Hour Exam #2
Chemistry 343 (AM)
Professor Gellman
2 November 2011

Last Name Answers

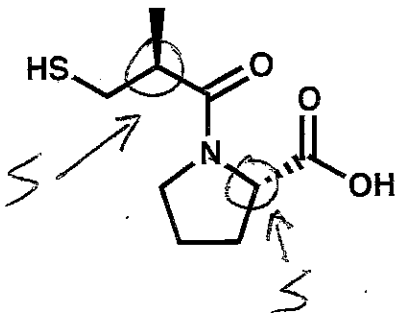
First Name Key

General Instructions:

(i) Use scratch paper at back of exam to work out answers; final answers must be recorded at the proper place on the exam itself for credit.
(ii) Print your name on each page.
(iii) Please keep your paper covered and your eyes on your own work. Misconduct will lead to failure in the course.

1. (9 points) Shown below is the drug captopril, which is used to treat high blood pressure and congestive heart failure. CIRCLE each stereogenic center, and assign the configuration (R or S).

+2 for each correct "S"

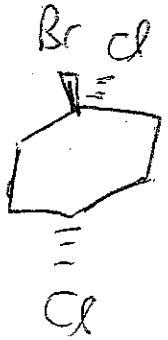



+3 for one correct circle or +5 for both correct circles

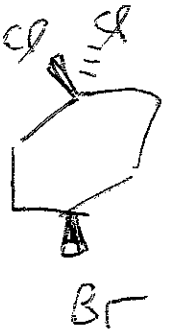
(-1 for additional circle(s))

2. (14 points) Draw all stereoisomers of bromo-dichloro-cyclohexane that are NOT chiral and NOT meso.


+5



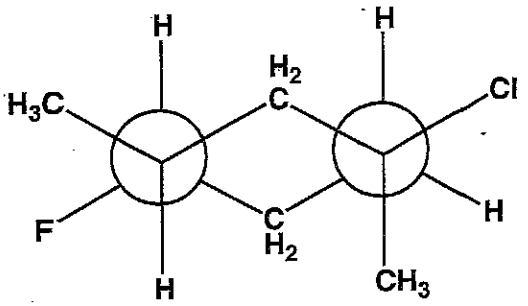

+5



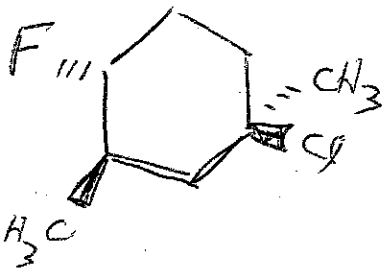

+4

Name _____

3. (19 points) Consider the Newman projection shown below.

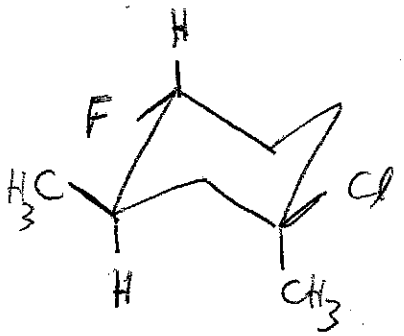



(a) Draw the regular hexagon image (not a chair) that corresponds to the Newman projection.




+5 (-2 for enantiomer)

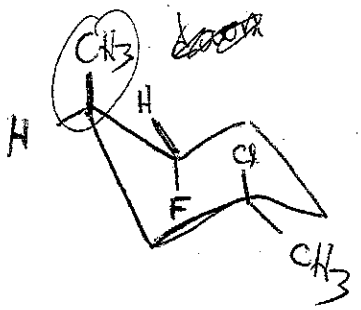
(b) Draw the chair conformation that corresponds to the Newman projection.




+6 (Note: H's not required – but helpful)

(Note: If (a) was incorrect, but (b) or (c) corresponds to (a), then +4 (or +8))

(c) Draw the other chair conformation available to this molecule.




+6

(d) Which conformation is more stable? (Circle the appropriate answer below.)

