

Seat No. \_\_\_\_\_

Name KEY  
(Please print your name and **circle** your last name)

**CHEMISTRY 331**

**EXAM II**

Section A

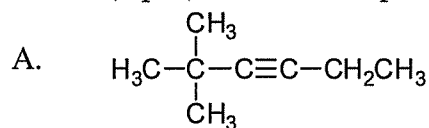
Tuesday, October 6, 2009

- I. ( 6 points) \_\_\_\_\_
- II. ( 6 points) \_\_\_\_\_
- III. (30 points) \_\_\_\_\_
- IV. ( 9 points) \_\_\_\_\_
- V. ( 4 points) \_\_\_\_\_
- VI. ( 8 points) \_\_\_\_\_
- VII. (10 points) \_\_\_\_\_
- VIII. (21 points) \_\_\_\_\_
- IX. ( 4 points) \_\_\_\_\_
- X. ( 2 points) \_\_\_\_\_

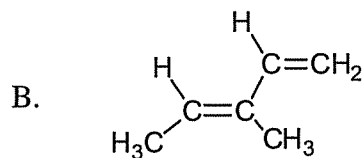
\_\_\_\_\_

TOTAL(100 points) \_\_\_\_\_

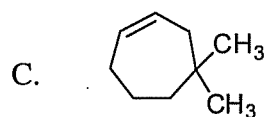
I. (6 pts.) Provide acceptable names for each of the following compounds.



2,2-dimethyl-3-hexyne



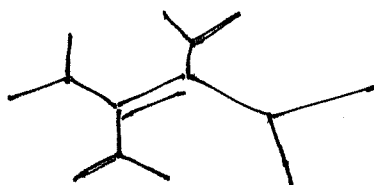
(E)-3-methyl-1,3-pentadiene



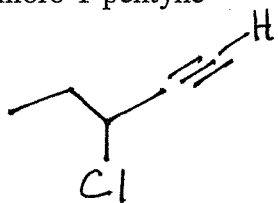
4,4-dimethylcycloheptene

II. (6 pts.) Provide correct structures for the following names.

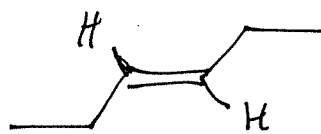
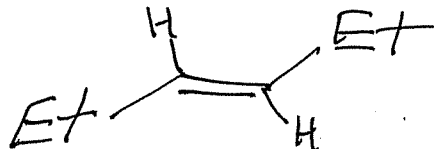
A) 3,4-diisopropyl-2,5-dimethyl-3-hexene



B) 3-chloro-1-pentyne

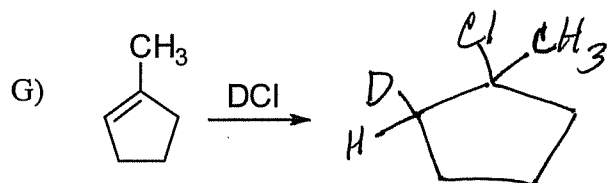
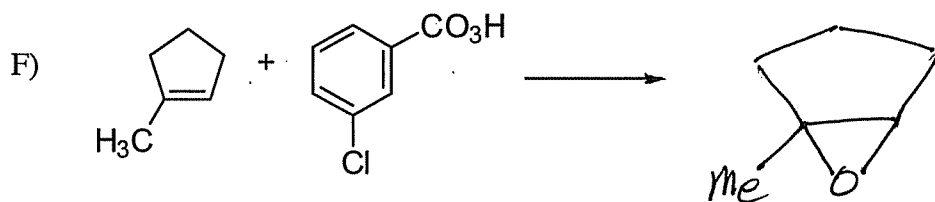
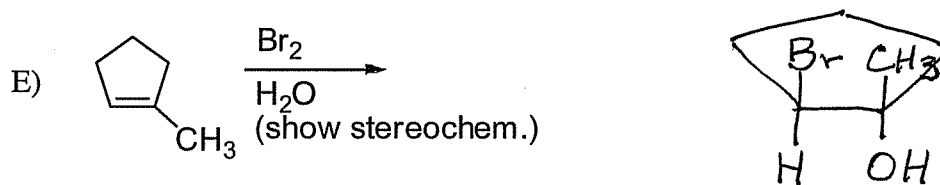
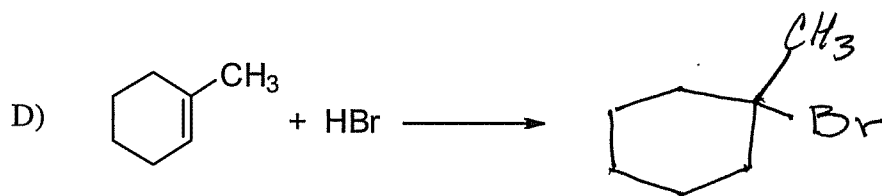
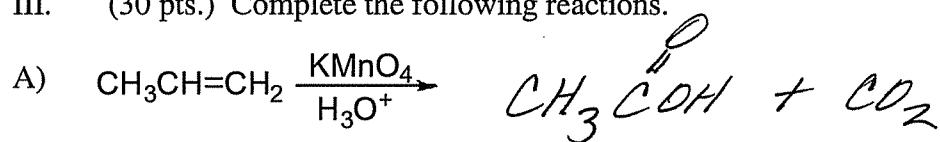


