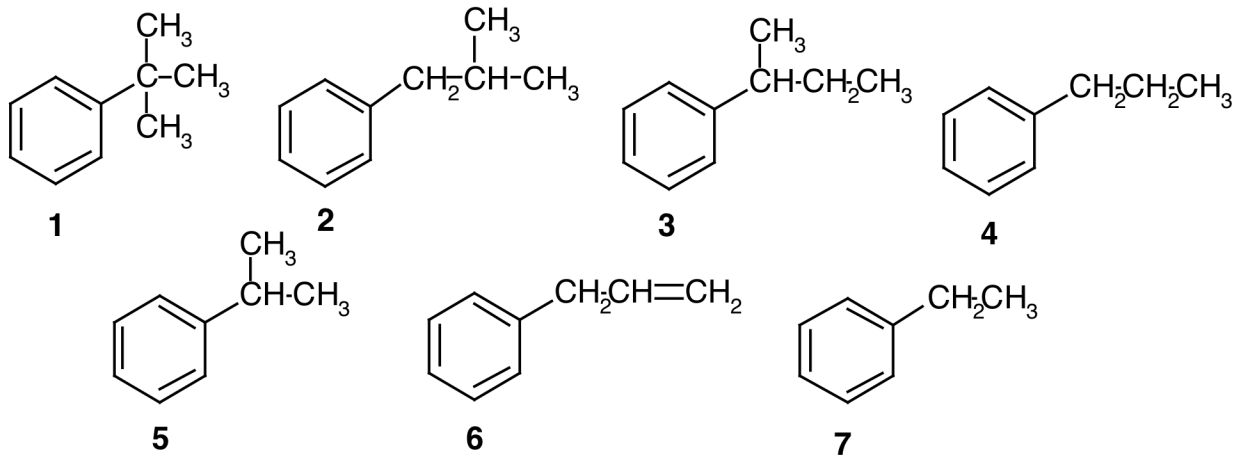
"Grade or Education" = 1

CHEM 2261/01
Summer 12
Final Exam
Chapters 1-12, 15

1. Find the choice which gives the **WRONG** structure of the **MAJOR** product of the Friedel-Crafts alkylation reaction with the alkyl chloride specified.



__ A. Friedel-Crafts alkylation of benzene with $CH_3CH_2CH_2Cl$ yields **4**.

__ B. Friedel-Crafts alkylation of benzene with $(CH_3)_2CHCH_2Cl$ yields **1**.

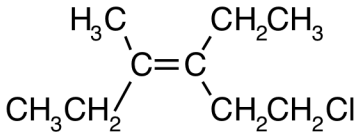
__ C. Friedel-Crafts alkylation of benzene with $CH_3CH_2CH(Cl)CH_3$ yields **3**.

__ D. Friedel-Crafts alkylation of benzene with $(CH_3)_3CCl$ yields **1**.

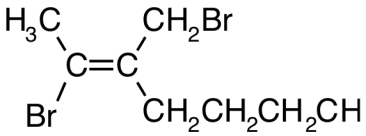
__ E. Friedel-Crafts alkylation of benzene with CH_3CH_2Cl yields **7**.

Rationale:
Chapter 15 Problem 27

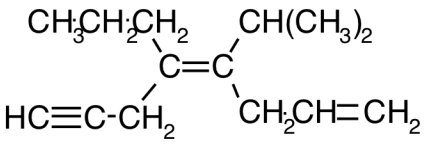
2. Which of the compounds whose structures are shown below have the **Z** configuration?



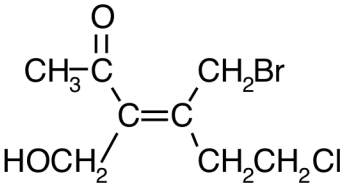
structure A



structure C



structure B



structure D

__ A. The compounds with structures A and D have the Z configuration.

__ B. Only the compound with structure D has the Z configuration.

__ C. The compounds with structures B and C have the Z configuration.

__ D. None of the above compounds have the Z configuration.

__ E. All of the above compounds have the Z configuration.

Rationale:
Chapter 3 Problem 48

3. In each of the following pairs of reactions circle the reaction which will take place **more rapidly**. Pairs of reactions share the same line and the same letter, like **a1** and **a2**. Now use your work to select the **CORRECT** statement from the multiple choices.

a1: $CH_3Br + HO^- \rightarrow CH_3OH + Br^-$ **a2**: $CH_3Br + H_2O \rightarrow CH_3OH + HBr$

b1: $CH_3I + HO^- \rightarrow CH_3OH + I^-$ **b2**: $CH_3Cl + HO^- \rightarrow CH_3OH + Cl^-$

c1: $CH_3Br + NH_3 \rightarrow CH_3NH_3^+ + Br^-$ **c2**: $CH_3Br + H_2O \rightarrow CH_3OH + HBr$

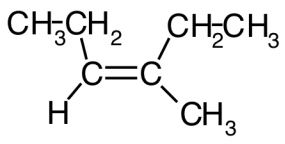
d1: $CH_3Br + HO^- \xrightarrow{DMSO} CH_3OH + Br^-$ **d2**: $CH_3Br + HO^- \xrightarrow{EtOH} CH_3OH + Br^-$

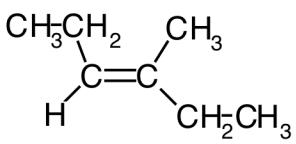
e1: $CH_3Br + NH_3 \xrightarrow{EtOEt} CH_3NH_3^+ + Br^-$ **e2**: $CH_3Br + NH_3 \xrightarrow{EtOH} CH_3NH_3^+ + Br^-$

__ A. Reaction **d2** will take place more rapidly than reaction **d1**.
__ B. Reaction **e2** will take place more rapidly than reaction **e1**.
__ C. Reaction **c2** will take place more rapidly than reaction **c1**.
__ D. Reaction **b2** will take place more rapidly than reaction **b1**.
__ E. Reaction **a2** will take place more rapidly than reaction **a1**.

Rationale:
Chapter 8 Problem 30

4. Find the structure of the E2 product of the reaction of (3S,4R)-3-bromo-4-methylhexane + CH_3O^- among the structures shown below and choose the answer which references this structure correctly. Hint: Use a Newman projection for the starting compound.


1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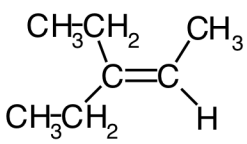
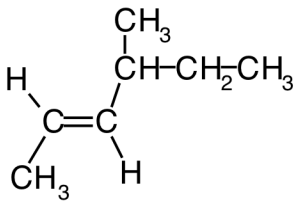

3


4

__ A. **1** is the E2 product of this reaction.
__ B. **2** is the E2 product of this reaction.
__ C. **4** is the E2 product of this reaction.
__ D. The structure of the E2 product of this reaction is not shown.
__ E. **3** is the E2 product of this reaction.

