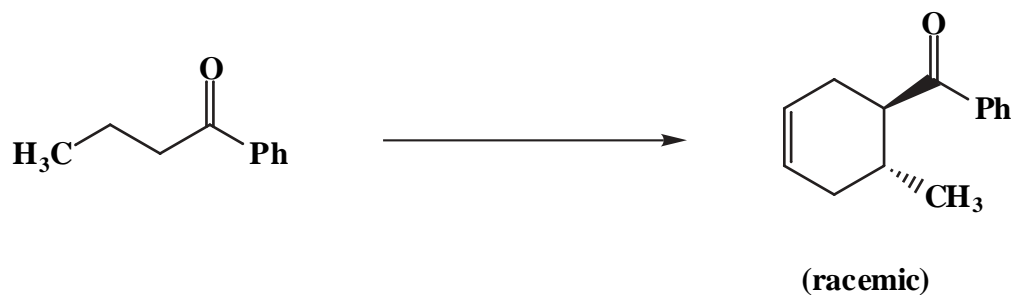


Name: \_\_\_\_\_

2. (25 points)

For both of the following two (2) 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.

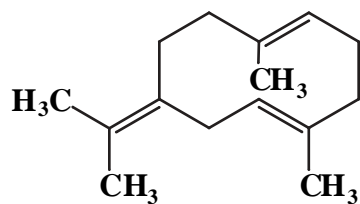


B.



3. (10 points)

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

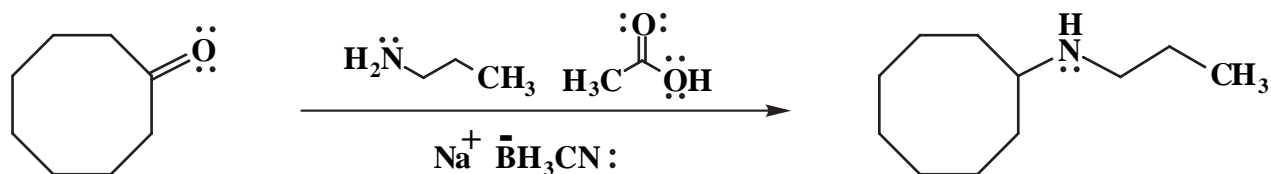


**germacrene B**

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

4. (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 unshared electrons, formal charges and countercharges where appropriate. Clearly denote reversibility or irreversibility for each primary mechanistic step.



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

5. (25 points)

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

A. The electron-impact mass spectrum of an amine that contains three nitrogen atoms has a molecular ion that is:

1. even
2. odd
3. even or odd

B. "Simple" proteins contain:

1.  $\alpha$ -amino acids, only
2.  $\alpha$ -amino acids and a prosthetic group
3.  $\alpha$ -amino acids and  $\beta$ -amino acids

C. Acidic  $\alpha$ -amino acids contain:

1. one amino and one carboxyl group
2. one amino and more than one carboxyl group
3. one carboxyl and more than one amino group

D. A  $\beta$ -bend is an example of protein:

1. primary structure
2. secondary structure
3. tertiary structure

E. All lipids:

1. contain an ester functional group
2. contain glycerol
3. are soluble in nonpolar organic solvents

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

6. (25 points)

Draw a specific example of each of the following.

A. any allylic halide:

B. any dienophile:

C. any naturally-occurring triacylglycerol:

D. any electrophile:

E. any prostaglandin:

F. any secondary amide:

G. any steroid:

H. the  $\alpha$ -anomer of any glycoside:

I. any naturally-occurring unsaturated fatty acid:

J. any naturally-occurring saturated fatty acid:

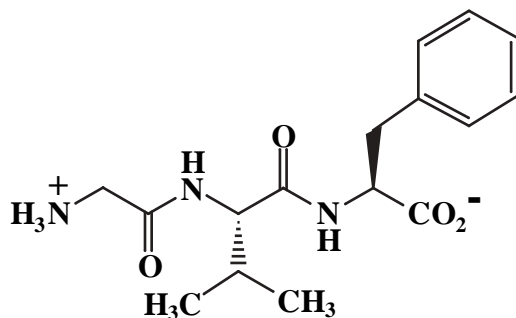
K. any chain-growth polymer:

L. any step-growth polymer:

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

7. (25 points)

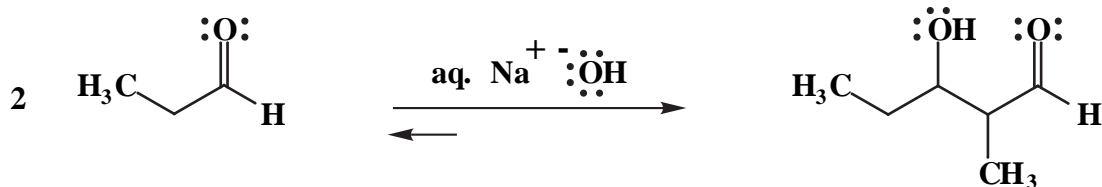
Design a synthesis of the following tripeptide from the corresponding BOC-protected  $\alpha$ -amino acids. Use any inorganic and organic reagents that are necessary. Show all reagents and stable synthetic intermediate compounds. (**N.B.** Do not draw mechanisms for each synthetic transformation!)



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

8. (15 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 unshared electrons, formal charges and countercharges where appropriate. Clearly denote reversibility or irreversibility for each primary mechanistic step.



(mixture of diastereomers)

**Congratulations!**

1	/50
2	/25
3	/10
4	/25
5	/25
6	/25
7	/25
8	/15
<hr/> Total:	<hr/> /200

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