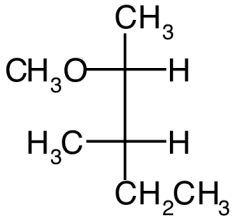
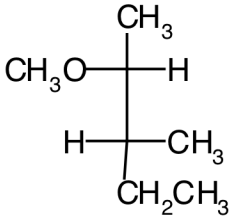
"Grade or Education" = 1

CHEM 2261/01
Summer 08
Exam 3
Chapters 7-9

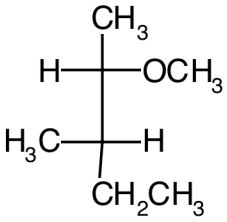
1. Find the substitution product(s) of the reaction of (2S,3R)-2-chloro-3-methylpentane + high concentration of CH_3O^- from among the numbered structures shown below. Choose the CORRECT statement from the multiple choices.



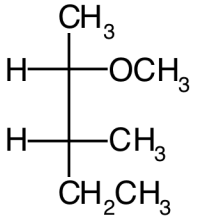
1



2



3



4

__ A. 1 is the sole product of this reaction.

__ B. 3 is the sole product of this reaction.

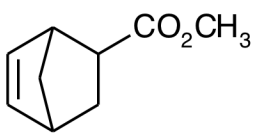
__ C. 2 is the sole product of this reaction.

__ D. 2 and 4 are both products of this reaction.

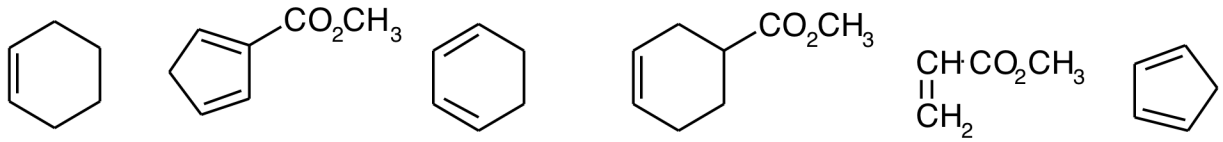
__ E. 4 is the sole product of this reaction.

Rationale:
Chapter 8 Problem 52b

2. What two compounds could be used to produce the compound whose structure is shown below from a Diels-Alder reaction?



Pick the structures of the two compounds which can be used in this Diels-Alder reaction from the numbered choices below.



1 **2** **3** **4** **5** **6**

__ A. Compounds 5 and 6 can be used in this reaction.

__ B. Compounds 1 and 2 can be used in this reaction.

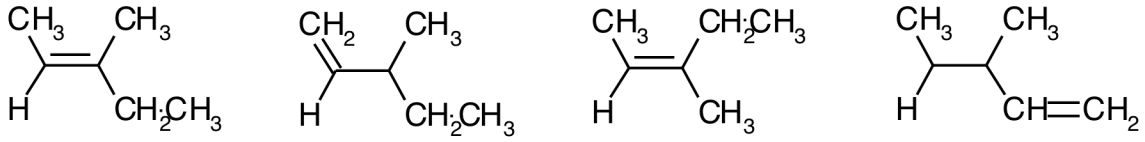
__ C. Compounds 4 and 6 can be used in this reaction.

__ D. Compounds 3 and 5 can be used in this reaction.

__ E. Compounds 3 and 4 can be used in this reaction.

Rationale:
Chapter 7 Problem 64b

3. Find the elimination product(s) of (2S,3R)-2-chloro-3-methylpentane + high concentration of CH_3O^- among the numbered structures below. Choose the CORRECT product of this reaction.



1 **2** **3** **4**

__ A. 1 and 3 are both products of this reaction.

__ B. 4 is the product of this reaction.

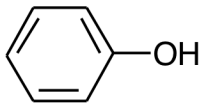
__ C. 2 is the product of this reaction.

__ D. 1 is the product of this reaction.

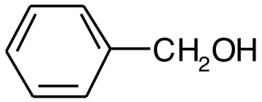
__ E. 3 is the product of this reaction.