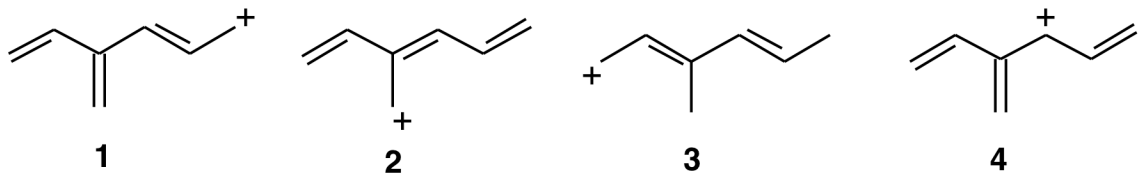
Rationale:
Chapter 9 Problem 52c

5. Water and diethyl ether are immiscible liquids. In a vessel containing both water and ether charged compounds dissolve in water, and uncharged compounds dissolve in ether. Given that $C_6H_{11}COOH$ has a pKa of 4.8 and $C_6H_{11}NH_3^+$ ion has a pKa of 10.7, which of the following statements is **TRUE**?

__ A. If the pH of the water layer is between 6.8 and 8.7 both compounds will dissolve in the ether layer.
__ B. If the pH of the water layer is below 2.8 both compounds will dissolve in the ether layer.
__ C. If the pH of the water layer is above 12.7 the amine will dissolve in the water layer and the carboxylic acid will dissolve in the ether layer.
__ D. If the pH of the water layer is below 2.8 the amine will dissolve in the water layer and the carboxylic acid will dissolve in the ether layer.
__ E. If the pH of the water layer is above 12.7 both compounds will dissolve in the water layer.

Rationale:
Chapter 1 Problem 103

6. Pick the numbers of the structures which are **CORRECT** resonance contributors for the ion labelled **1**, shown below.

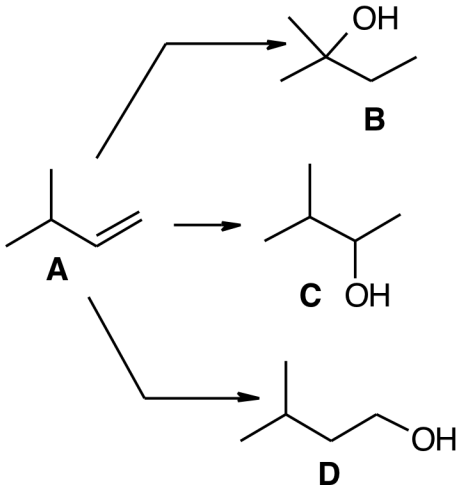


1 **2** **3** **4**

__ A. Structures 3 and 4 are resonance contributors for this ion.
__ B. Structures 2 and 4 are resonance contributors for this ion.
__ C. Structures 2 and 3 are resonance contributors for this ion.
__ D. Only structure 3 is a resonance contributor for this ion.
__ E. Structures 2, 3, and 4 are resonance contributors for this ion.

Rationale:
Chapter 7 Problem 44c

7. 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 H_2O and H_2SO_4 to form alcohol **D**.

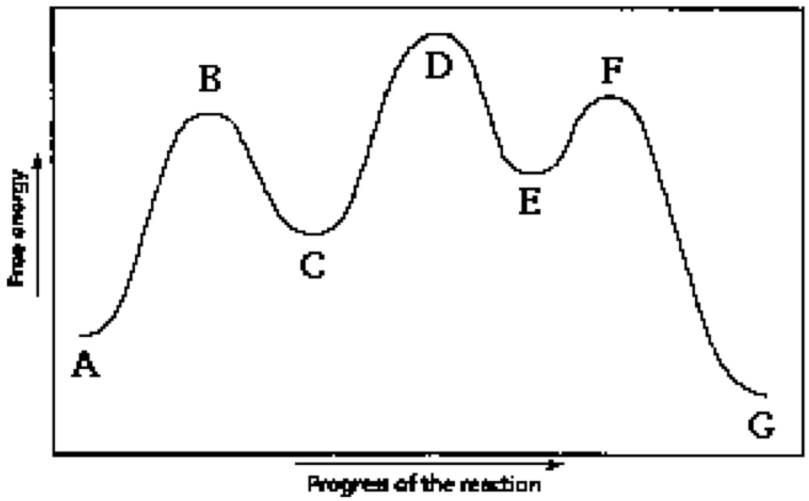
__ C. Alkene **A** will react with: 1. BH_3/THF; followed by 2. H_2O_2, HO^-, H_2O to form alcohol **C**.

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

__ E. Alkene **A** will react with H_2O and H_2SO_4 to form alcohol **B**.

Rationale:
Chapter 4 Problem 43

8. Given the following reaction-coordinate diagram for the reaction of A to give G choose the statement which is **WRONG** about the reaction depicted in the diagram.



__ A. The first step of the reaction is endergonic.

__ B. The overall reaction is endergonic.

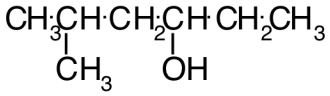
__ C. There are two intermediates in the reaction.

__ D. G is more stable than A.

__ E. The reactant of the rate-determining step is C

Rationale:
Chapter 3 Problem 55

9. Pick the choice which is an acceptable systematic name for the compound with the structure shown below.



__ A. 2-methyl-4-hexanol

__ B. 4-ethyl-2-methyl-4-butanol

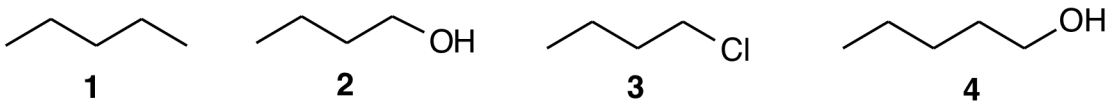
__ C. 5-methyl-3-hexanol

__ D. 1-ethyl-3-methyl-1-butanol

__ E. 1-isobutyl-1-propanol

Rationale:
Chapter 2 Problem 50a3

10. Pick the choice which, lists the numbered structures below in order of **DECREASING** boiling points of the compounds having these structures (highest boiling point first).



