Chemistry 334

Hour Examination #2

April 7, 1999 Professor Charonnat

Name: _____

Be certain that your examination has seven (7) pages including this one.

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

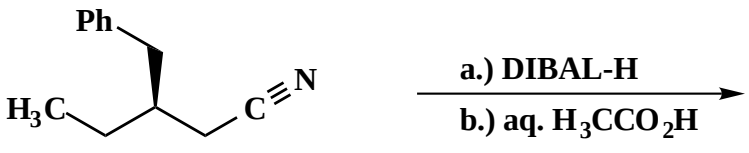
By putting your name on this examination booklet you agree to abide by
California State University, Northridge policies of academic honesty and integrity.

Name:_____

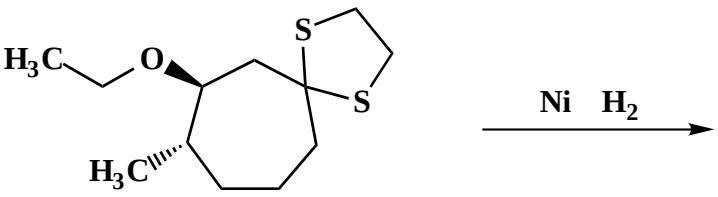
1. (25 points)

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

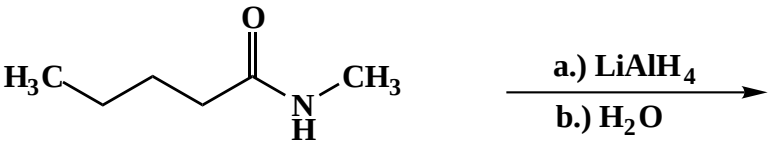
A.



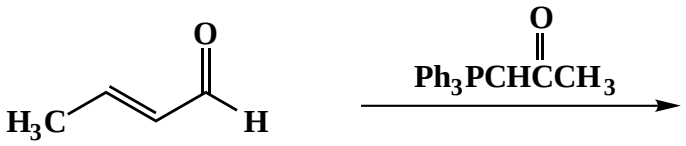
B.



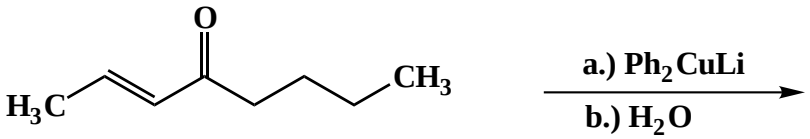
C.



D.



E.



Name:_____

2. (20 points)

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

A. An ester is:

1. less reactive than an amide toward nucleophiles
2. equally reactive as an amide toward nucleophiles
3. more reactive than an amide toward nucleophiles

B. 2-Chloroacetic acid is more acidic than acetic acid due to:

1. resonance
2. sterics
3. induction

C. The "salt-free" Wittig reaction of propanal with Ph_3PCHCH_3 affords:

1. a trans alkene
2. a cis alkene
3. approximately a 1:1 mixture of cis and trans alkenes

D. Aldehydes are more reactive toward nucleophilic addition than ketones due to:

1. sterics only
2. induction only
3. both sterics and induction

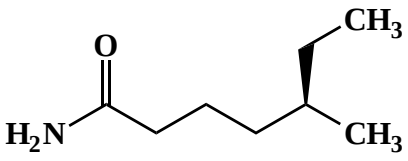
E. Acetal formation requires:

1. basic conditions
2. neutral conditions
3. acidic conditions

Name:_____

3. (10 points)

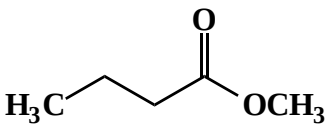
Use IUPAC nomenclature to write the systematic name of the following primary amide.



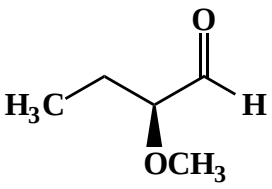
4. (10 points)

Answer the following question precisely, succinctly and with correct grammar.

How could one use ^{13}C NMR spectroscopy to distinguish between the following carbonyl compounds? State specifically which resonances one would look for. Do so for both carbonyl compounds.



1

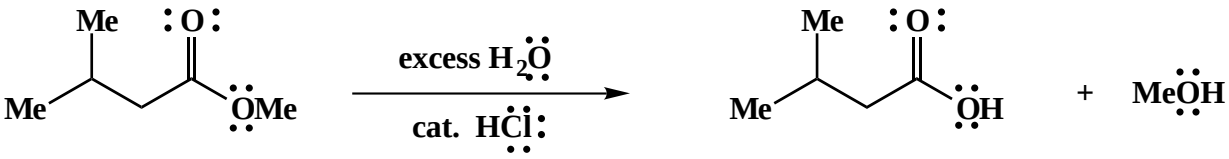


2

Name:_____

5. (20 points)

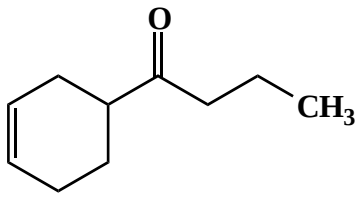
Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show **all** intermediates and denote **all** lone pair electrons, formal charges and countercharges where appropriate. Clearly designate reversibility or irreversibility for each primary mechanistic step.



Name:_____

6. (15 points)

Design a synthesis of a racemic mixture of the ketone **3** from propenal. 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!)

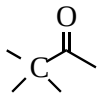
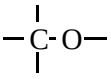
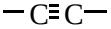


3

Congratulations!

1	/25
2	/20
3	/10
4	/10
5	/20
6	/15
Total:	/100

SELECTED ^{13}C NMR CORRELATIONS

structural type	chemical shift range (ppm)
cyclopropyl	- 10 - 10
 (saturated)	10 - 30
 (saturated)	10 - 55
 (saturated)	25 - 55
 (saturated)	30 - 55
	- 10 - 45
	25 - 65
	35 - 80
	20 - 50
	30 - 70
	40 - 80
	65 - 85
	100 - 150
	110 - 125
ArH	110 - 160
	155 - 185
	190 - 210