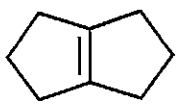
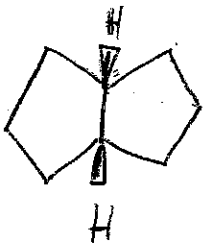
The conformation in (a). (b)

The conformation in (b). (c)

+2

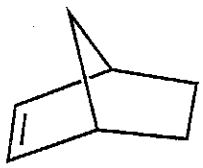
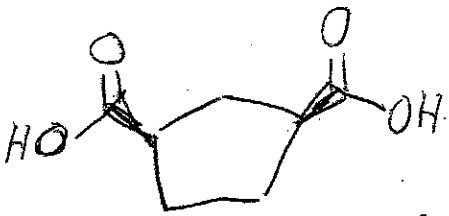
Name _____

4. (26 points) Show the major product(s) expected from the reactions below.

(a)  $H_2$, Pd/C → 

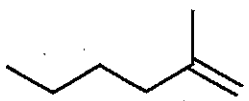
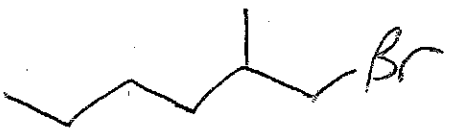
+6 (-1 for "racemic")

-2 for unclear stereochem

(b)  1) $O_3$ → 2) $H_2O_2$, $H_2O$ 

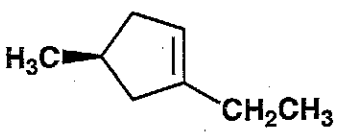
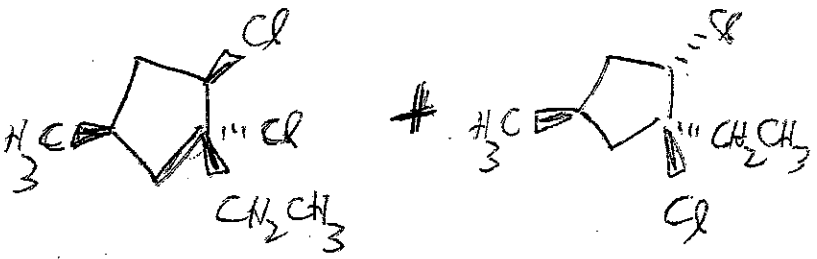
+6 (-1 for "racemic")

