

Chemistry 334

Examination #1

July 29, 1999

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.

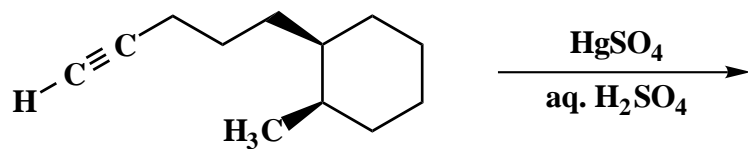
By putting your name on this examination booklet you agree to abide by California State University, Northridge policies of academic honesty and integrity.

Name: _____

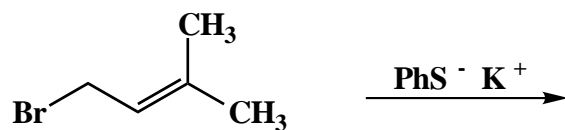
1. (25 points)

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

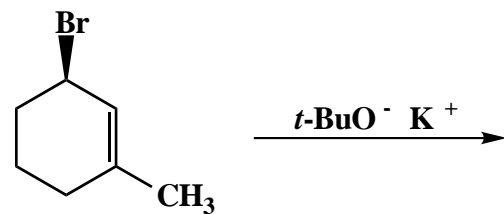
A.



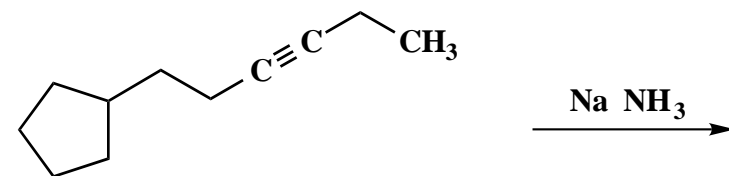
B.



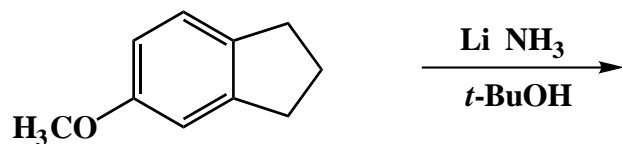
C.



D.



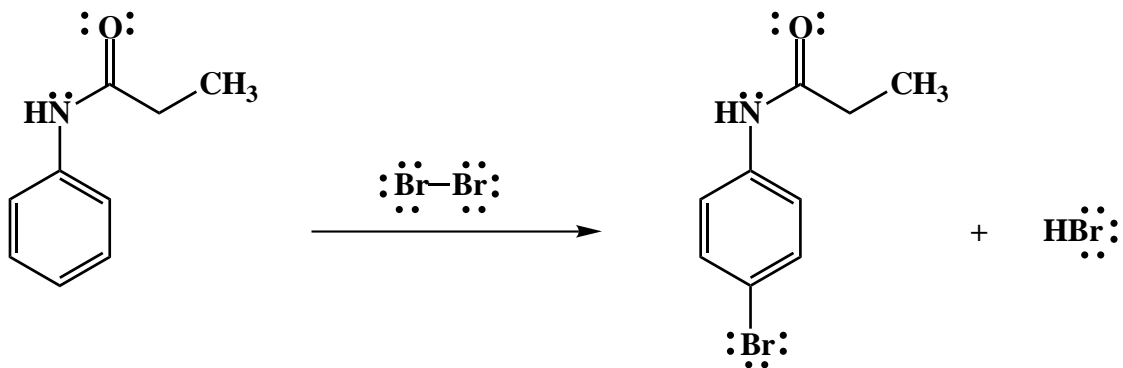
E.



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2. (25 points)

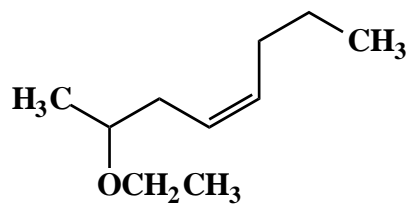
Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show all intermediates and denote all lone pair electrons, formal charges and countercharges where appropriate. Draw all important resonance contributors for intermediates.



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3. (20 points)

Design a synthesis of the racemic ether **1** from acetylene, organic compounds that contain three or fewer carbons, and any additional inorganic reagents that are necessary. Show all reagents and stable synthetic intermediate compounds.