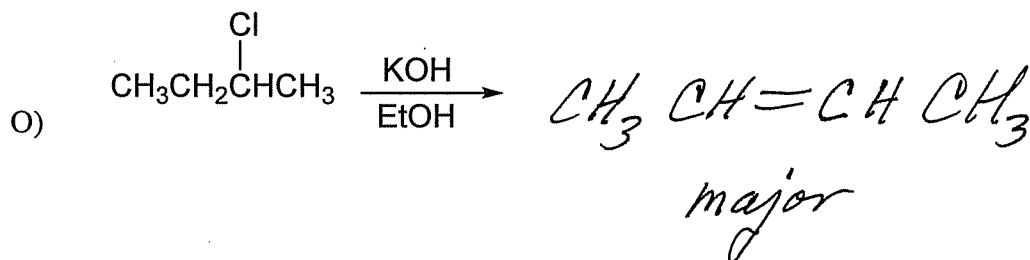
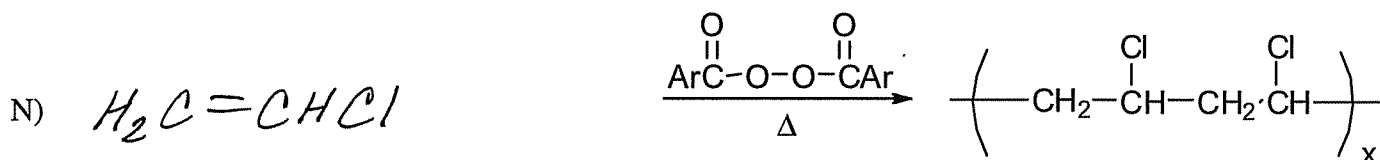
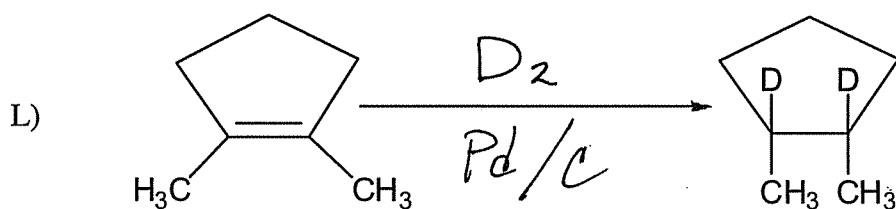
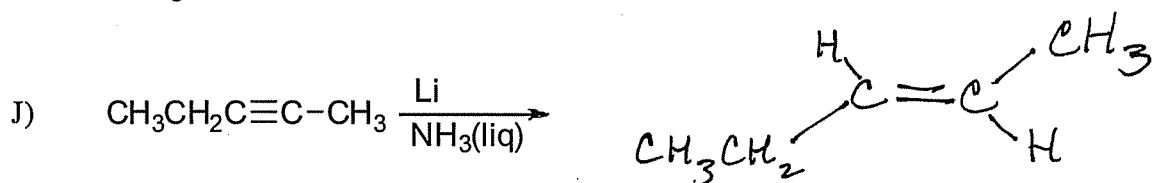
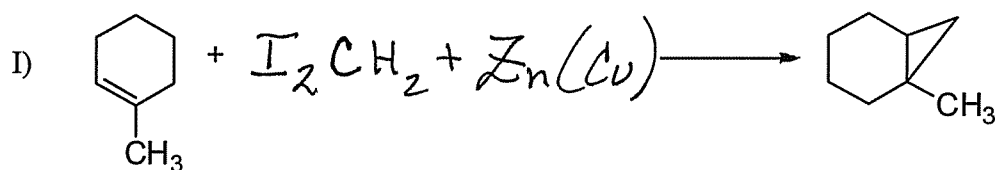
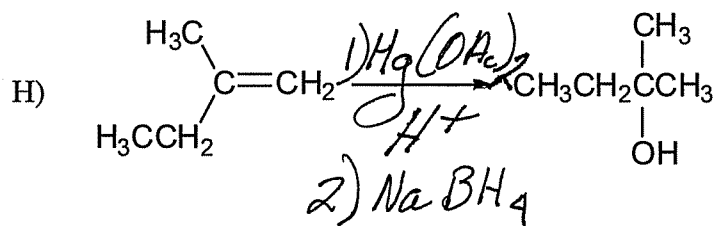
C) trans-3-hexene