-2 for unclear stereochem

(c)  HBr, tBuOOtBu, Δ 

~~(racemic) -1~~

+6

(d)  $Cl_2$, $CH_2Cl_2$ 

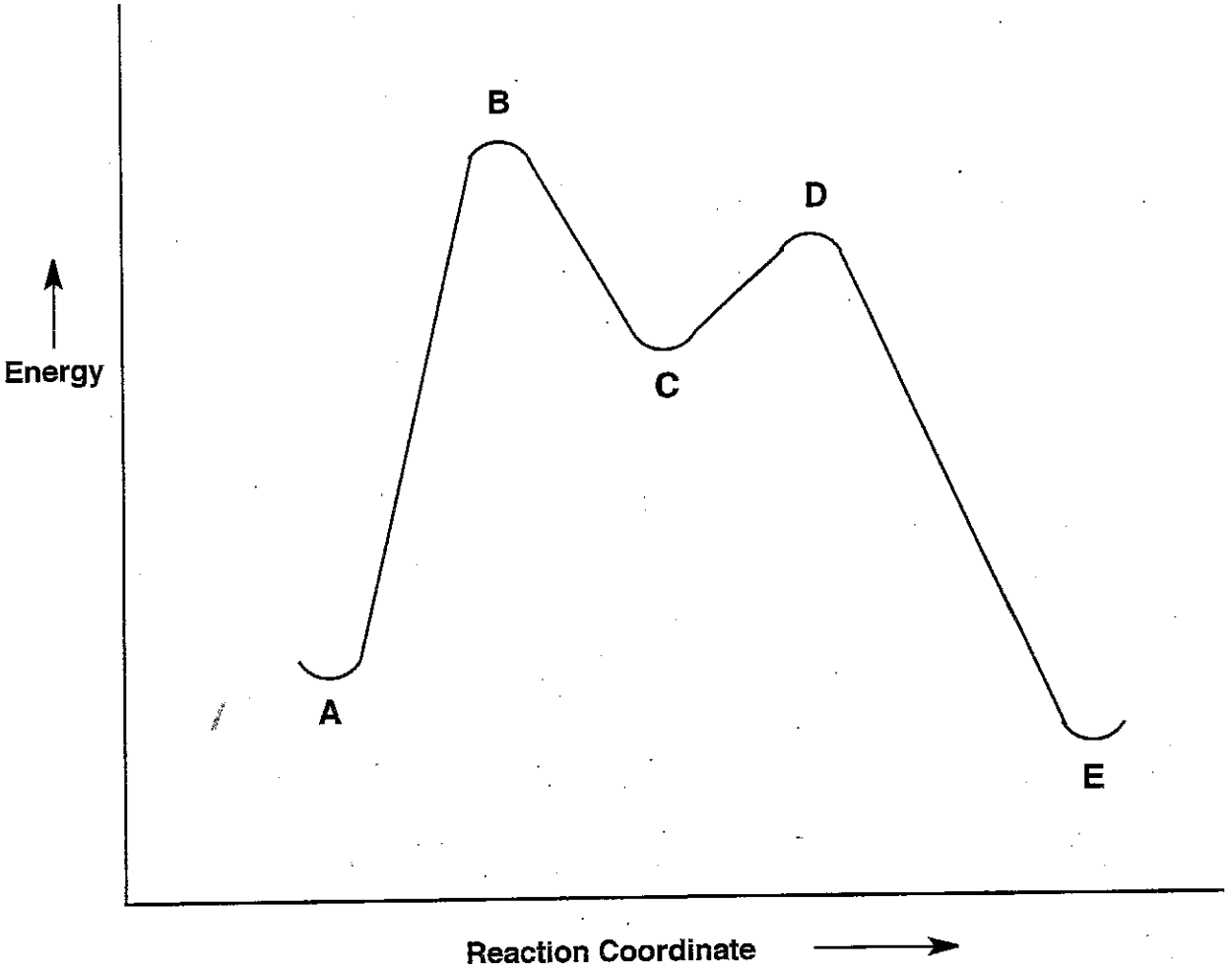
(The starting material is a single enantiomer.)

+5 for one or +8 for both

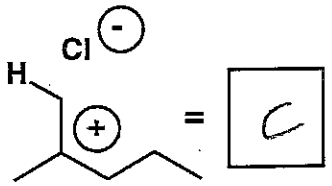
(-1 for "racemic")

Name _____

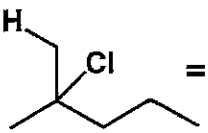
5. (20 points) Answer the questions below based on the reaction energy diagram.



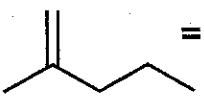

Shown below are species involved in the reaction of an alkene with HCl. Indicate which location (among A-E) on the diagram corresponds to each species (fill in the boxes).




