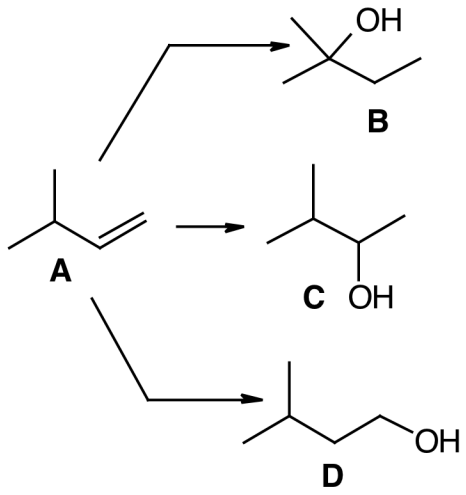
"Grade or Education" = 1

CHEM 2261/01
Summer 11
Exam 2
Chapters 4-6

1. Figure out what reagents are required to convert the alkene labelled A shown below into the alcohols labelled B, C, and D. Choose the CORRECT statement from the multiple choices.



__ A. Alkene A will react with H_2O and H_2SO_4 to form alcohol C.

__ B. Alkene A will react with: 1. BH_3/THF; followed by 2. H_2O_2, HO^-, H_2O to form alcohol C.

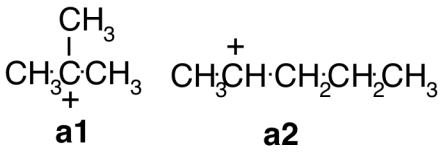
__ C. Alkene A will react with: 1. $Hg(O_2CCH_3)_2$, H_2O/THF; followed by 2. $NaBH_4$ to form alcohol C.

__ D. Alkene A will react with H_2O and H_2SO_4 to form alcohol D.

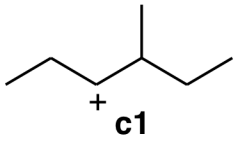
__ E. Alkene A will react with: 1. $Hg(O_2CCH_3)_2$, H_2O/THF; followed by 2. $NaBH_4$ to form alcohol B.

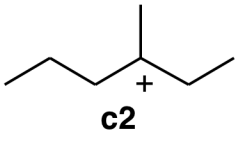
Rationale:
Chapter 4 Problem 43

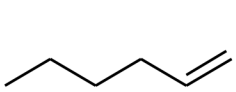
2. For each of the pairs of structures shown below figure out which structure is more stable. Pairs of structures share the same letter, like a1 and a2. Choose the CORRECT statement from the multiple choices.

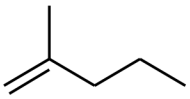

a1

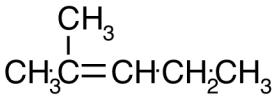
a2

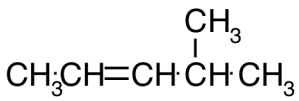

c1

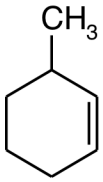

c2

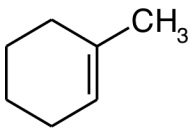

d1


d2


e1


e2


f1


f2

__ A. Structure e1 is more stable than structure e2.

__ B. Structure a2 is more stable than structure a1.

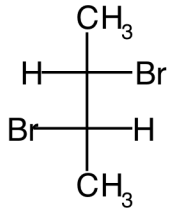
__ C. Structure d1 is more stable than structure d2.

__ D. Structure c1 is more stable than structure c2.

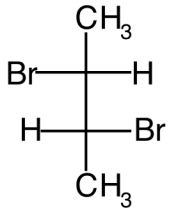
__ E. Structure f1 is more stable than structure f2.