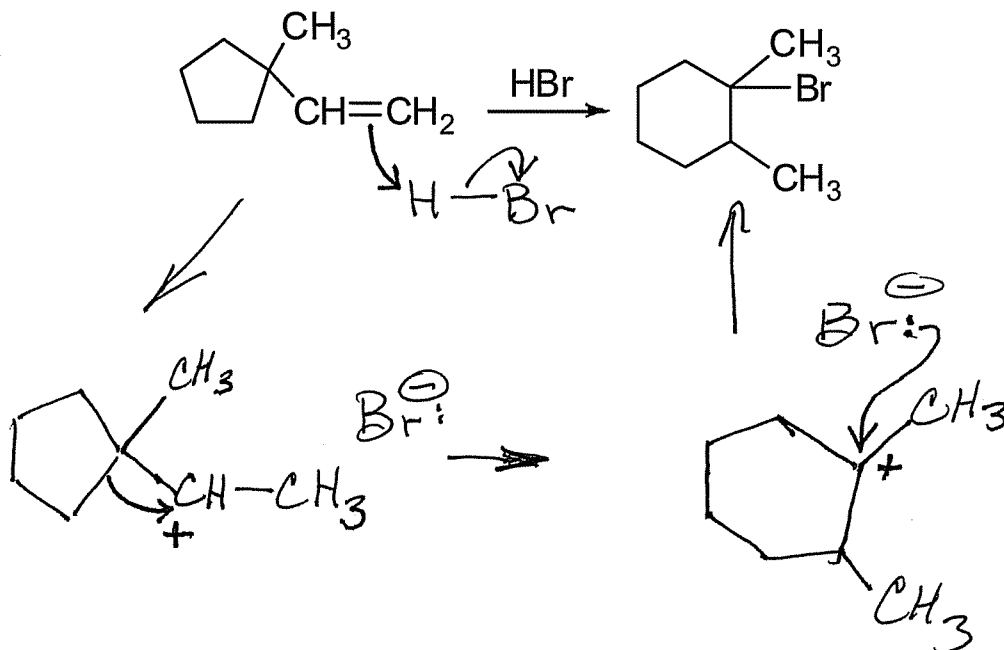
etc. 2

III. (30 pts.) Complete the following reactions.

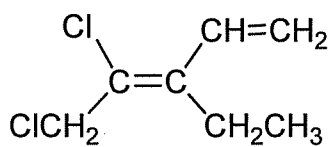




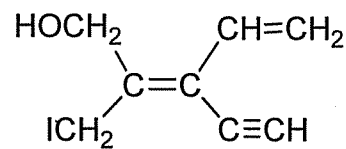
IV. (9 pts.) Provide a detailed, stepwise mechanism for the following reaction. Show all e-pair movements w/curved arrows.



