

Chemistry 334

Examination #1

February 23, 2009

Professor Charonnat

Name: _____

Be certain that your examination has six (6) 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.

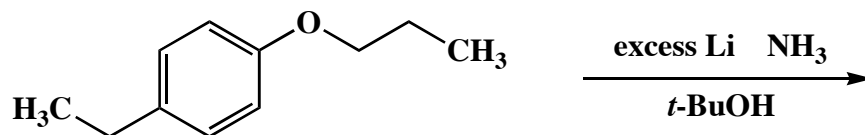
Molecular models are allowed for this examination. All electronic devices, including calculators, are unnecessary and are not allowed.

Name: _____

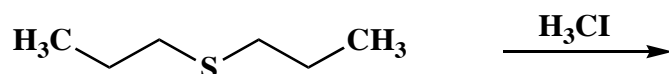
1. (25 points)

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

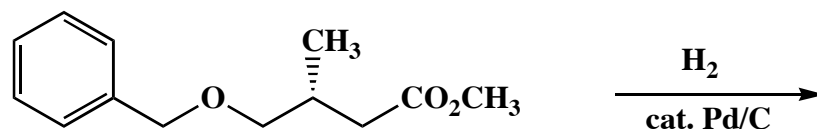
A.



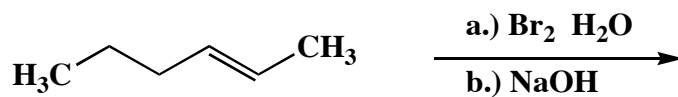
B.



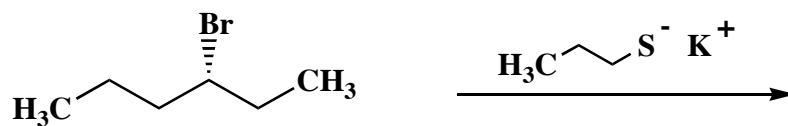
C.



D.



E.



Name: _____

2. (25 points)

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

A. An organic compound has a molecular formula of $C_{10}H_{22}O$. Which spectroscopic technique could be used to distinguish whether this compound is an alcohol or an ether?

1. ^{13}C NMR

2. UV

3. IR

B. Epoxidation of alkenes with a peroxy acid occurs via

1. a concerted mechanism

2. a radical mechanism

3. an ionic mechanism

C. The reaction of 1,3-butadiene with anhydrous hydrogen bromide at 40 °C affords

1. equal amounts of the 1,2- and 1,4-products

2. more of the 1,2-product than the 1,4-product

3. more of the 1,4-product than the 1,2-product

D. Allyl bromide

1. is more reactive than *n*-propyl bromide in S_N2 reactions

2. is less reactive than *n*-propyl bromide in S_N2 reactions

3. has the same reactivity as *n*-propyl bromide in S_N2 reactions

E. If 1,3,5,7-cyclooctatetraene existed in a planar conformation, it would be

1. aromatic

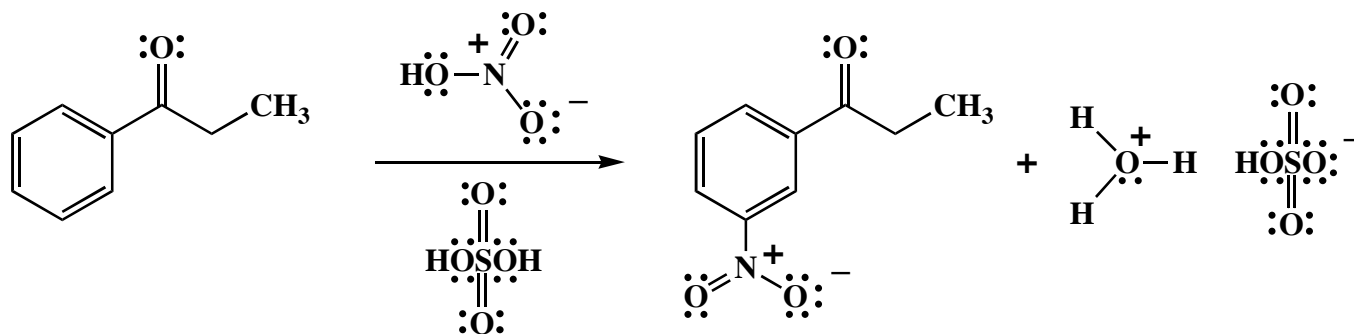
2. antiaromatic

3. nonaromatic

Name: _____

3. (20 points)

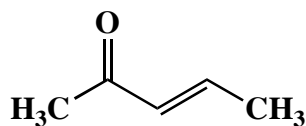
Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show all intermediates and denote all unshared electrons, formal charges and countercharges where appropriate. Draw all important resonance contributors for intermediates (but do not draw all resonance contributors for the hydrogen sulfate anion).



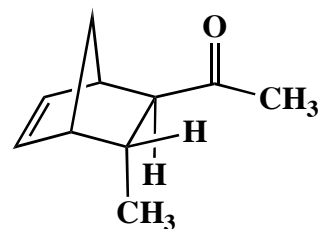
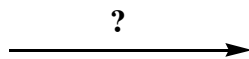
Name: _____

4. (15 points)

Design a synthesis of the racemic ketone **2** starting from cyclopentene, the unsaturated ketone **1**, and any additional reagents that are necessary. Show all reagents and stable synthetic intermediates. (N.B. Do **not** draw mechanisms!)



1

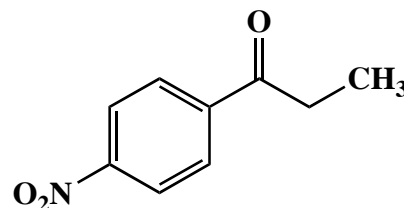
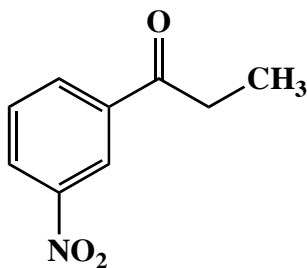
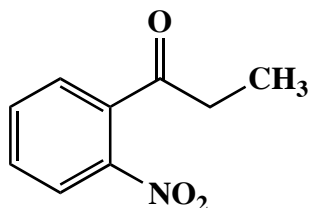


2

Name: _____

5. (15 points)

Use ^1H NMR to distinguish the following ortho, meta and para regioisomers from each other. To do so, label all sets of chemically equivalent aromatic protons for each compound, and identify their corresponding multiplicities and (qualitative) coupling constants. For the purpose of this question, assume that para proton-proton couplings are not discernible.



Congratulations!

1	/25
2	/25
3	/20
4	/15
5	/15
<hr/> Total:	<hr/> /100