Rationale:
Chapter 9 Problem 48b

4. Rank the compounds whose structures are shown below in order of INCREASING acid strength (weakest acid listed first).



1



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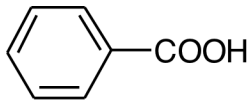


3

__ A. 1 < 3 < 2

__ B. 1 < 2 < 3

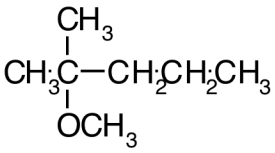
__ C. 3 < 2 < 1

__ D. 3 < 1 < 2

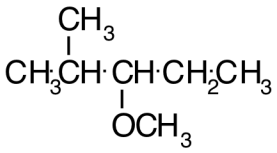
__ E. 2 < 1 < 3

Rationale:
Chapter 7 Problem 18

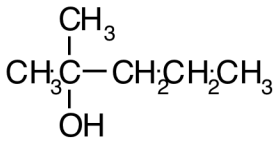
5. Choose the CORRECT substitution product of the reaction of 3-bromo-2-methylpentane + CH_3OH from the numbered structures shown below.



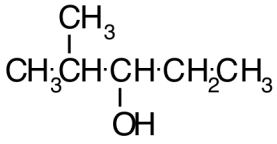
1



2



3



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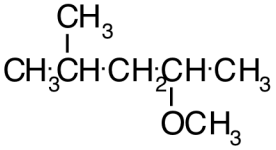


5

__ A. 4 is the product of this reaction.

__ B. 5 is the product of this reaction.

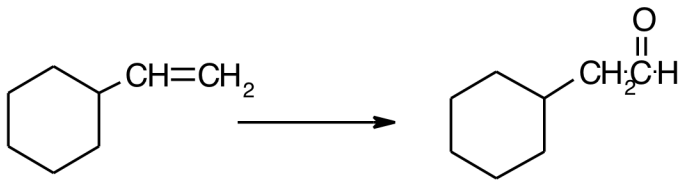
__ C. 3 is the product of this reaction.

__ D. 1 is the product of this reaction.

__ E. 2 is the product of this reaction.

Rationale:
Chapter 8 Problem 45e

6. For the target compound whose structure is shown below choose the multistep synthesis which could be used to prepare it from the given starting material.



__ A. First: Br_2/CH_2Cl_2; Next: excess $^-NH_2$; Finally: $H_2SO_4/HgSO_4$

__ B. First: Br_2/CH_2Cl_2; Next: excess $^-NH_2$; Finally: 1. disiamylborane and 2. HO^-, H_2O_2, H_2O

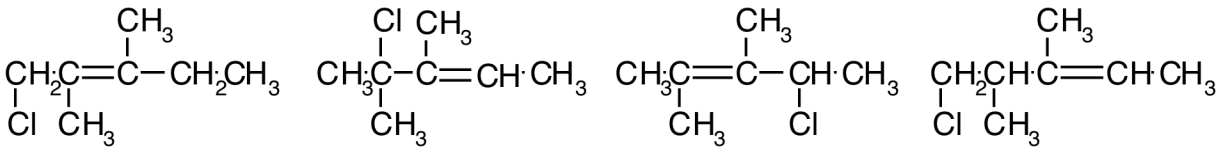
__ C. First: HBr/CH_2Cl_2; Next: $^-NH_2$; Finally: 1. BH_3/THF and 2. HO^-, H_2O_2, H_2O

__ D. First: Br_2/CH_2Cl_2; Next: excess $^-NH_2$; Finally: H_2SO_4/H_2O

__ E. First: Br_2/H_2O; Next: $^-NH_2$

Rationale:
Chapter 9 Problem 31b

7. Find the kinetic and thermodynamic products of the reaction of one equivalent of HCl with 2,3-dimethyl-1,3-pentadiene among the numbered structures below. Choose the CORRECT statement from the multiple choices.