V. (4 pts.) Assign E or Z configurations for the following alkenes.



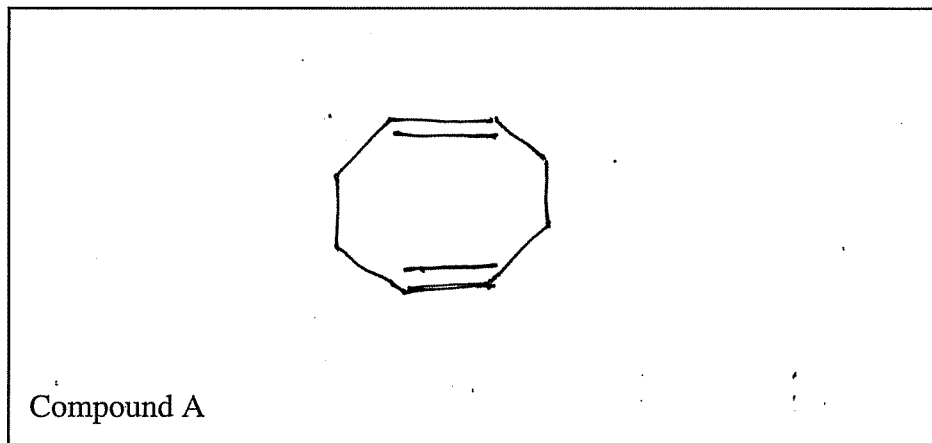
Z



Z

VI. (8 pts.) Compound A,  $C_8H_{12}$ , reacts with 2 molar equivalents of  $H_2$ . Reaction of

compound A with ozone, followed by a reductive workup, affords only  $H-\overset{O}{\parallel}C-CH_2-CH_2-\overset{O}{\parallel}CH$ . Draw the structure of "A".



VII. (10 pts.) Hammond's postulate assumes that the more endergonic a reaction the more the

transition state will resemble the product. A  $3^\circ$  carbocation is more stable than a  $1^\circ$  carbocation due to both inductive e-release and  $\sigma-\pi$ -hyperconjugation.

Carbocation rearrangements occur so as to produce more stable carbocations. The hydrogenation of an acetylene can be