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

__ A. 1 > 3 > 2 > 4

__ B. 1 > 2 > 4 > 3

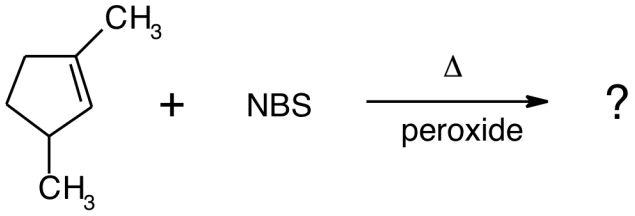
__ C. 4 > 2 > 3 > 1

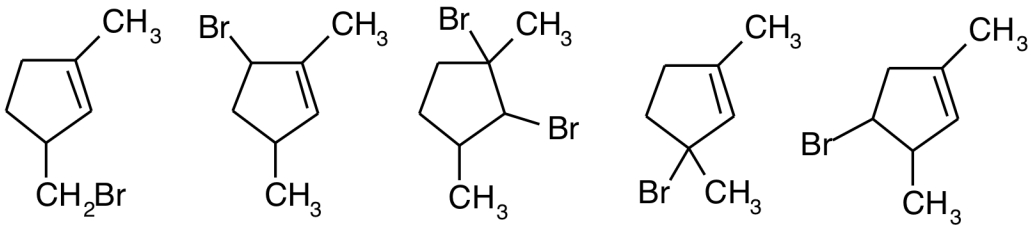
__ D. 3 > 4 > 2 > 1

__ E. 1 > 2 > 3 > 4

Rationale:
Chapter 2 Problem 32c

11. Choose structure of the **MAJOR** product of the reaction shown below.





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

__ A. **2**

__ B. **5**

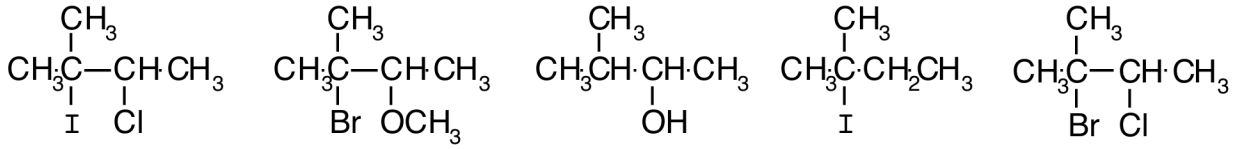
__ C. **1**

__ D. **3**

__ E. **4**

Rationale:
Chapter 12 Problem 26e

12. Pick the choice which gives the **CORRECT** major product of the reaction of 2-methyl-2-butene with the specified reagents. The structures numbered below are those of possible reaction products.



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

__ A. When 2-methyl-2-butene reacts with H_2O + trace H_2SO_4 the major product is **3**.

__ B. When 2-methyl-2-butene reacts with HI the major product is **4**.

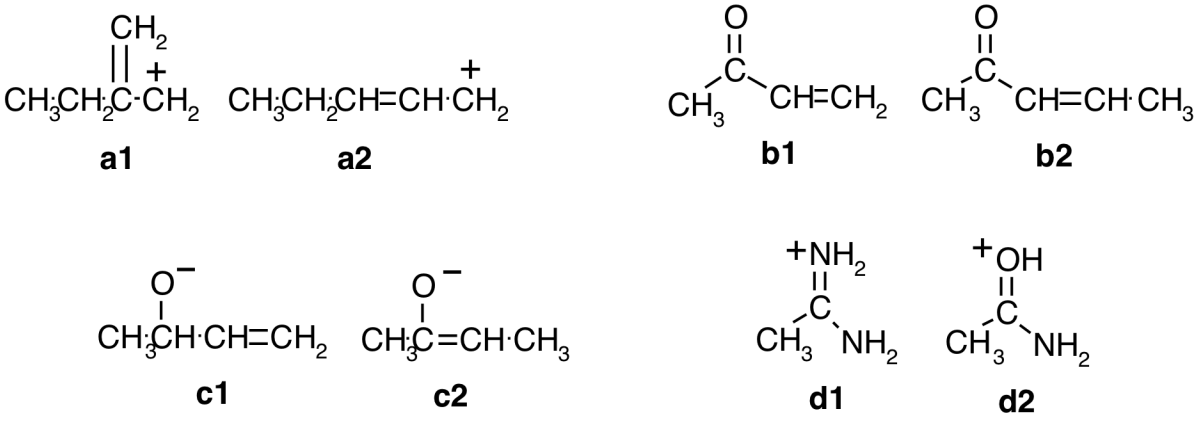
__ C. When 2-methyl-2-butene reacts with ICl the major product is **1**.

__ D. When 2-methyl-2-butene reacts with Br_2 + excess NaCl the major product is **5**.

__ E. When 2-methyl-2-butene reacts with Br_2/CH_3OH the major product is **2**.

Rationale:
Chapter 4 Problem 40(c,e,g,i,l)

13. Figure out which species is the more stable of each of the labelled pairs shown below. A pair of species share the same letter, like **a1** and **a2**. Choose the statement which is **CORRECT** about the relative stabilities of these pairs of species.



a1 **a2** **b1** **b2**

c1 **c2** **d1** **d2**

__ A. **b2** is more stable than **b1**.

__ B. **d2** is more stable than **d1**.

__ C. **c1** is more stable than **c2**.

__ D. **a1** is more stable than **a2**.

__ E. None of the other choices is correct.

Rationale:
Chapter 7 Problem 7

14. Squalene, a hydrocarbon with the molecular formula $C_{30}H_{50}$, is obtained from shark liver. (Squalus is Latin for "shark.") If squalene is an acyclic compound, how many π bonds does it have?

__ A. 10
__ B. 5
__ C. 20
__ D. 12
__ E. 6

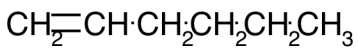
Rationale:
Chapter 3 Problem 49

15. What is the formula of a hydrocarbon that has one triple bond, 2 double bonds, one ring, and 32 carbons?

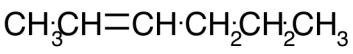
__ A. $C_{32}H_{58}$
__ B. $C_{32}H_{48}$
__ C. $C_{32}H_{54}$
__ D. $C_{32}H_{56}$
__ E. $C_{32}H_{50}$

Rationale:
Chapter 6 Problem 36

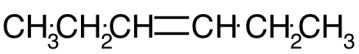
16. Find the structure(s) of all of the alkene(s) you would expect to be obtained from the acid-catalyzed dehydration of 1-hexanol from the figure below.



1



2

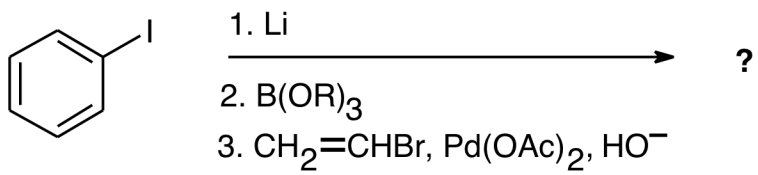


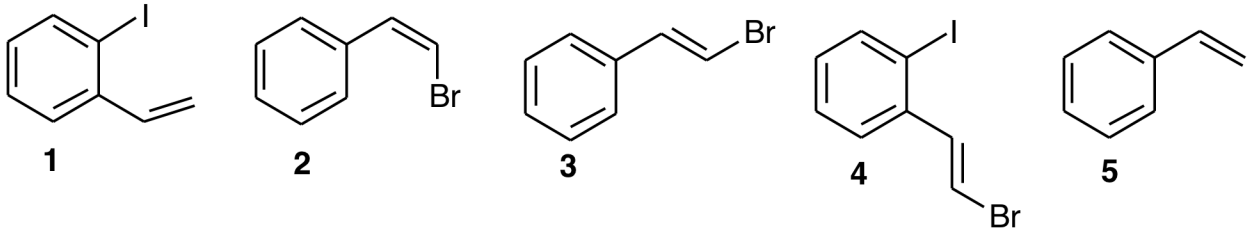
3

__ A. 1, 2, and 3
__ B. 3 only
__ C. 1 only
__ D. 2 only
__ E. 1 and 2 only

Rationale:
Chapter 10 Problem 37

17. Choose the **CORRECT** structure of the **MAJOR** product of the reaction shown below. shown below.





__ A. **1**

__ B. **5**

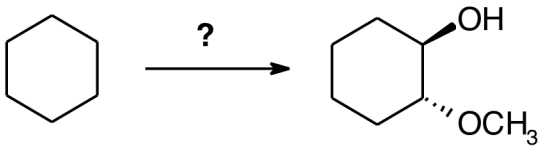
__ C. **4**

__ D. **2**

__ E. **3**

Rationale:
Chapter 11 Problem 28d

18. Choose the procedure which would **BEST** accomplish the synthesis suggested below.



__ A. First react with $Br_2/h\nu$. Next react with tert-BuO^-. Next react with Br_2/CH_3OH. Finally react with HO^-.

__ B. First react with $Br_2/h\nu$. Next react with tert-BuO^-. Next react with Br_2/CH_2Cl_2. Next react with $Mg/(CH_3CH_2)_2O$. Next react with CH_3OOCH_3. Finally react with H_2SO_4/H_2O.