1 **2** **3** **4**

__ A. 4 is the kinetic product and 1 is the thermodynamic product.

__ B. 1 is the kinetic product and 4 is the thermodynamic product.

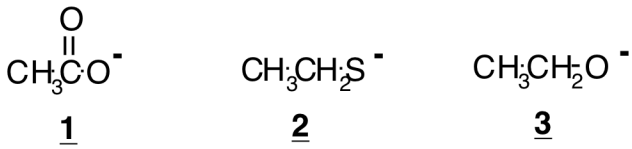
__ C. 3 is the kinetic product and 1 is the thermodynamic product.

__ D. 2 is the kinetic product and 3 is the thermodynamic product.

__ E. 3 is the kinetic product and 2 is the thermodynamic product.

Rationale:
Chapter 7 Problem 68a

8. Rank the ions whose structures are shown below in order of DECREASING nucleophilicity in methanol (strongest nucleophile listed first).



1 **2** **3**

__ A. 2 > 3 > 1

__ B. 1 > 3 > 2

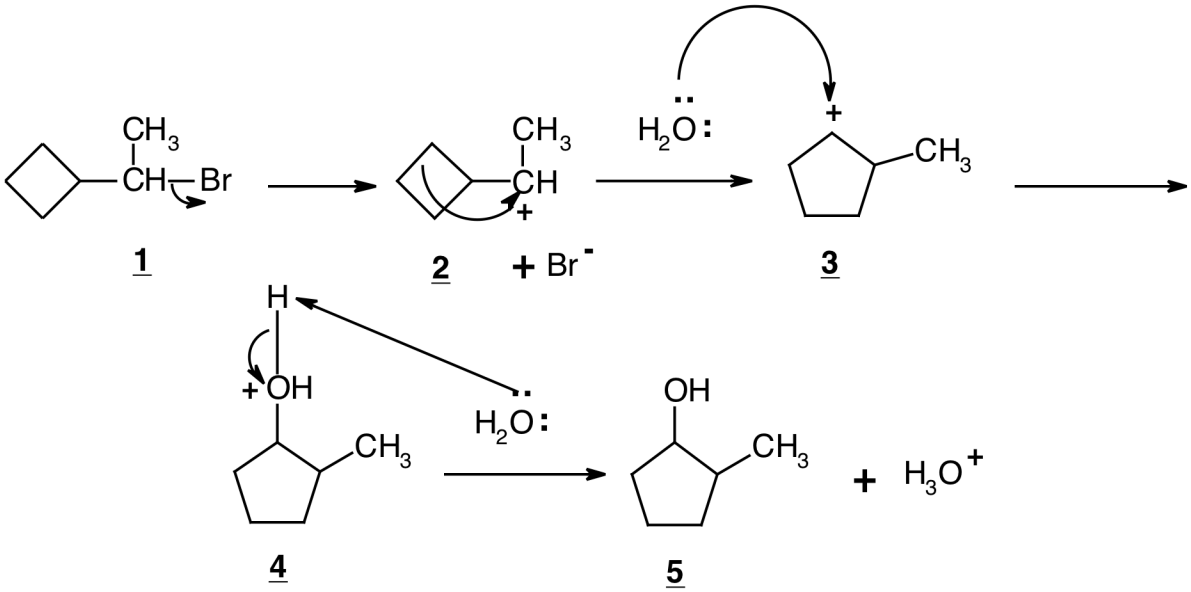
__ C. 1 > 2 > 3

__ D. 3 > 2 > 1

__ E. 2 > 1 > 3

Rationale:
Chaptr 8 Problem 42a

9. Shown below is a curved-arrow mechanism for converting structure 1 into structure 5. Which structure has the curved arrow(s) associated with it drawn INCORRECTLY ?



