

Chemistry 333

Examination #2

July 2, 2007

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.

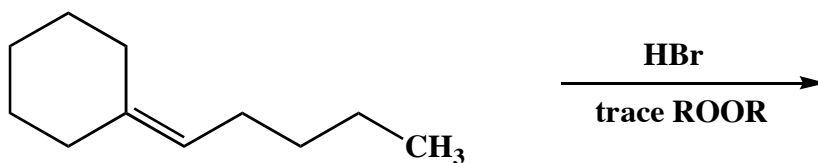
Molecular models are allowed for this examination. All electronic devices, including calculators, are unnecessary and are not allowed.

Name: _____

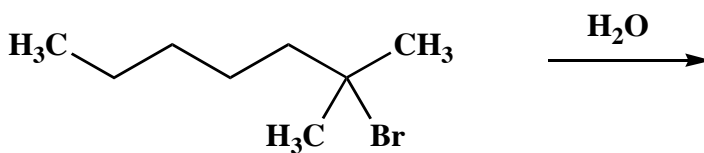
1. (25 points)

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

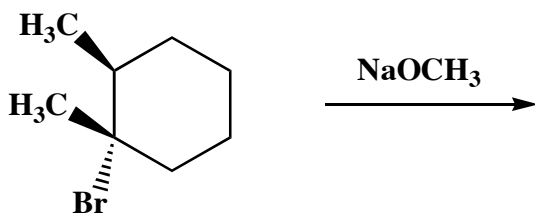
A.



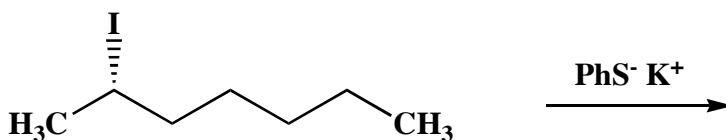
B.



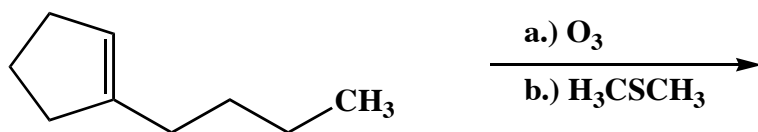
C.



D.



E.

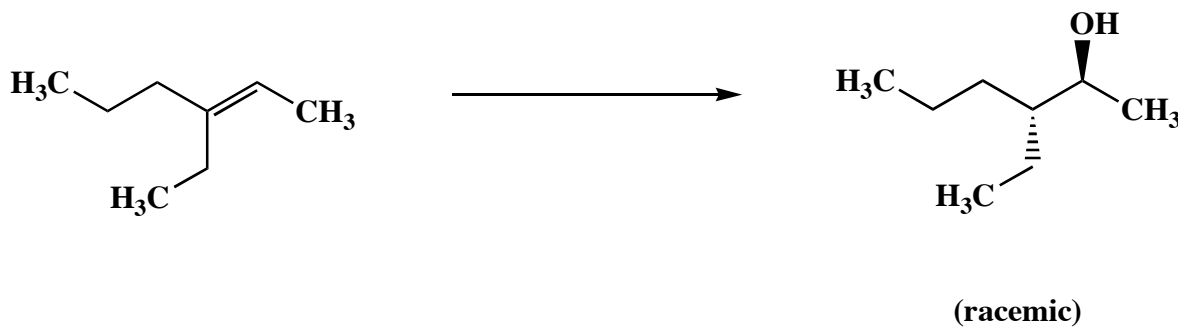


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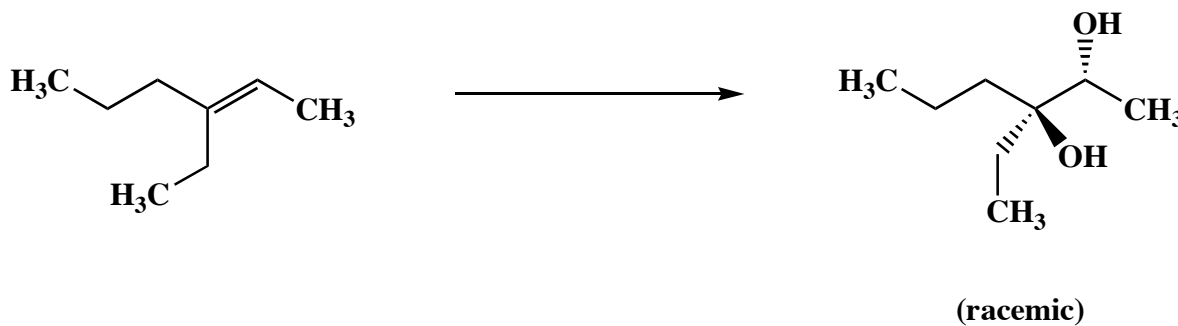
2. (25 points)

Draw the specific reagent(s) necessary to effect the following three (3) transformations. If more than one reaction is involved in an answer, be certain to distinguish the individual steps clearly.