Rationale:
Chapter 4 Problem 52

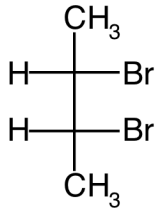
3. Pick the stereoisomer(s) from below obtained from the reaction of 2-butyne with $Na/NH_3(liq)$ followed by Br_2/CH_2Cl_2.



stereoisomer 1



stereoisomer 2



stereoisomer 3

__ A. Only stereoisomer 3 is obtained.

__ B. Stereoisomers 1, 2, and 3 are obtained.

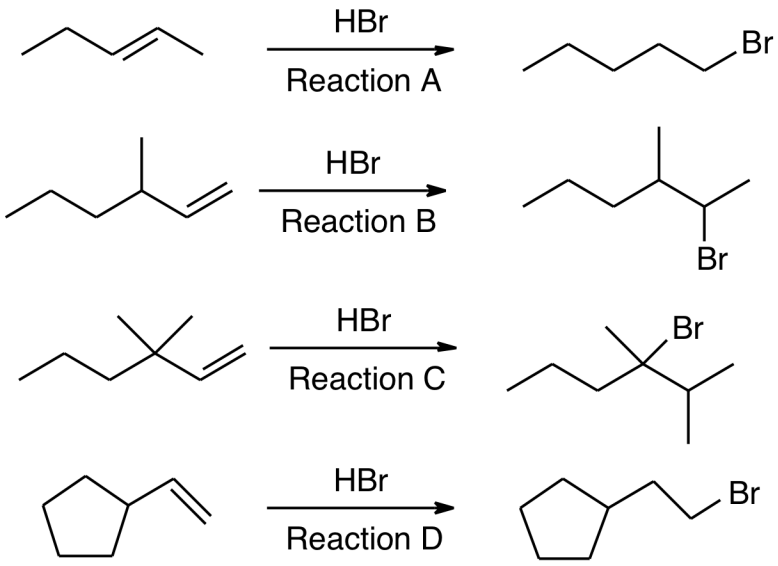
__ C. Only stereoisomer 1 is obtained.

__ D. Stereoisomers 1 and 2 are obtained.

__ E. Stereoisomers 2 and 3 are obtained.

Rationale:
Chapter 6 Problem 44b

4. Which, if any, of the reactions shown below is correct?



__ A. Reaction A is correct.

__ B. Reaction C is correct.

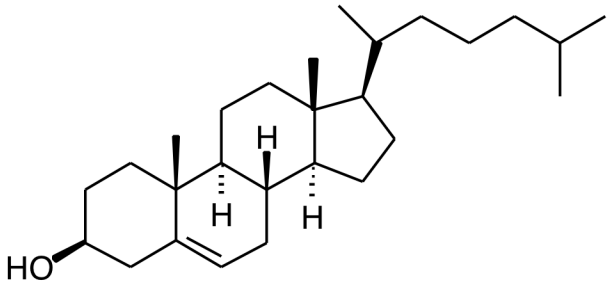
__ C. Reaction D is correct.