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4. (20 points)

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

A. Which of the following species is aromatic?

1. the 1,3,5-cycloheptatrienyl anion
2. the 1,3,5-cycloheptatrienyl radical
3. the 1,3,5-cycloheptatrienyl cation

B. The ^{13}C NMR spectrum of $\text{CH}_2=\text{CHCH}_2^+ \text{BF}_4^-$ shows:

1. one peak
2. two peaks
3. three peaks

C. Addition of anhydrous HBr to 1,3-butadiene at $-78\text{ }^\circ\text{C}$ affords:

1. the more stable product
2. the less stable product
3. a 1:1 mixture of the above two products

D. Which of the following dienes is conjugated?

1. 1,5-hexadiene
2. *trans*-1,4-hexadiene
3. *trans,trans*-2,4-hexadiene

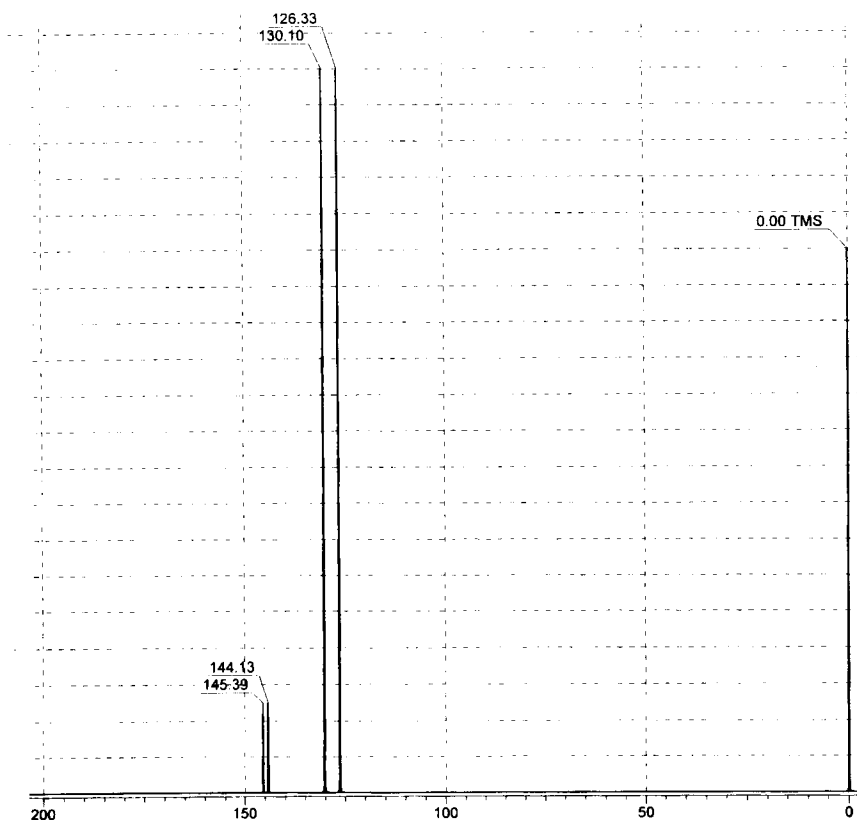
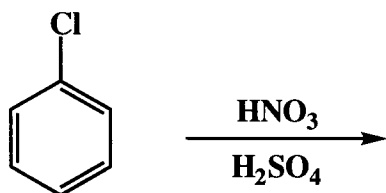
E. If a lower concentration is used to obtain an ultraviolet/visible spectrum, the absorbance will be:

1. larger
2. the same
3. smaller

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5. (20 points)

The following reaction affords a number of organic products. Draw each of these products. The ^{13}C NMR spectrum of the major product is shown below. Use this spectroscopic evidence to identify the compound. Describe your reasoning clearly, including why the other compounds that you drew were excluded from consideration.



Name: _____

6. (20 points)

Answer the following two (2) questions precisely, succinctly and with correct grammar.

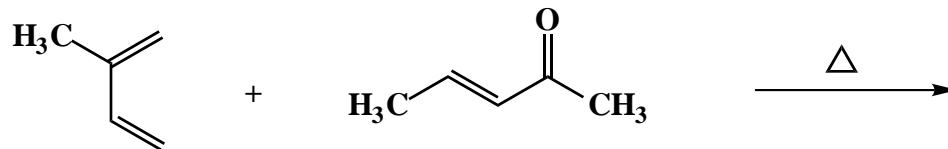
A. Why does photochemical bromination of propene with N-bromosuccinimide (NBS) afford allyl bromide, not 1,2-dibromopropane? Draw mechanisms to illustrate your answer.

B. Why are protecting groups used in organic synthesis? Why is it desirable if they can be avoided?

Name: _____

7. (20 points)

Draw all of the products for the following Diels-Alder reaction. Put a star next to the major product(s). If more than one compound is starred, explain the mechanistic basis for this result.



Congratulations!

1	/25
2	/25
3	/20
4	/20
5	/20
6	/20
7	/20
Total:	/150