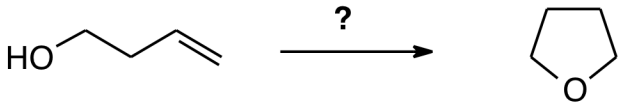
__ C. First react with $Br_2/h\nu$. Next react with HO^-. Next dehydrate with $POCl_3$. Next react with Br_2/CH_3OH. Finally react with HO^-.

__ D. First react with $Br_2/h\nu$. Next react with tert-BuO^-. Next react with a peracid, RCO_3H. Finally react with CH_3O^-.

__ E. First react with $Br_2/h\nu$. Next react with HO^-. Next dehydrate with $POCl_3$. Next react with NBS/peroxide/heat. Next react with CH_3O^-. Finally react with H_2SO_4/H_2O.

Rationale:
Chapter 12 Problem 35c

19. Choose the procedure which would accomplish the synthesis suggested below.



__ A. First react with HBr and peroxide, and then react with NaH.

__ B. First react with HBr and then react with NaH.

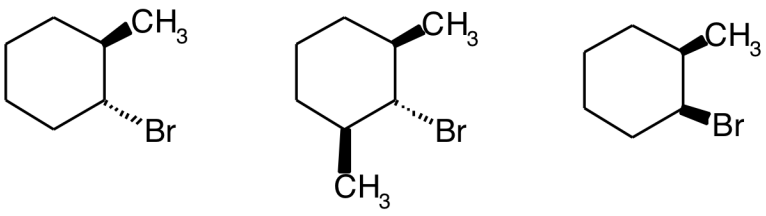
__ C. First react with HBr and peroxide. Next react with a sulfonyl chloride, RSO_2Cl, in pyridine. Next react with $Mg/(CH_3CH_2)_2O$. Finally react with ethylene oxide.

__ D. First react with a peracid, RCO_3H. Next react with NaH. Finally dehydrate with $POCl_3$.

__ E. First react with $POCl_3$ and then react with Grubb's catalyst.

Rationale:
Chapter 12 Problem 35a

20. Rank the following compounds in order of **DECREASING** rate in an E2 reaction (ie. most reactive > intermediate reactivity > least reactive).



1 **2** **3**

__ A. **1** > **2** > **3**

__ B. **2** > **1** > **3**

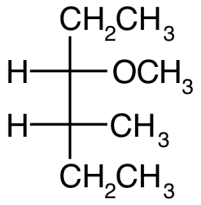
__ C. **2** > **3** > **1**

__ D. **1** > **3** > **2**

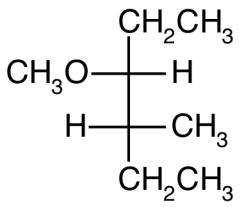
__ E. **3** > **1** > **2**

Rationale:
Chapter 9 Problem 42

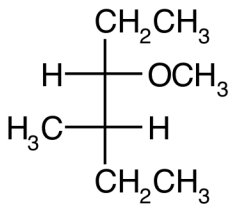
21. Choose the **CORRECT** substitution product(s) of the reaction of (3S,4S)-3-bromo-4-methylhexane with CH_3O^- from below. Assume that this reaction is carried out under S_N2 conditions. Choose the correct stereoisomer(s).



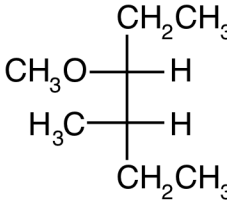
1



2



3



4

__ A. **2** is produced by this reaction.

__ B. **4** is produced by this reaction.

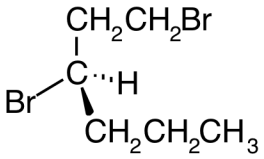
__ C. **1** and **2** are produced by this reaction.

__ D. **3** is produced by this reaction.

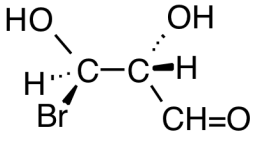
__ E. **3** and **4** are produced by this reaction.

Rationale:
Chapter 8 Problem 60a

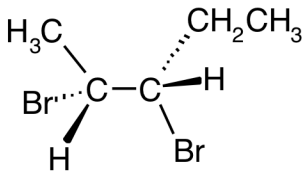
22. Which of the structures below have at least one of their asymmetric carbons in the S configuration?



1



2



3

__ A. Only structure **1** has an asymmetric carbon in the S configuration.

__ B. Only structure **2** has an asymmetric carbon in the S configuration.

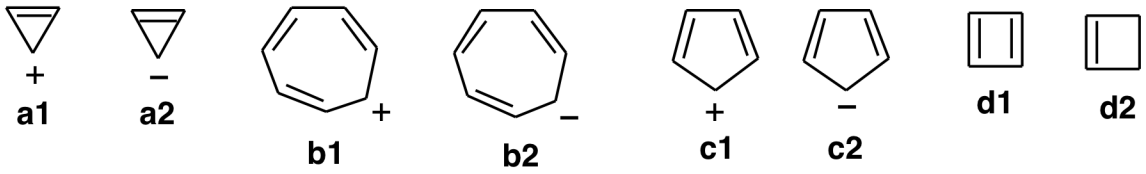
__ C. Structures **1** and **2** have asymmetric carbons in the S configuration.

__ D. Structures **2** and **3** have asymmetric carbons in the S configuration.

__ E. Only structure **3** has an asymmetric carbon in the S configuration.

Rationale:
Chapter 5 Problem 84

23. Look at each of the pairs of labelled structures in the figure below and figure out which structure is more stable in each pair and why. Choose the **CORRECT** statement from the multiple choices.