stopped at the olefin stage by using Lindlar's

catalyst. The product of this hydrogenation will be a

cis olefin. The alkylation of acetylide anions is limited to

methyl & primary alkyl halides, since the acetylide anion can also act as a

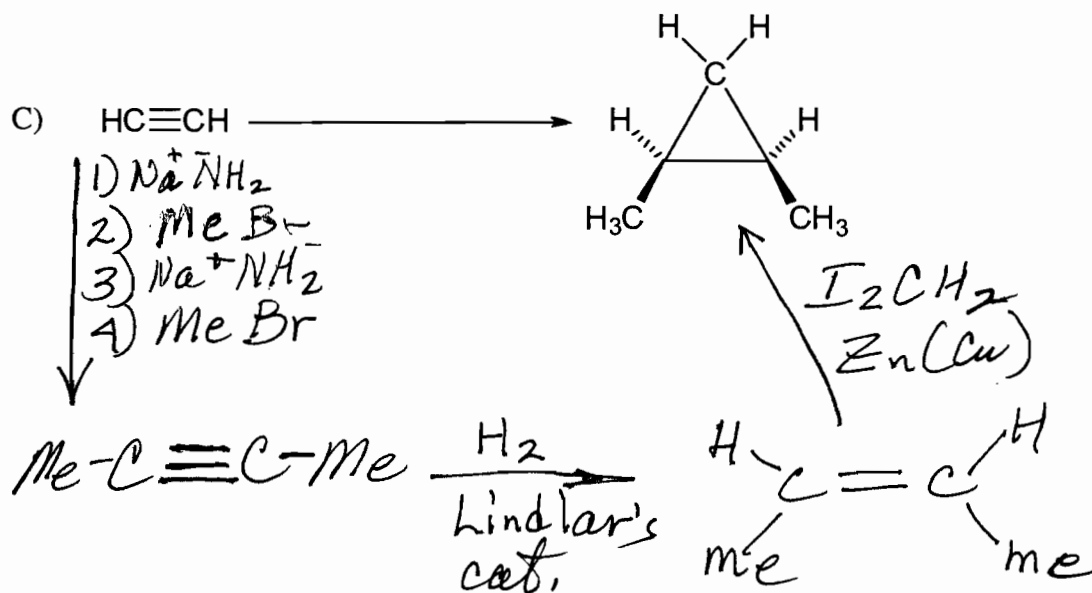
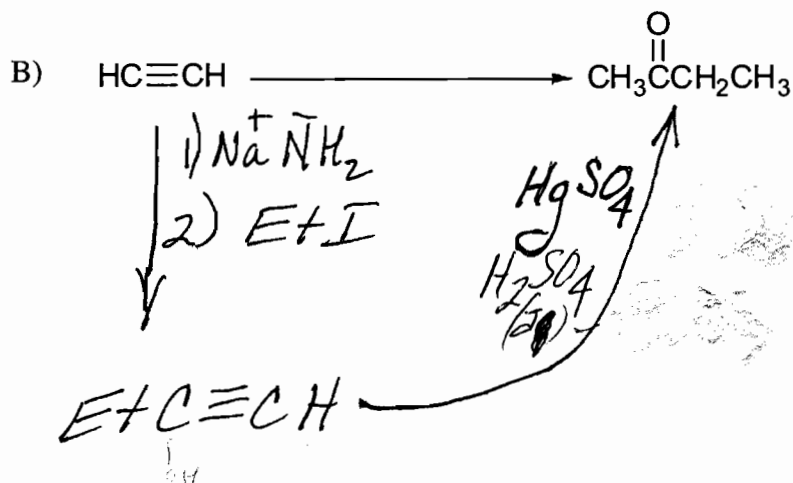
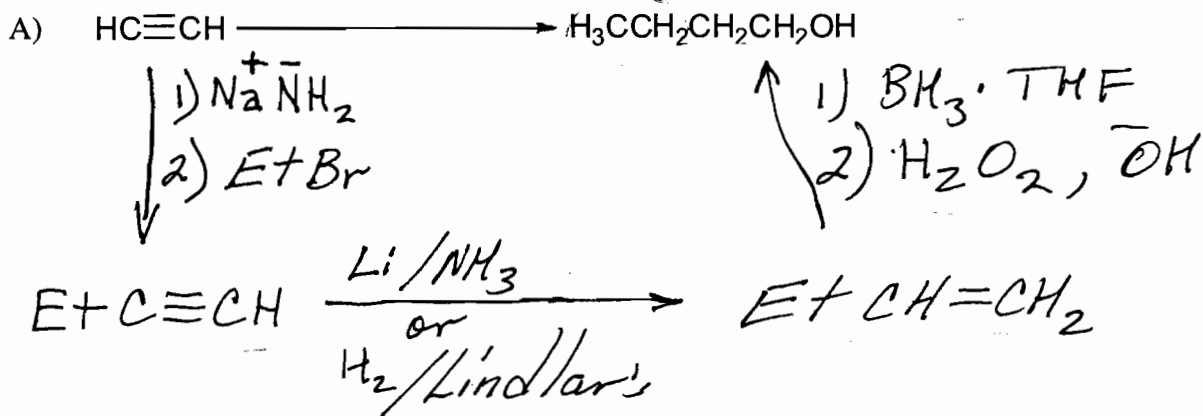
base. The reaction of  $BH_3$  and an alkene proceeds via a

concerted rather than a polar mechanism. The problem with

synthesis of  $CH_3Cl$  from methane and chlorine is that the reaction doesn't

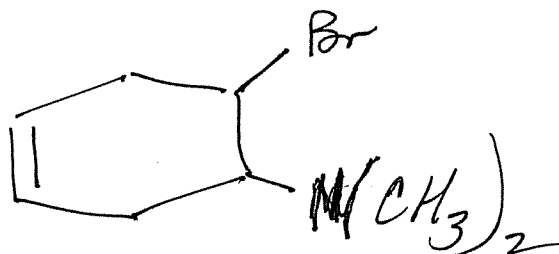
stop with monosubstitution.

VIII. (21 pts.) Show how you would perform the following transformations.



IX. (4 pts.) Calculate the degree of unsaturation for  $C_8H_{14}BrN$  and draw one possible structure.

$$D.U. = \frac{18 - (14 - 1 + 1)}{2} = \frac{4}{2} = 2$$



X. (2 pts.) Work two (or three) (or none) of the following problems.

A) If Jimmy cracked corn and no one cared, why did they write a song about it?

*d'Who cares?*

B) Why does Donald Duck wear a towel when he comes out of the shower, when he doesn't usually wear any pants?

C) When cows laugh too hard does milk come out of their noses?