__ D. Reaction B is correct.

__ E. None of these reactions is correct.

Rationale:
Chapter 4 Problem 60

5. The stereoisomer of cholesterol found in nature is shown below. How many asymmetric centers does cholesterol have?



cholesterol

__ A. 10

__ B. 4

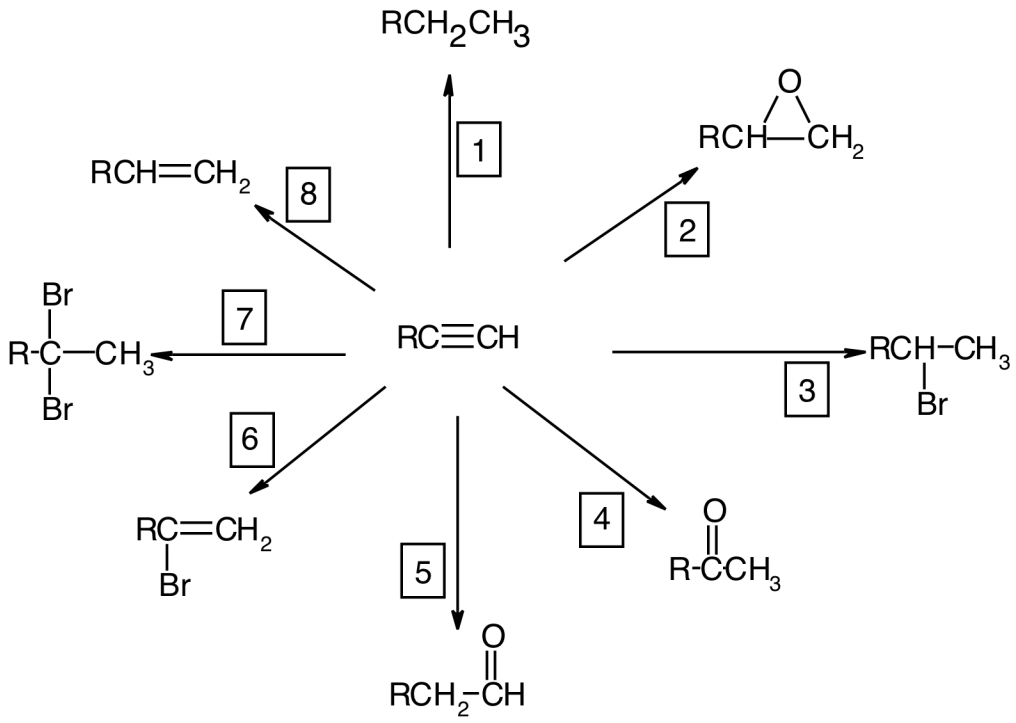
__ C. 8

__ D. 6

__ E. 2

Rationale:
Chapter 5 Problem 25

6. The compound whose structure is shown in the center of the figure below can be converted into all of the other outer compounds whose structures are shown. Conversion number 1 transforms the center compound into the topmost compound in the figure (see boxed number 1). Conversion number 2 transforms the center compound into the outer compound one position clockwise from the topmost compound, etc. (ie. the conversion numbers are arranged in a clockwise pattern). Use this information To find the multiple choice answer which is ****WRONG****.



__ A. Conversion number 7 can be carried out using excess HBr.

__ B. Conversion number 8 can be carried out using excess H_2/Pd/C.

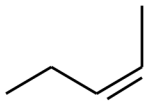
__ C. Conversion number 4 can be carried out using $H_2O/H_2SO_4 + HgSO_4$.

__ D. Conversion number 5 can be carried out using BH_3/THF followed by HO^-/H_2O_2.

__ E. Conversion number 6 can be carried out using 1 equiv. of HBr.

Rationale:
Chapter 6 Problem 29

7. Using ethyne as the starting material, pick the choice which CORRECTLY describes how the compound with the structure shown below can be prepared.



__ A. First steps: 1. $NaNH_2$, 2. CH_3Br; Next steps: 1. $NaNH_2$, 2. CH_3CH_2Br; Final step: H_2 and Pd/C

__ B. First steps: 1. $NaNH_2$, 2. CH_3Br; Next step: Na/NH_3; Final steps: 1. $NaNH_2$, 2. CH_3CH_2Br

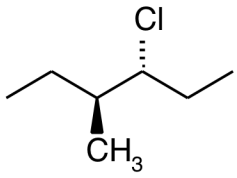
__ C. First steps: 1. $NaNH_2$, 2. CH_3Br; Next step: H_2/Lindlar catalyst; Final steps: 1. $NaNH_2$, 2. CH_3CH_2Br

