

Chemistry 334

Final Examination

December 14, 1998

Professor Charonnat

Name: _____

Be certain that your examination has eight (8) pages including this one.

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

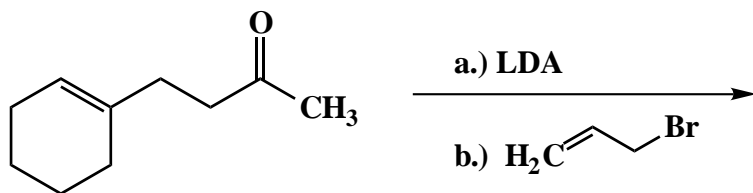
By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.

Name: _____

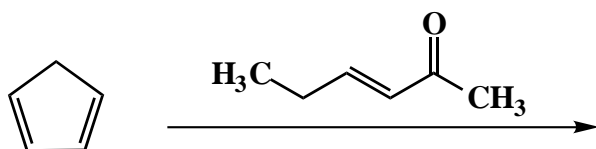
1. (25 points)

For each of the following five (5) questions, draw the structure of the expected major organic product. If relevant, specify absolute and/or relative stereochemistry.

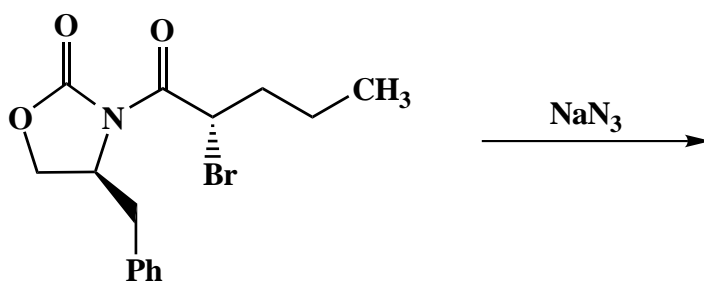
A.



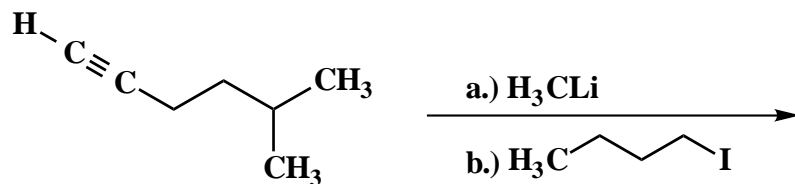
B.



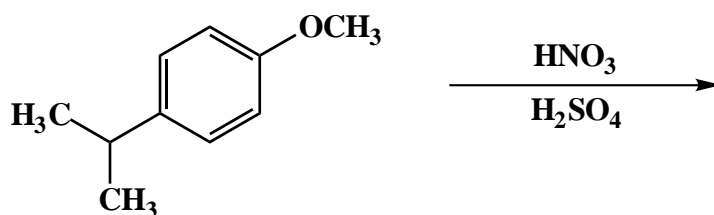
C.



D.



E.

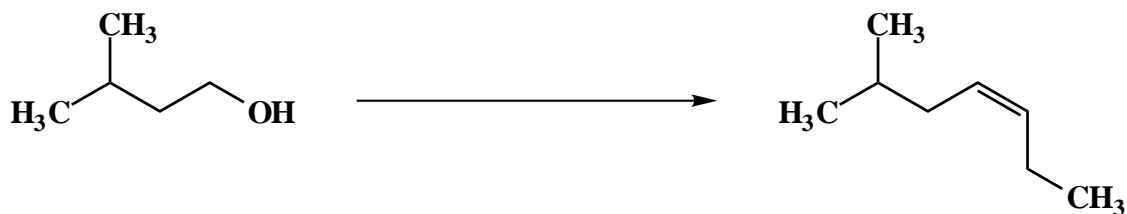


Name: _____

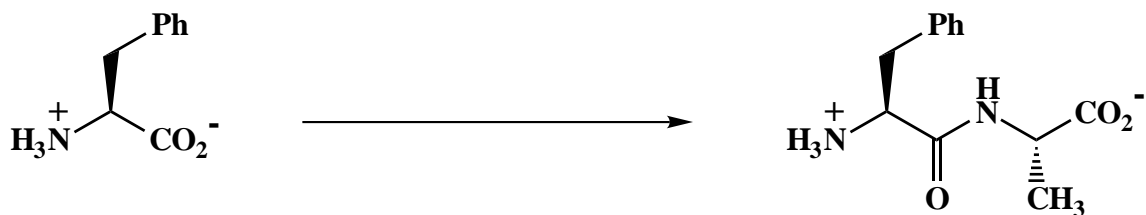
2. (30 points)

For each of the following three (3) questions, draw the specific reagents necessary to effect the transformation shown. If more than one reaction is involved for an answer, be certain to distinguish the individual steps clearly.

A.



B.



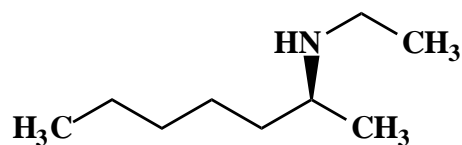
C.