__ A. **d2** is more stable than **d1** because **d2** is aromatic and **d1** is antiaromatic.

__ B. **a1** is more stable than **a2** because **a1** is aromatic and **a2** is antiaromatic.

__ C. **c1** is more stable than **c2** because **c1** is aromatic and **c2** is antiaromatic.

__ D. **d1** is more stable than **d2** because **d1** is aromatic and **d2** is nonaromatic.

__ E. **b2** is more stable than **b1** because **b2** is aromatic and **b1** is antiaromatic.

Rationale:
Chapter 15 Problem 38

24. Choose the correct statement about approximate bond angles from the multiple choices.

__ A. The C-O-C bond angle in CH_3OCH_3 is 180°.

__ B. The H-C-H bond angle in $H_2C{=}O$ is about 109.5°.

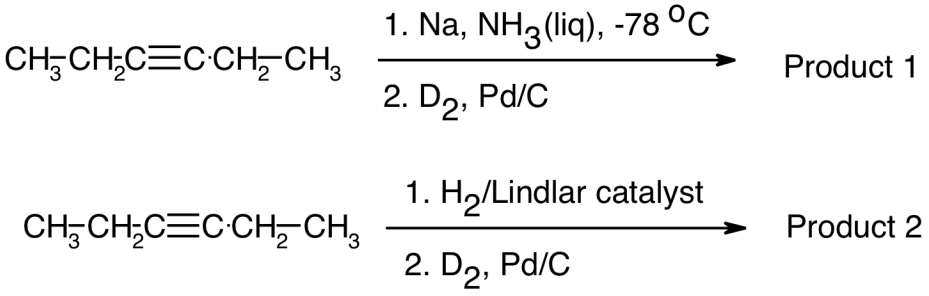
__ C. The C-N-H bond angle in $(CH_3)_2NH$ is about 120°.

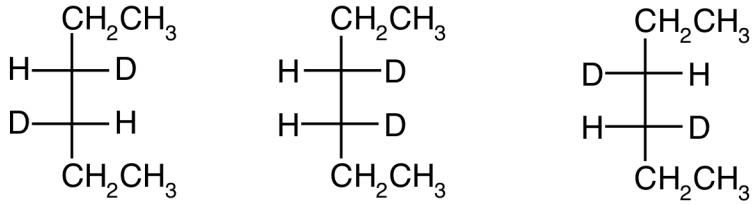
__ D. The C-O-H bond angle in CH_3OH is 180°.

__ E. The C-C-N bond angle in $CH_3C{\equiv}N$ is 180°.

Rationale:
Chapter 1 Problem 75

25. Find the Fischer projections of the **CORRECT** products of the two reactions shown in the figure below. Pick the choice which **CORRECTLY** identifies the structures of Product 1 and Product 2.





__ A. Product 1 is a mixture with structures corresponding to Fischer projections **B** and **C**, whereas Product 2 is a pure compound whose structure is given by Fischer projection **A**.

__ B. Product 1 is a mixture with structures corresponding to Fischer projections **A** and **B**, whereas Product 2 is a pure compound whose structure is given by Fischer projection **C**.

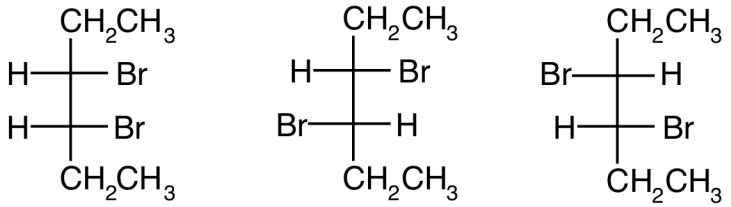
__ C. Product 2 is a mixture with structures corresponding to Fischer projections **A** and **C**, whereas Product 1 is a pure compound whose structure is given by Fischer projection **B**.

__ D. Product 2 is a mixture with structures corresponding to Fischer projections **A** and **B**, whereas Product 1 is a pure compound whose structure is given by Fischer projection **C**.

__ E. Product 1 is a mixture with structures corresponding to Fischer projections **A** and **C**, whereas Product 2 is a pure compound whose structure is given by Fischer projection **B**.

Rationale:
Chapter 6 Problem 49

26. Find the structures of the products of the reactions given in the multiple choices among the Fisher projections numbered **1**, **2**, and **3** below. Pick the choice which indicates the **CORRECT** product(s) of the reaction given.



__ A. trans-3-hexene + Br_2/CH_2Cl_2 → products **2** and **3**

__ B. cis-3-hexene + Br_2/CH_2Cl_2 → product **1**

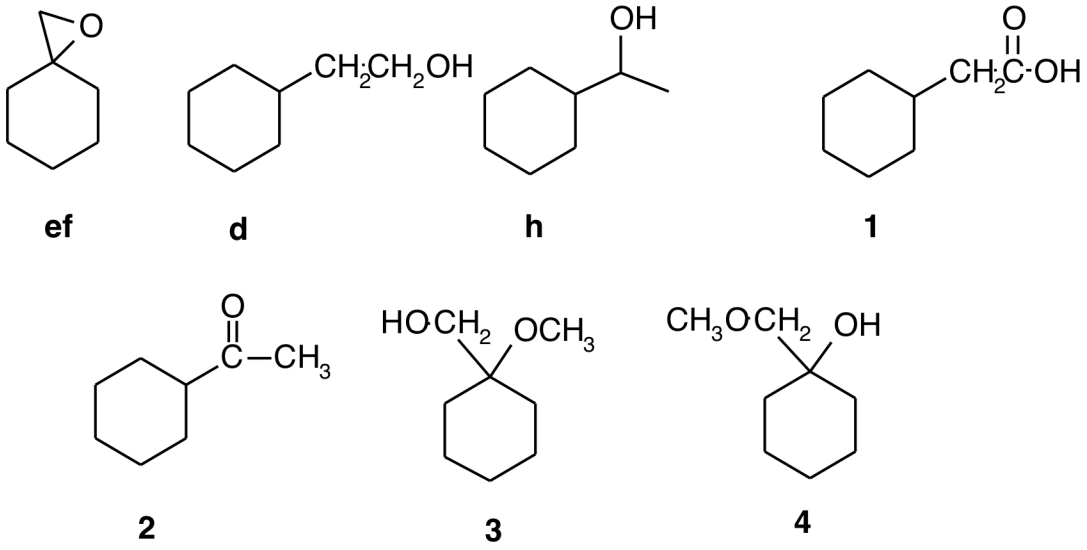
__ C. trans-3-hexene + Br_2/CH_2Cl_2 → product **1**

__ D. cis-3-hexene + Br_2/CH_2Cl_2 → product **1** and **3**

__ E. trans-3-hexene + Br_2/CH_2Cl_2 → product **3**

Rationale:
Chapter 5 Problem 82(e,f)

27. By looking at the numbered structures below figure out which of the multiple choices specifies the **CORRECT** product of a reaction.