= C

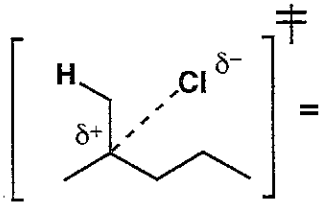



= E

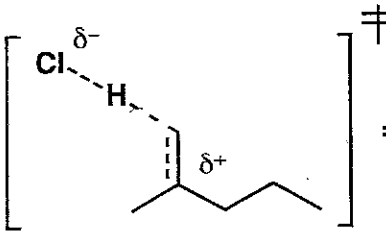


= A

+ HCl




= D



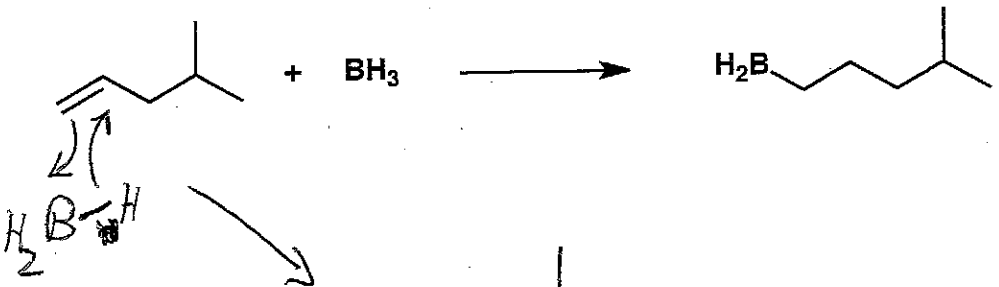

= B

+4 each

Name _____

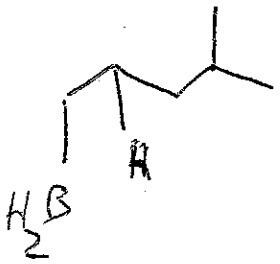
**6. (12 points) Draw a mechanism (curved arrows) for each reaction shown below. Be sure to draw all intermediates.**

(a)



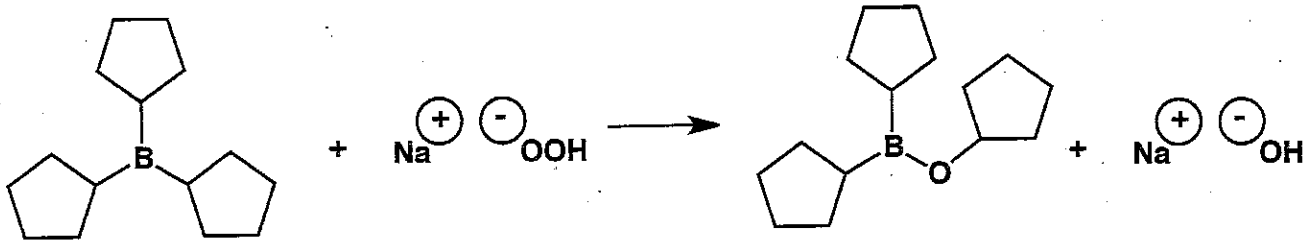


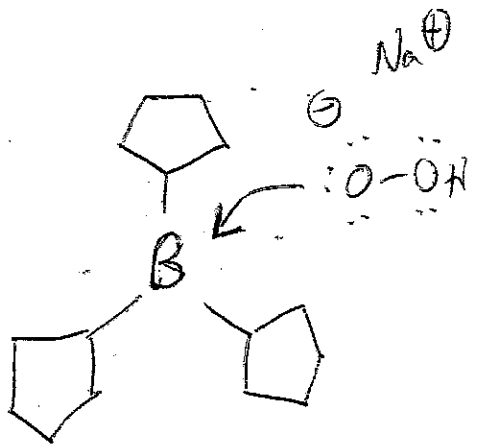

+2 for each curved arrow (must be concerted)



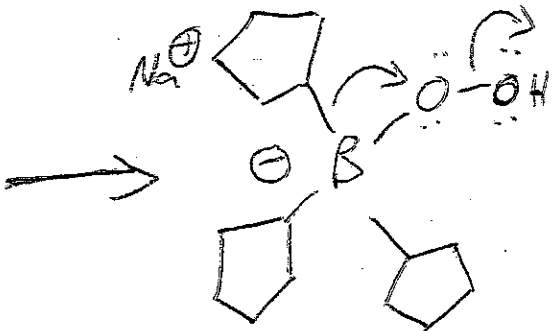

(+4 total)

(b)



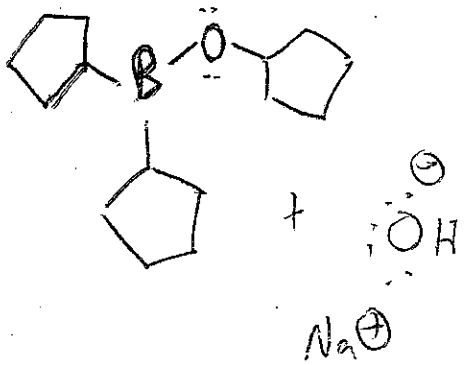




+2 for curved arrow




+2 for intermediate

+2 for each curved arrow




(+8 for total)