1 **2** **3** **4** **5**

__ A. 3

__ B. 5

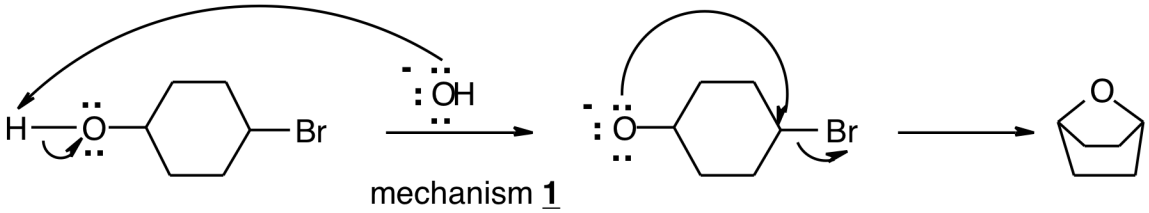
__ C. 4

__ D. 1

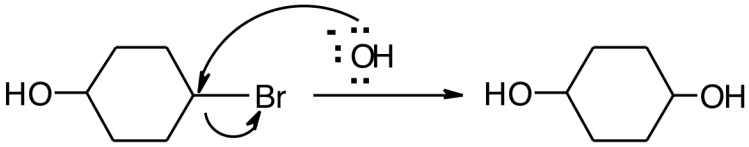
__ E. 2

Rationale:
Chapter 8 Problem 62a

10. Two curved-arrow mechanisms are shown for the reaction of 4-bromocyclohexanol with HO^- to form substitution products. Figure out the substitution mechanism(s) for the reaction of cis-4-bromocyclohexanol and trans-4-bromocyclohexanol with HO^- to form product(s). Choose the CORRECT statement from the multitple choices.



mechanism 1



mechanism 2

__ A. cis-4-bromocyclohexanol undergoes mechanism 2.

__ B. Neither cis-4-bromocyclohexanol nor trans-4-bromocyclohexanol undergo mechanism 2.

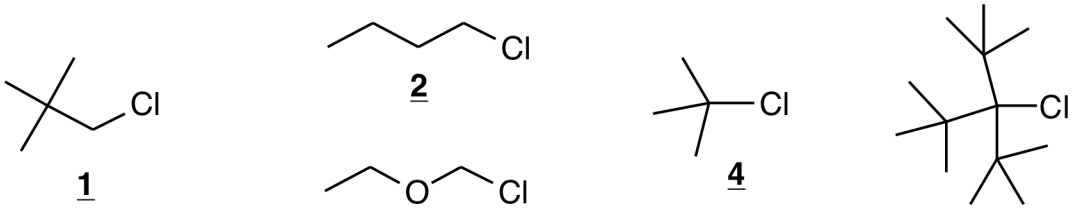
__ C. cis-4-bromocyclohexanol undergoes mechanism 1.

__ D. trans-4-bromocyclohexanol cannot react by either mechanism.

__ E. Both cis-4-bromocyclohexanol and trans-4-bromocyclohexanol undergo mechanism 1.

Rationale:
Chapter 9 Problem 55a

11. Use the numbered structures shown below to choose the CORRECT statement from the multiple choices.



__ A. $(CH_3)_3CBr$ will react faster with CH_3CH_2OH than it will with H_2O.

__ B. $(CH_3)_2CHS^-$ will react faster with 1 than CH_3S^- will.

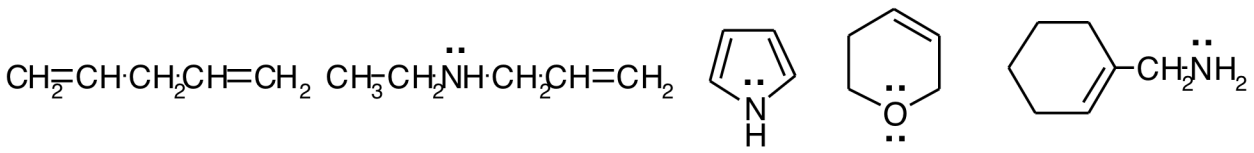
__ C. 3 will not react with HO^-.