__ A. **d** + H_2CrO_4 → **2**

__ B. **ef** + HCl/CH_3OH → **d**

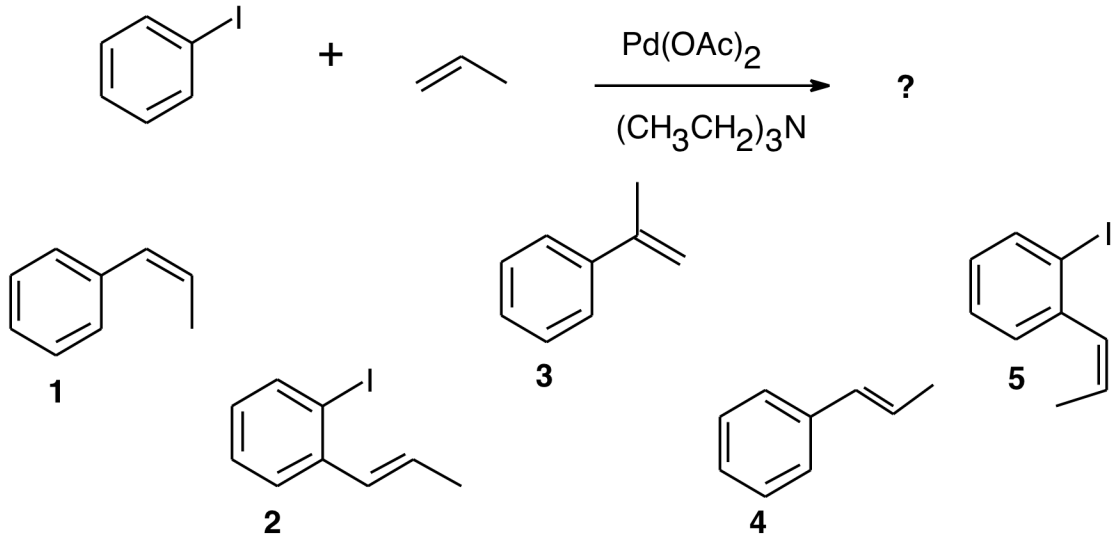
__ C. **h** + H_2CrO_4 → **1**

__ D. **ef** + HCl/CH_3OH → **4**

__ E. **ef** + CH_3O^-/CH_3OH → **4**

Rationale:
Chapter 10 Problem 38(d,e,f,h)

28. Choose the **CORRECT** structure of the **MAJOR** product of the reaction shown below.



__ A. **5** is the major product of this reaction.

__ B. **3** is the major product of this reaction.

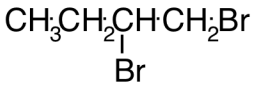
__ C. **2** is the major product of this reaction.

__ D. **1** is the major product of this reaction.

__ E. **4** is the major product of this reaction.

Rationale:
Chapter 11 Problem 22a

29. Using ethyne as the starting material pick the choice which **CORRECTLY** describes how the compound shown below can be prepared.



__ A. First react the ethyne with Na/NH_3 followed by CH_3CH_2Br. React the resulting product with $H_2/Pd/C$. Finally react with Br_2/CH_2Cl_2.

__ B. First react the ethyne with Na/NH_3 followed by CH_3CH_2Br. React the resulting product with Br_2/CH_2Cl_2.

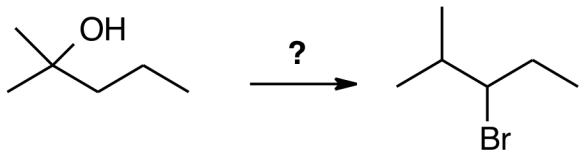
__ C. First react the ethyne with $NaNH_2$ followed by CH_3CH_2Br. React the resulting product with $H_2/Pd/C$. Finally react with Br_2/CH_3OH.

__ D. First react the ethyne with $NaNH_2$ followed by Br_2/CH_2Cl_2. React the resulting product with H_2/Lindlar catalyst. Finally react with CH_3CH_2Br.

__ E. First react the ethyne with $NaNH_2$ followed by CH_3CH_2Br. React the resulting product with H_2/Lindlar catalyst. Finally react with Br_2/CH_2Cl_2.

Rationale:
Chapter 6 Problem 43b

30. Choose the procedure which would **BEST** accomplish the synthesis suggested below.



__ A. First dehydrate with H_2SO_4/heat. Next react with a peracid (RCO_3H). Next react with HBr. Next dehydrate with $POCl_3$. Finally react with H_2/Pd/C.

__ B. First dehydrate with H_2SO_4/heat and then react with HBr/peroxide.

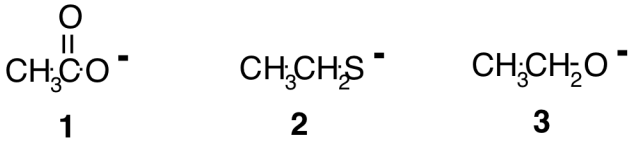
__ C. First dehydrate with H_2SO_4/heat and then react with HBr/CH_2Cl_2.

__ D. First react with PBr_3. Next react with tert-BuO^-. Finally react with HBr/CH_2Cl_2.

__ E. First react with a sulfonyl chloride (RSO_2Cl). Next react with Br^-.

Rationale:
Chapter 12 Problem 42b

31. 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. 2 > 1 > 3

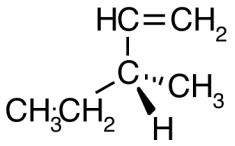
__ C. 1 > 2 > 3

__ D. 1 > 3 > 2

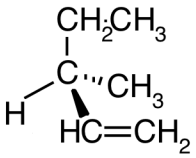
__ E. 3 > 2 > 1

Rationale:
Chapter 8 Problem 42a

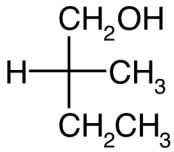
32. Figure out whether each of the following pairs of compounds are identical, or are enantiomers, diastereomers, or constitutional isomers. Pairs of compounds share the same letter, like **a1** and **a2**. Choose the **CORRECT** statement from the multiple choices.



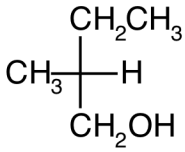
a1



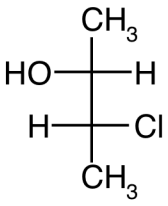
a2



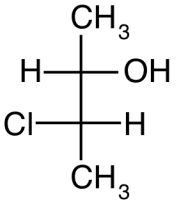
b1



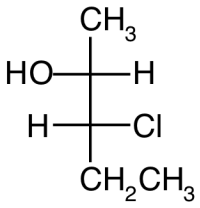
b2



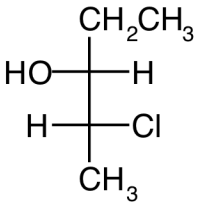
c1



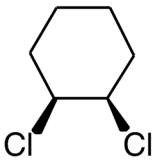
c2



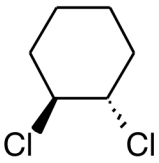
d1



d2



f1



f2

__ A. **c1** and **c2** are diasteriomers.

__ B. **f1** and **f2** are enantiomers.

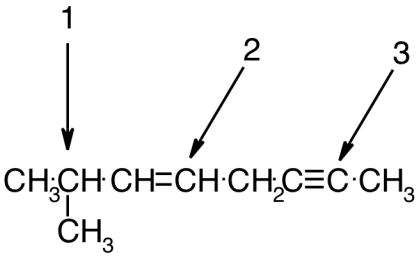
__ C. **d1** and **d2** are diasteriomers.

