

Chemistry 334

Examination #2

April 5, 2016

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.

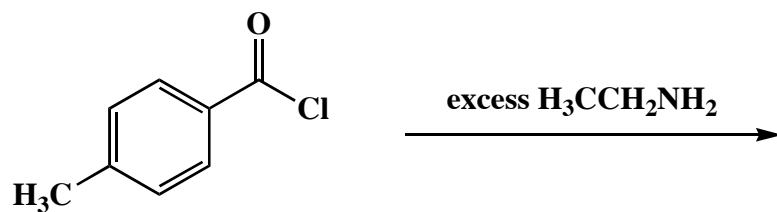
Molecular models are allowed for this examination. All electronic devices, including calculators and cell phones, are unnecessary and are not allowed.

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

1. (25 points)

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

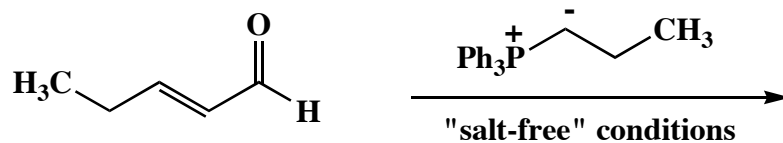
A.



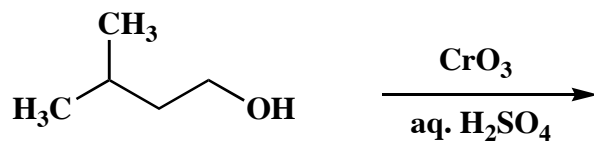
B.



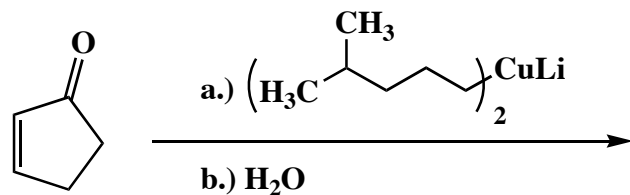
C.



D.



E.



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

2. (25 points)

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

A. What class(es) of reagent(s) bonds to the carbonyl carbon of aldehydes?

1. electrophiles
2. nucleophiles
3. both

B. The reaction of a ketone with a primary amine in mildly acidic conditions yields an

1. amide
2. imine
3. enamine

C. The equilibrium in Fischer esterification can be shifted toward the product ester by

1. adding water
2. adding strong acid
3. removing water

D. The reaction of a primary amide with thionyl chloride affords

1. a nitrile
2. an amine
3. an ester

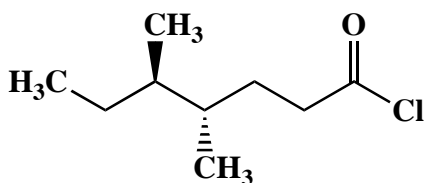
E. Most substitution reactions of carboxylic acid derivatives occur via an

1.  $S_N2$  mechanism
2.  $S_N1$  mechanism
3. addition/elimination mechanism

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

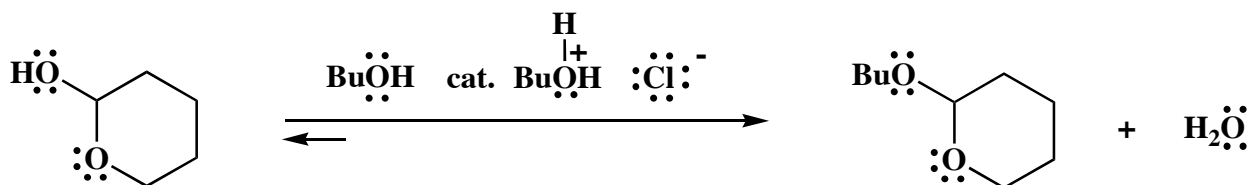
3. (10 points)

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



4. (30 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 irreversibility. Finally, explain clearly why only a catalytic amount of acid is required for this reaction to occur.



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

5. (10 points)

Explain clearly and concisely why the  $pK_a$  of pentanoic acid is much less than the  $pK_a$  of pentan-1-ol. Use structural formulas to draw reactions to illustrate your answer.

**Congratulations!**

1	/25
2	/25
3	/10
4	/30
5	/10
<hr/> total:	<hr/> /100