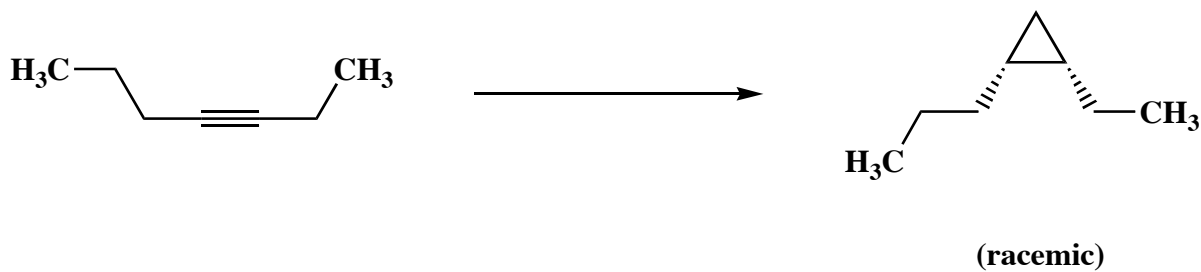
A.



B.



C.



Name: _____

3. (50 points)

Circle the number that corresponds to the correct answer for each of the following ten (10) questions.

A. The rate of a one-step reaction can be raised by

1. raising the energy of the transition state
2. raising the energy of the reactants
3. lowering the energy of the reactants

B. (*E*)-4-methylhex-2-ene contains

1. two chiral carbons
2. two stereocenters
3. three stereocenters

C. The second step of an E1cB reaction is

1. a protonation
2. a deprotonation
3. the loss of a leaving group

D. The first step in an S_N1 reaction of an alkyl halide has

1. an early transition state
2. a late transition state
3. neither

E. Which organic solvent is appropriate for a phase-transfer catalyzed reaction?

1. *n*-hexane
2. ethanol
3. methanol

Name: _____

3. (continued)

F. The diisopropylamide anion is a

1. strong nucleophile
2. average nucleophile
3. weak nucleophile

G. Which reaction proceeds with complete control of stereochemistry?

1. S_N1
2. S_N2
3. E1

H. The specific rotation of (*2R,3R*)-2,3-butanediol ($H_3CCHOHCHOHCH_3$) is -13.2° . The specific rotation of (*2S,3S*)-2,3-butanediol is

1. 13.2°
2. 26.4°
3. -26.4°

I. When a carbon undergoes an S_N2 reaction, what is its hybridization at the transition state?

1. sp
2. sp^2
3. sp^3

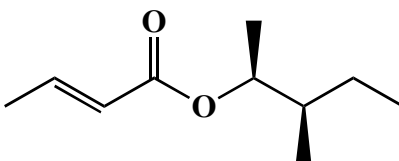
J. E2 eliminations with unhindered bases typically afford

1. Hofmann product distribution
2. Markovnikov product distribution
3. Zaitsev product distribution

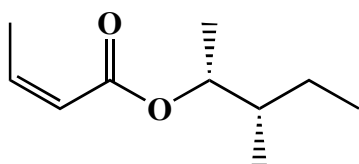
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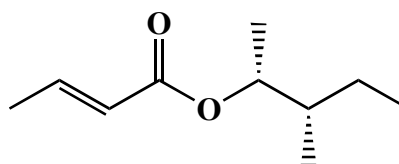
4. (30 points)

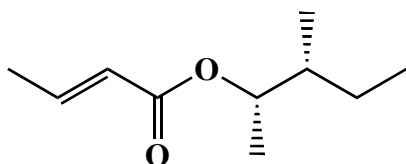
State the relationship between each of the six (6) structures at the bottom of this page and the ester **1** (identical, enantiomer, diastereomer, structural isomer, conformational isomer, different compound that is not isomeric).

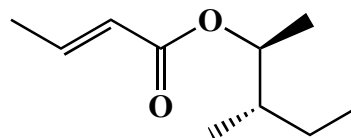


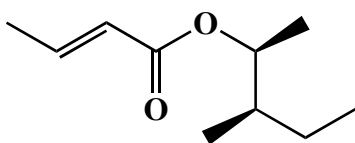
1

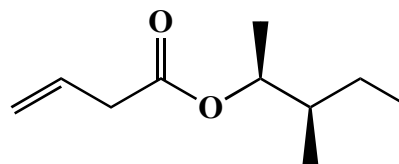








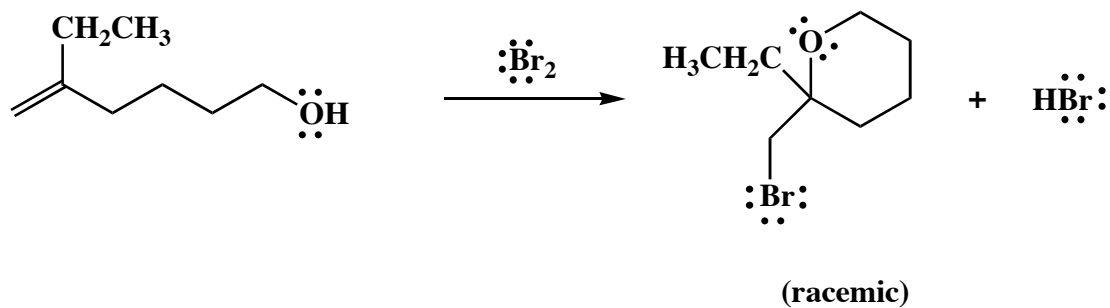




Name: _____

5. (20 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.



Congratulations!

1	/25
2	/25
3	/50
4	/30
5	/20
Total:	/150