

Chemistry 333

Hour Examination #3

May 1, 2000

Professor Charonnat

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

Be certain that your examination contains five (5) pages including this cover page.

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.

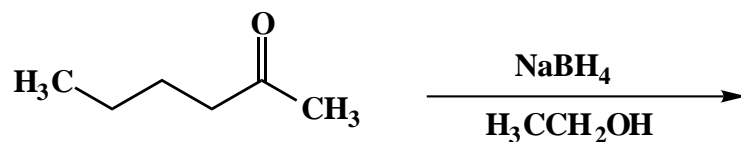
Molecular models are allowed for this examination. Calculators are unnecessary and are not allowed.

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

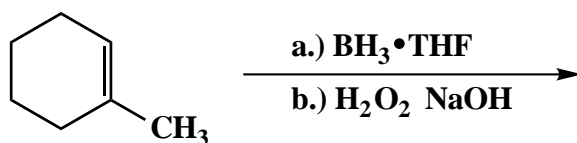
1. (25 points)

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

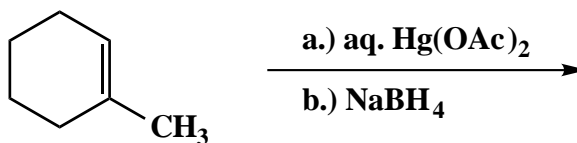
A.



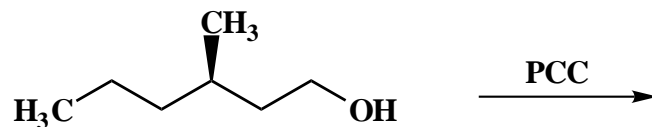
B.



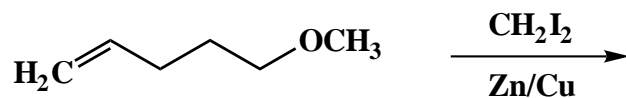
C.



D.



E.



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2. (25 points)

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

A. The addition of HBr to an alkene in the presence of peroxides proceeds via a

1. carbocation pathway
2. radical pathway
3. carbene pathway

B. The addition of HBr to an alkene in the absence of peroxides proceeds via a

1. carbocation pathway
2. radical pathway
3. carbene pathway

C. The formal charge of a singlet carbene is

1. zero
2. positive one
3. negative one

D. Rank the following compounds from smallest to largest  $pK_a$ .

1.  $H_2O$ ,  $NH_3$ ,  $HC\equiv CH$
2.  $NH_3$ ,  $H_2O$ ,  $HC\equiv CH$
3.  $H_2O$ ,  $HC\equiv CH$ ,  $NH_3$

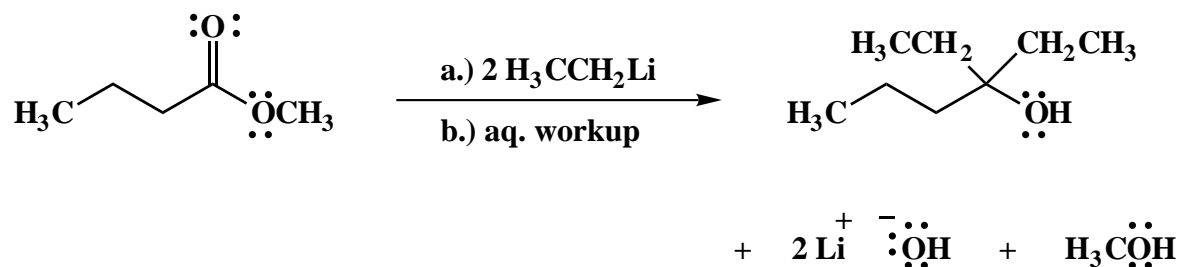
E. A primary alcohol has

1. one hydrogen attached to the carbinol carbon
2. two hydrogens attached to the carbinol carbon
3. three hydrogens attached to the carbinol carbon

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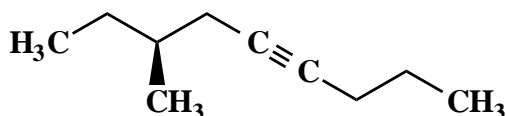
3. (20 points)

Draw the mechanism of the following reaction, using the curved-arrow notation to indicate the reorganization of electron density. Show all intermediates, unshared electrons, formal charges and countercharges. Specify reversibility or irreversibility for each primary mechanistic step.



4. (10 points)

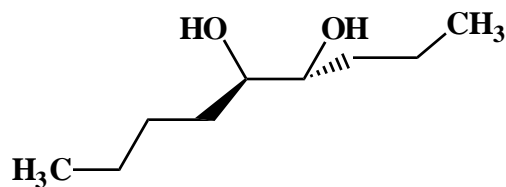
Use IUPAC nomenclature to write the systematic name of the following internal alkyne.



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5. (20 points)

Design a synthesis of the racemic, vicinal diol shown below, from acetylene, organic compounds that contain four or less carbons, and any inorganic reagents. Show specific reagents and all stable synthetic intermediate compounds. (**N.B.** Do not draw mechanisms for each synthetic transformation!)



**Congratulations!**

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