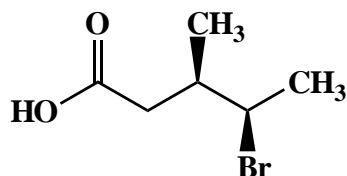
3. (20 points)

Use IUPAC nomenclature to write the systematic name for both of the following two (2) compounds.

A.



B.



Name: _____

4. (20 points)

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

A. Non-essential α -amino acids are obtained

1. only from dietary sources.
2. only from biosynthesis in the body.
3. from dietary sources and biosynthesis in the body.

B. An α -amino acid exists at its isoelectric point as an

1. ammonium carboxylic acid.
2. ammonium carboxylate.
3. amino carboxylate.

C. The secondary structure of a protein is

1. the sequence of α -amino acids of the protein.
2. the local conformation of the protein's backbone.
3. the overall conformation of the entire protein.

D. Terpenes contain a multiple of five carbons, not two carbons, due to a critical step in their biosynthesis. This step is

1. an elimination of carbon dioxide.
2. a condensation.
3. an oxidation.

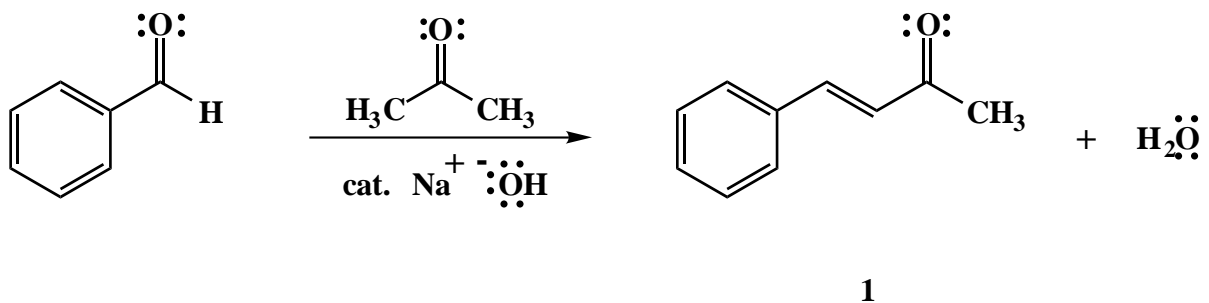
E. The tetracyclic ring system of steroids is formed by

1. a sequence of multiple hydrations.
2. a sequence of nucleophilic addition/eliminations.
3. a sequence of cationic cyclizations.

Name: _____

5. (25 points)

You synthesized the ketone **1** in the Chemistry 334L laboratory this semester by the reaction of benzaldehyde with aqueous sodium hydroxide and an excess of acetone. Draw the mechanism of the 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.

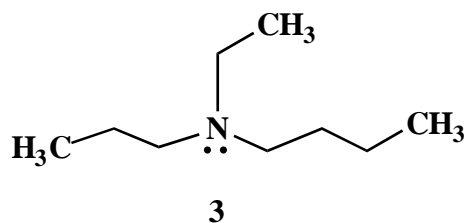
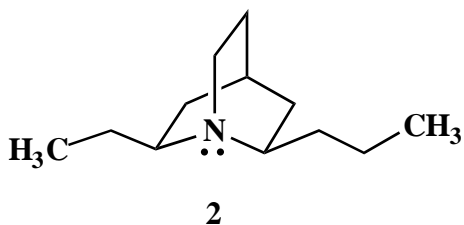


Name: _____

6. (30 points)

Answer the following three (3) questions precisely, succinctly and with correct grammar.

A. The tertiary amine **2** is optically active but **3** is not. What is the chemical basis for this difference?



B. How does the disulfide, cystine, affect the three-dimensional structure of proteins like insulin?

C. How do soaps function to remove grease particles? Draw a rough diagram to illustrate your answer.

Name: _____

7. (25 points)

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

A. any terpene:

B. any reducing carbohydrate:

C. any nonreducing carbohydrate:

D. any prostaglandin:

E. any naturally-occurring phospholipid:

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

G. any L-aldose:

H. any D-ketose:

I. any two compounds that are anomers of each other:

J. any steroid:

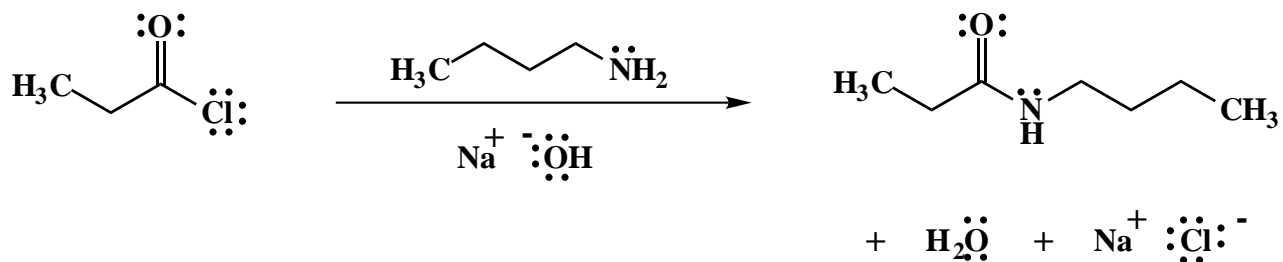
K. any step-growth polymer:

L. any chain-growth polymer:

Name: _____

8. (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.



Congratulations!

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