__ D. First steps: 1. $NaNH_2$, 2. CH_3Br; Next steps: 1. $NaNH_2$, 2. CH_3CH_2Br; Final step: H_2/Lindlar catalyst

__ E. First steps: 1. $NaNH_2$, 2. CH_3Br; Next steps: 1. $NaNH_2$, 2. CH_3CH_2Br; Final step: Na/NH_3

Rationale:
Chapter 6 Problem 43e

8. Select the correct name of the compound which has the structure shown below from the multiple choices.



__ A. (3R,4R)-3-chloro-4-methylhexane

__ B. (3R,4S)-3-chloro-4-methylhexane

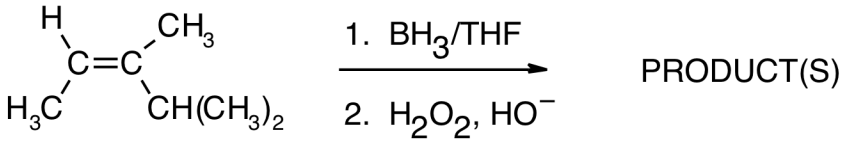
__ C. meso-3-chloro-4-methylhexane

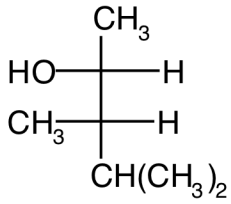
__ D. (3S,4S)-3-chloro-4-methylhexane

__ E. (3S,4R)-3-chloro-4-methylhexane

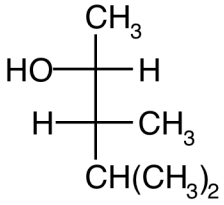
Rationale:
Chapter 5 Problem 39d

9. Find the structure(s) of the product(s) of the reaction shown below. Pick the choice which references ALL of the CORRECT reaction products.

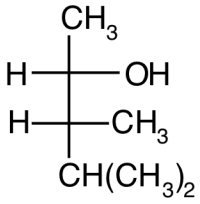




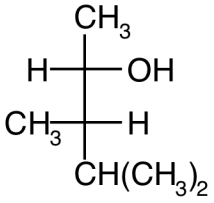
1



2



3



4

__ A. This reaction produces only product 3.

__ B. This reaction produces products 2 and 4.

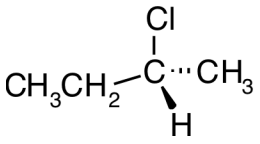
__ C. This reaction produces products 1, 2, 3, and 4.

__ D. This reaction produces only product 4.

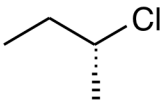
__ E. This reaction produces products 1 and 3.

Rationale:
Chapter 5 Problem 93

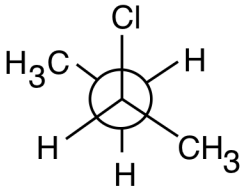
10. Which of the structures below is/are (R)-2-chlorobutane?



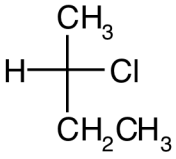
a



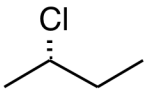
c



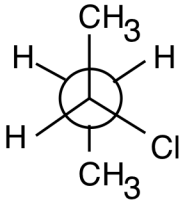
e



b



d



f

__ A. Structures b and c are (R)-2-chlorobutane.

__ B. Structures b, d and f are (R)-2-chlorobutane.

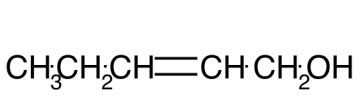
__ C. Only b is (R)-2-chlorobutane.

__ D. Only c is (R)-2-chlorobutane.

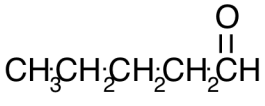
__ E. Structures a, c, and e are (R)-2-chlorobutane.

Rationale:
Chapter 5 Problem 78

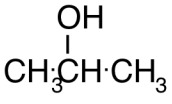
11. Look at the pairs of structures below and determine which pairs are keto-enol tautomers. Choose the CORRECT statement from the multiple choices.