__ D. 5 will react with H_2O faster than 4 will.

__ E. 2 will react with HO^- faster than 3 will.

Rationale:
Chapter 8 Problem 48

12. Which of the structures shown below has delocalized electrons?



1 **2** **3** **4** **5**

__ A. structure 4

__ B. structure 3

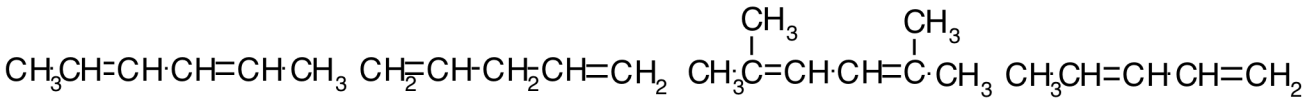
__ C. structure 5

__ D. structure 2

__ E. structure 1

Rationale:
Chapter 7 Problem 3

13. Name the dienes shown below and rank them in order of INCREASING stability (name of least stable diene listed first).



__ A. 1,5-pentanediene < 2,5-pentanediene < 2,5-hexanediene < 2,5-dimethyl-2,5-hexanediene

__ B. 1,4-pentadiene < 1,3-pentadiene < 2,4-hexadiene < 2,5-dimethyl-2,4-hexadiene

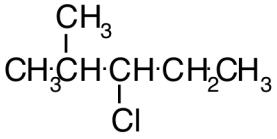
__ C. 1,3-pentadiene < 2,4-hexadiene < 1,4-pentadiene < 2,5-dimethyl-2,4-hexadiene

__ D. 2,5-dimethyl-2,4-hexadiene < 2,4-hexadiene < 1,3-pentadiene < 1,4-pentadiene

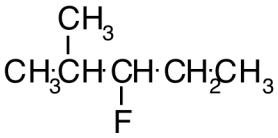
__ E. 2,5-dimethyl-2,5-hexanediene < 2,5-hexanediene < 2,5-pentanediene < 1,5-pentanediene

Rationale:
Chapter 7 Problem 10

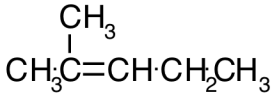
14. Figure out what the major elimination product(s) obtained from E2 reactions of hydroxide ion and the alkyl halides with structures 1 and 2 are. Choose the statement which is CORRECT from the multiple choices.



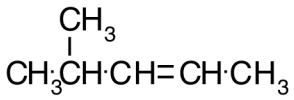
1



2



3



4

__ A. 1 reacts with hydroxide to give 3 as the major E2 product and 2 reacts with hydroxide to give 4 as the major E2 product.

__ B. Both 1 and 2 react with hydroxide to give 3 as the major E2 product.

__ C. Both 1 and 2 react with hydroxide to give 4 as the major E2 product.

__ D. 1 reacts with hydroxide to give 4 as the major E2 product and 2 reacts with hydroxide to give 3 as the major E2 product.

__ E. 1 and 2 react with hydroxide to give E2 products which are not shown in the structures above.

Rationale:
Chapter 9 Problem 4(b,f)

15. By looking at the numbered structures below find the major elimination product(s) of a mixture of the two stereoisomers of trans-1-chloro-2-methylcyclohexane for the conditions specified in each of the multiple choices. Choose the CORRECT statement.

1

2

3

__ A. trans-1-chloro-2-methylcyclohexane + high concentration of CH_3O^- yields 2.

__ B. trans-1-chloro-2-methylcyclohexane + high concentration of CH_3O^- yields 1 and 2.

__ C. trans-1-chloro-2-methylcyclohexane + CH_3OH yields 2 and 3.

__ D. trans-1-chloro-2-methylcyclohexane + high concentration of CH_3O^- yields 1 and 3.

__ E. trans-1-chloro-2-methylcyclohexane + CH_3OH yields 1 and 3.

Rationale:
Chapter 9 Problem 38(c,d)

Answer Key

"Grade or Education" = 1

CHEM 2261/01
Summer 08
Exam 3
Chapters 7-9

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