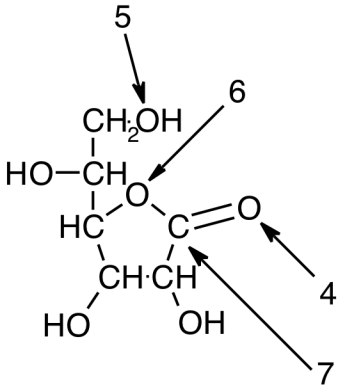
__ D. **a1** and **a2** are identical.

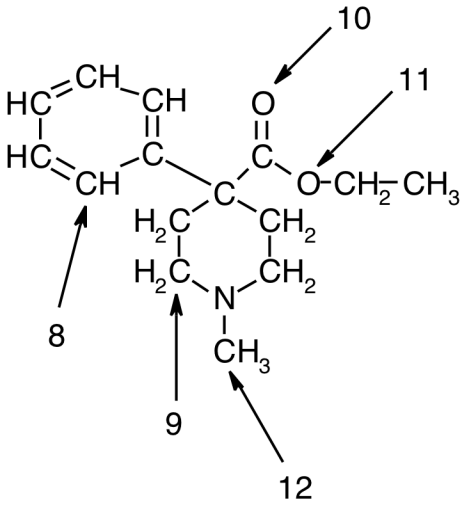
__ E. **b1** and **b2** are enantiomers.

Rationale:
Chapter 5 Problem 76(a,b,c,d,f)

33. Figure out the hybridization of each of the atoms pointerd to by the numbered arrows in the structures below. Pick the correct statement from the multiple choices.







__ A. The oxygen atom pointed to by arrow 6 has sp^2 hybridization.

__ B. The oxygen atom pointed to by arrow 10 has sp^2 hybridization.

__ C. The oxygen atom pointed to by arrow 5 has sp hybridization.

__ D. The carbon atom pointed to by arrow 3 has sp^2 hybridization.

__ E. The carbon atom pointed to by arrow 3 has sp^3 hybridization.

Rationale:
Chapter 1 Problem 32

34. Draw the two chair conformers of each compound mentioned in the choices below and pick the choice which **CORRECTLY** describes the substituent positions in the **MORE STABLE** conformer of one of these compounds.

__ A. In the more stable conformer of cis-1-ethyl-3-methylcyclohexane the ethyl group is equatorial and the methyl group is axial.

__ B. In the more stable conformer of cis-1-ethyl-3-isopropylcyclohexane the isopropyl group is equatorial and the ethyl group is axial.

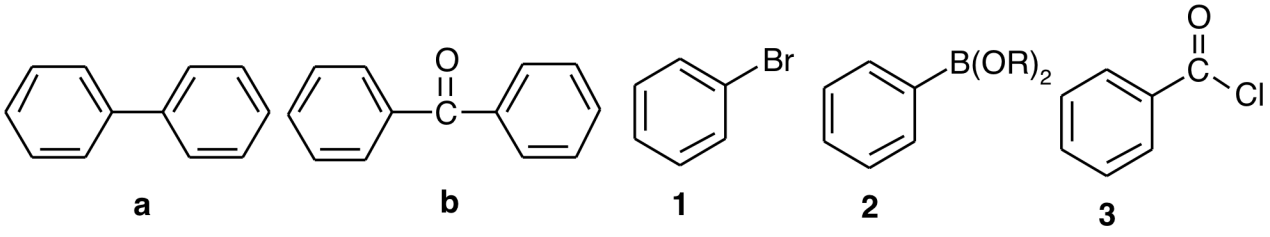
__ C. In the more stable conformer of trans-1-ethyl-2-isopropylcyclohexane the isopropyl group is equatorial and the ethyl group is axial.

__ D. In the more stable conformer of cis-1-ethyl-4-isopropylcyclohexane the ethyl group is axial and the isopropyl group is equatorial.

__ E. In the more stable conformer of trans-1-ethyl-2-methylcyclohexane the ethyl group is equatorial and the methyl group is axial.

Rationale:
Chapter 2 Problem 67

35. Which of the choices **CORRECTLY** describes how the compound with the structure labelled **b** shown below could be made using benzene as one of the starting materials?



a **b** **1** **2** **3**

__ A. React **1** with **3** in the presence of $Pd(OAc)_2/HO^-$.

__ B. React benzene with **3** and $AlCl_3$ followed by H_2O.

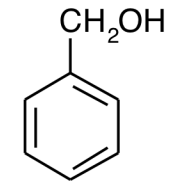
__ C. React benzene with $Br_2/FeBr_3$ to produce **1**. Then react **1** with **2** and $Pd(OAc)_2/HO^-$ to produce **b**.

__ D. React benzene with **2** and $Pd(OAc)_2/HO^-$.

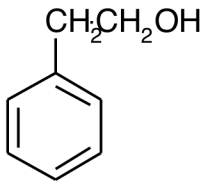
__ E. React **2** with **3** in the presence of Grubb's catalyst (M=CH-benzene).

Rationale:
Chapter 15 Problem 40(a/b)

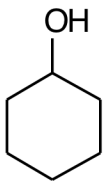
36. Figure out which alcohol in each of the pairs shown below will undergo dehydration more rapidly when heated with H_2SO_4. Pairs of alcohols share the same letter, ie, **a1** and **a2**. Choose the **CORRECT** statement from the multiple choices.



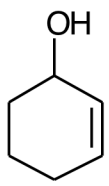
a1



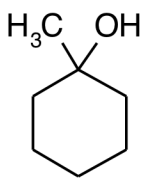
a2



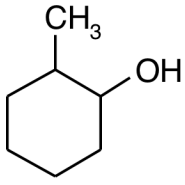
b1



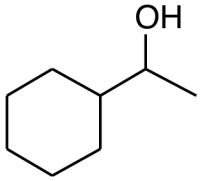
b2



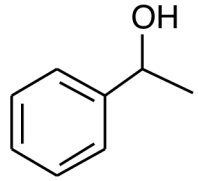
c1



c2



d1



d2

__ A. **a1** will undergo dehydration more rapidly than **a2** when heated with H_2SO_4.

__ B. None of the other choices is correct..

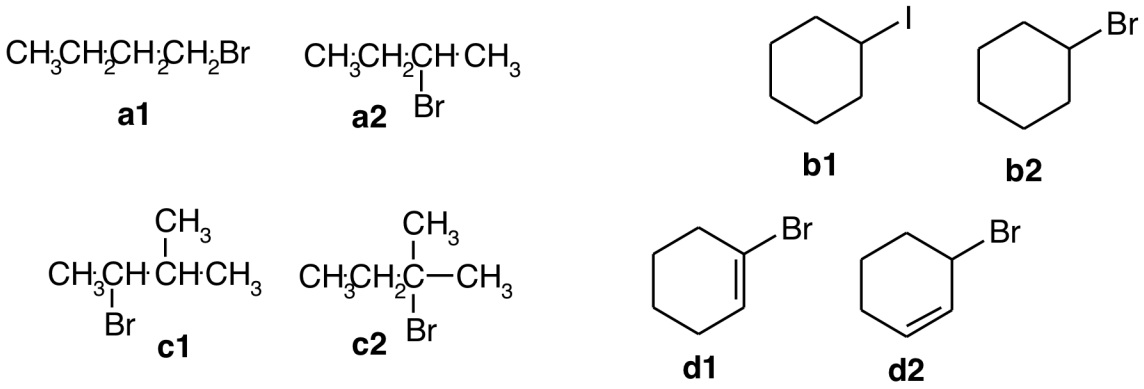
__ C. **c2** will undergo dehydration more rapidly than **c1** when heated with H_2SO_4.