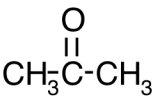
a1



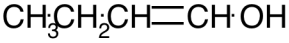
a2



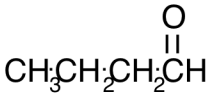
b1



b2

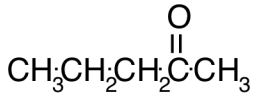


c1

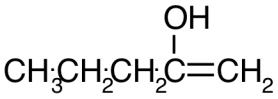


c2

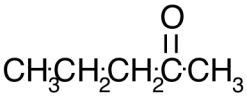
d1



d2



e1



e2

__ A. Structures d1 and d2 are keto-enol tautomers.

__ B. Structures a1 and a2 are keto-enol tautomers.

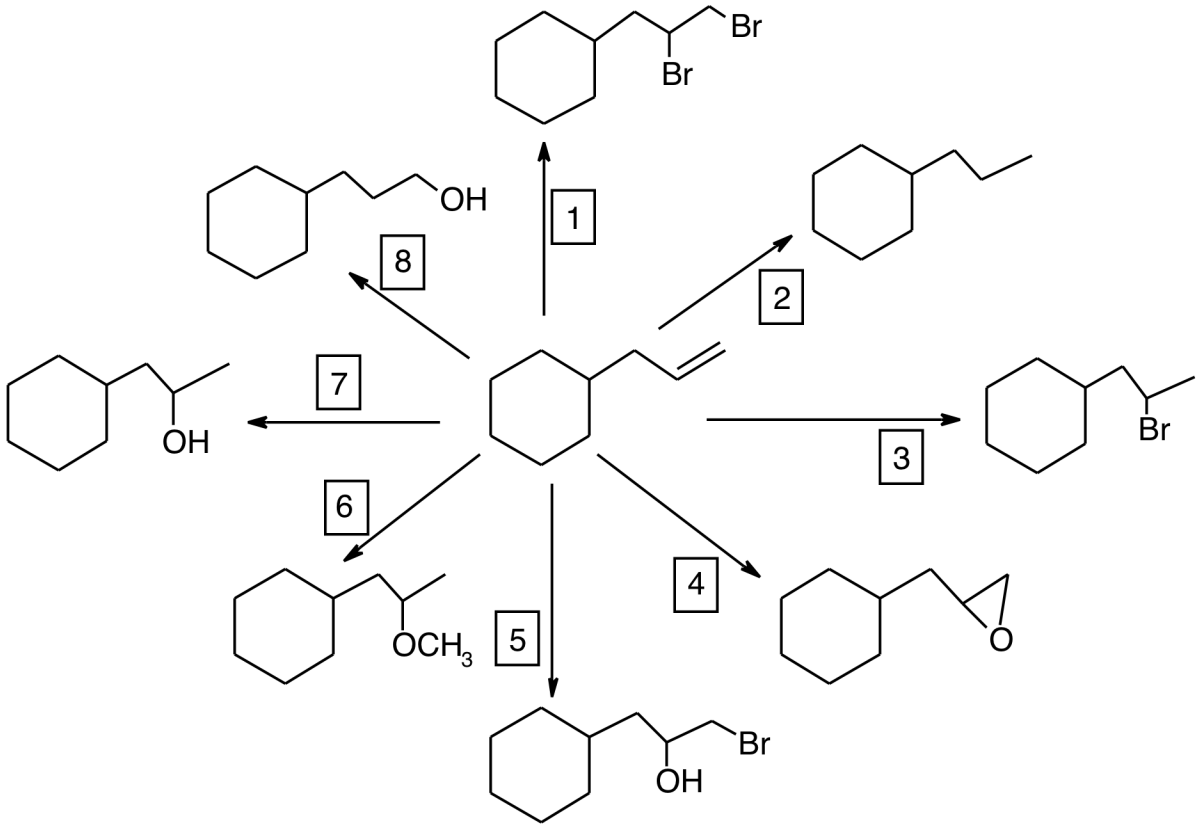
__ C. Structures e1 and e2 are keto-enol tautomers.

__ D. Structures b1 and b2 are keto-enol tautomers.

__ E. Structures c1 and c2 are not keto-enol tautomers.

Rationale:
Chapter 6 Problem 42

12. The compound whose structure is shown in the center of the figure following can be converted into all of the other outer compounds whose structures are shown. Conversion number 1 transforms the center compound into the topmost compound in the figure (see boxed number 1). Conversion number 2 transforms the center compound into the outer compound one position clockwise from the topmost compound, etc. (ie. the conversion numbers are arranged in a clockwise pattern). Use this information to find the multiple choice answer which is ****WRONG**** .



