

Chemistry 333

Examination #2

July 3, 2006

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.

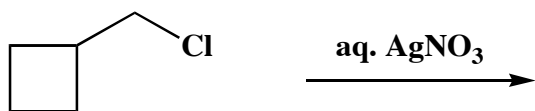
Molecular models are allowed for this examination. All electronic devices, including calculators, are unnecessary and are not allowed.

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

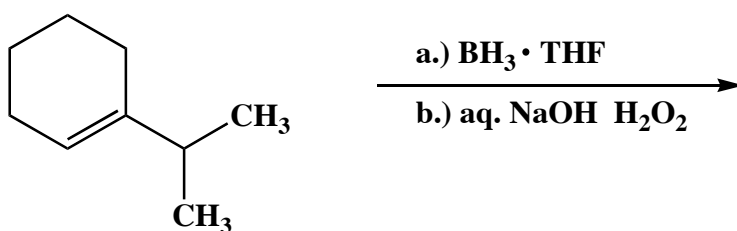
1. (25 points)

Draw the major organic product for each of the following five (5) reactions. Clearly specify stereochemistry, if relevant.

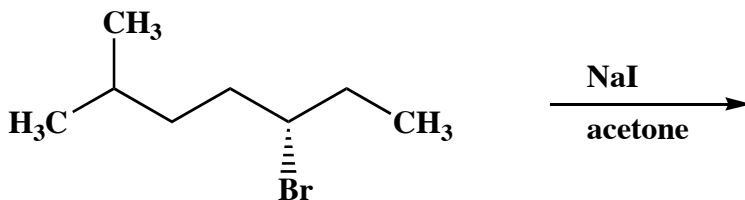
A.



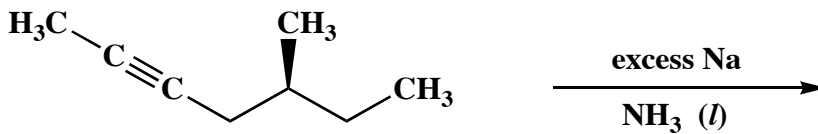
B.



C.



D.



E.



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

2. (30 points)

Circle the number that corresponds to the correct answer for each of the following six (6) questions.

A. Which of the following is the best leaving group for  $S_N1$  reactions?

1. fluoride
2. chloride
3. bromide
4. iodide

B. At a fixed concentration of a specific nucleophile, which class of alkyl halide is the most reactive in nucleophilic substitution reactions?

1. tertiary
2. secondary
3. primary
4. methyl

C.  $S_N2$  reactions proceed with

1. partial inversion of configuration
2. complete inversion of configuration
3. partial retention of configuration
4. complete retention of configuration

D. The Simmons-Smith cyclopropanation occurs via

1. a carbocation mechanism
2. a carbanion mechanism
3. a concerted mechanism
4. a radical mechanism

E. Which of the following compounds is the most stable alkene?

1. 4-methylpent-1-ene
2. 2-methylpent-2-ene
3. *trans*-4-methylpent-2-ene
4. *cis*-4-methylpent-2-ene

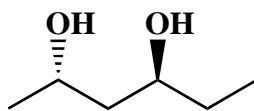
F. The density of alkyl halides

1. usually is greater than 1
2. always is greater than 1
3. usually is less than 1

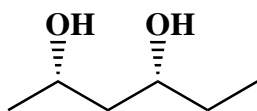
Name: \_\_\_\_\_

3. (30 points)

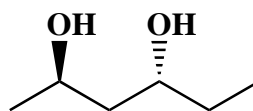
State the relationship between each of the six (6) structures at the bottom of this page and the diol **1** (identical, enantiomer, diastereomer, structural isomer, conformational isomer, different compound that is not isomeric).



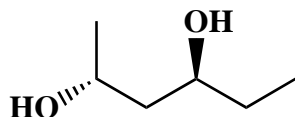
**1**



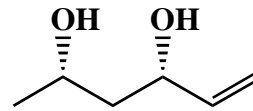
\_\_\_\_\_



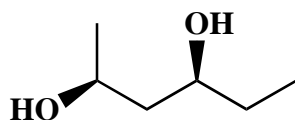
\_\_\_\_\_



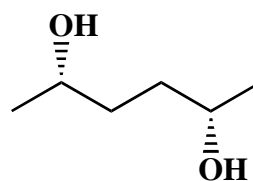
\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_

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

4. (20 points)

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

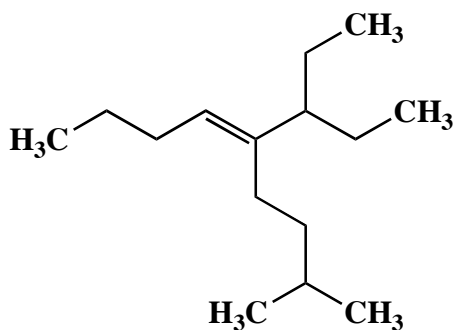
A. Why do  $S_N1$  reactions usually afford partial inversion of configuration or racemization, but not complete inversion of configuration?

B. Why do Wagner-Meerwein rearrangements occur in E1 but not E2 reactions?

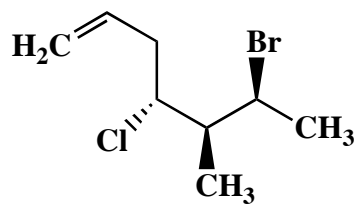
5. (20 points)

Use IUPAC nomenclature to write the systematic names of the following two (2) compounds.

A.



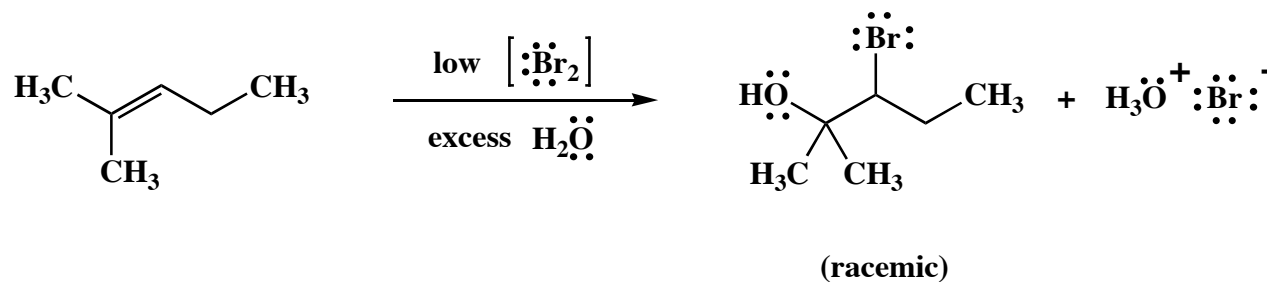
B.



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

6. (25 points)

Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Denote **all** lone pairs, nonzero formal charges, countercharges, and reversibility or nonreversibility. Explain clearly why a racemic mixture is formed. Finally, state what type of mechanism is involved in this transformation, based upon the observed regiochemical outcome.

**Congratulations!**

1	/25
2	/30
3	/30
4	/20
5	/20
6	/25
Total:	/150