__ A. Conversion number 2 can be carried out using H_2/Pt.

__ B. Conversion number 5 can be carried out using Br_2 and H_2O.

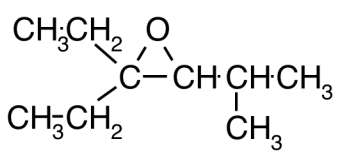
__ C. Conversion number 8 can be carried out using BH_3/THF followed by H_2O_2 and base (H_2O/OH^-).

__ D. Conversion number 6 can be carried out using acid (H_2SO_4) and CH_3OH.

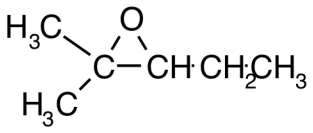
__ E. Conversion number 1 can be carried out using Br_2/CH_3OH.

Rationale:
Chapter 4 Problem 47

13. Which of the choices, if any, gives a ****WRONG**** name for one of the two compounds whose structures are shown below?



A



B

__ A. None of the names in the other choices is wrong.

__ B. The compound with structure B can be called 3-ethyl-2,2-dimethyloxirane.

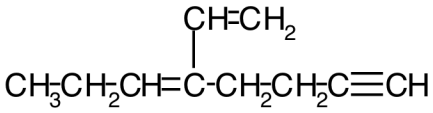
__ C. The compound with structure A can be called 3,4-epoxy-3-ethyl-5-methylhexane.

__ D. The compound with structure B can be called 2,3-epoxy-2-methylpentane.

__ E. The compound with structure A can be called 2,2-diethyl-3-isopropyloxirane.

Rationale:
Chapter 4 Problem 41

14. What is the systematic name of the compound whose structure is shown below?



__ A. 5-vinyl-5-octen-1-yne

__ B. 4-vinyl-oct-3-ene-7-yne

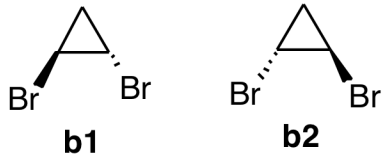
__ C. 3-(3-butynyl)-1,3-hexadiene

__ D. 4-(3-butynyl)-3,5-hexadiene

__ E. 5-vinyl-1-octyn-5-ene

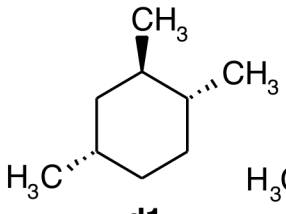
Rationale:
Chapter 6 Problem 6c

15. Figure out whether each of the following pairs of compounds are identical or are enantiomers, diastereomers, or constitutional isomers. Pick the choice which gives the CORRECT relationship between one of these pairs.

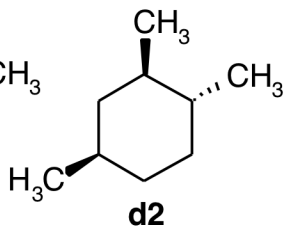


b1

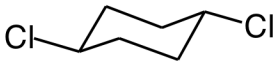
b2



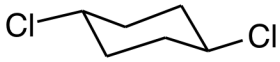
d1



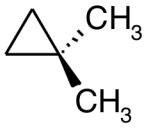
d2



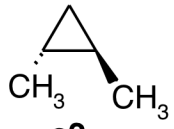
f1



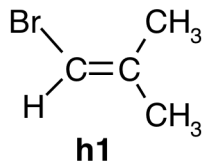
f2



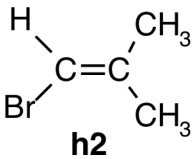
c1



c2



h1



h2

__ A. b1 and b2 are enantiomers.

__ B. c1 and c2 are diastereomers.

__ C. d1 and d2 are enantiomers.

__ D. f1 and f2 are enantiomers.

__ E. h1 and h2 are diasteriomers.

Rationale:
Chapter 5 Problem 67(b,c,d,f,h)

Answer Key

"Grade or Education" = 1

CHEM 2261/01
Summer 11
Exam 2
Chapters 4-6

1. C
2. A
3. A
4. B
5. C
6. B
7. D
8. B
9. B
10. E
11. C
12. E
13. C
14. A
15. A