__ D. **b1** will undergo dehydration more rapidly than **b2** when heated with H_2SO_4.

__ E. **d2** will undergo dehydration more rapidly than **d1** when heated with H_2SO_4.

Rationale:
Chapter 10 Problem 34(a-d)

37. Choose the **CORRECT** statement regarding relative reaction speeds of substances having the numbered structures shown in the figure below.



__ A. **d1** reacts faster than **d2** in an E2 reaction.

__ B. **c1** reacts faster than **c2** in an S_N1 reaction.

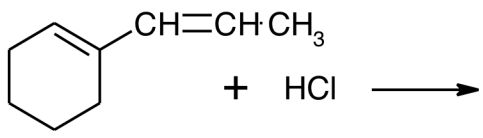
__ C. None of the other reaction-speed statements in this problem is correct.

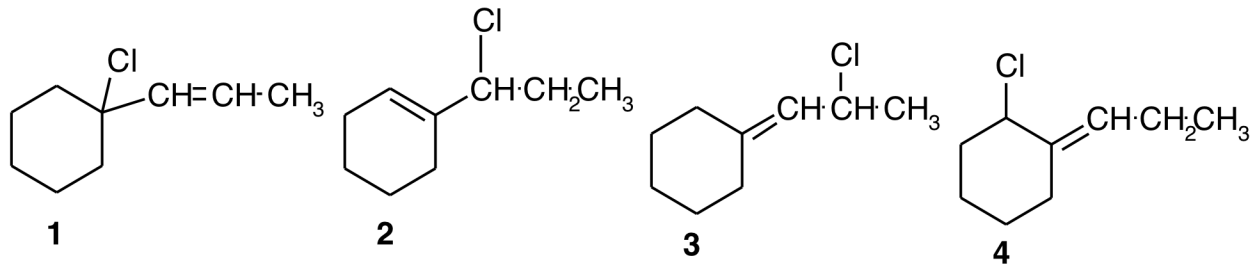
__ D. **b2** reacts faster than **b1** in an E1 reaction.

__ E. **a2** reacts faster than **a1** in an S_N2 reaction.

Rationale:
Chapter 9 Problem 21

38. For the reaction shown below find the major 1,2- and 1,4-addition products and determine which is the kinetic product and which is the thermodynamic product. Pick the **CORRECT** statement from the multiple choices.





__ A. The 1,2-addition product is **1** and the 1,4-addition product is **3**; the predominant kinetic product is **1**, and the predominant thermodynamic product is **3**.

__ B. The 1,2-addition product is **2** and the 1,4-addition product is **4**; the predominant kinetic product is **4**, and the predominant thermodynamic product is **2**.

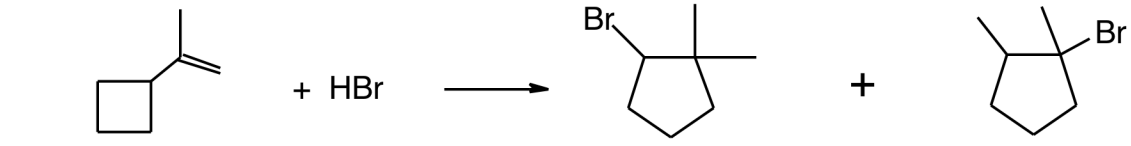
__ C. The 1,2-addition product is **3** and the 1,4-addition product is **1**; the predominant kinetic product is **3**, and the predominant thermodynamic product is **1**.

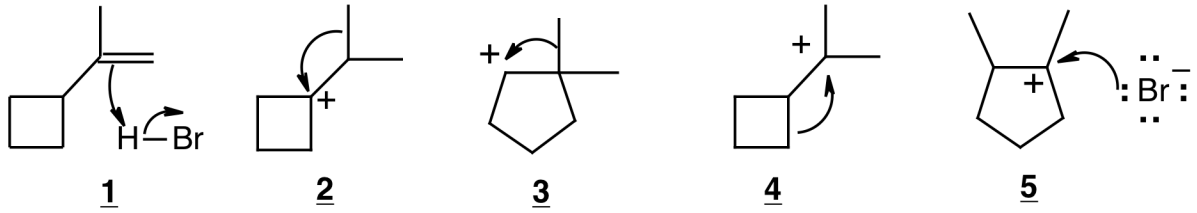
__ D. The 1,2-addition product is **2** and the 1,4-addition product is **4**; the predominant kinetic product is **2**, and the predominant thermodynamic product is **4**.

__ E. The 1,2-addition product is **4** and the 1,4-addition product is **2**; the predominant kinetic product is **4**, and the predominant thermodynamic product is **2**.

Rationale:
Chapter 7 Problem 31c

39. Draw out the mechanism for the reaction shown below. Use this mechanism along with the numbered figures below to find the number representing a process which does **NOT** occur in the reaction mechanism.





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

__ A. Process 3 does not occur in this mechanism.

__ B. Process 4 does not occur in this mechanism.

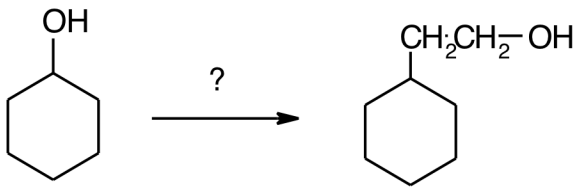
__ C. Process 1 does not occur in this mechanism.

__ D. Process 5 does not occur in this mechanism.

__ E. Process 2 does not occur in this mechanism.

Rationale:
Chapter 4 Problem 62a

40. Choose the **CORRECT** sequence of reactions to carry out the conversion shown below.



__ A. In the first step react the starting compound with PBr_3. Next react the product of the first step with magnesium in Et_2O. React the product of the second step with ethylene oxide followed by acid (H^+) to produce the final product.

__ B. In the first step react the starting compound with HBr. Next react the product of the first step with magnesium in Et_2O. React the product of the second step with 1-bromoethene to produce the third-step product. Finally react the product of the third step with BH_3 and ether followed by peroxide and base to produce the final product.

__ C. In the first step react the starting compound with PBr_3. Next react the product of the first step with lithium metal in ether. React the product of the second step with copper(I) iodide, CuI, to produce the third-step product. React the third-step product with 1-bromoethene to produce the fourth-step product. Finally react the product of the fourth step with H_2SO_4 and water to produce the final product.

__ D. In the first step react the starting compound with HBr. Next react the product of the first step with potassium tert-butoxide and [18]-crown-6 in ether. React the product of the second step with ethylene oxide followed by acid (H^+) to produce the final product.

__ E. In the first step react the starting compound with PBr_3. Next react the product of the first step with potassium tert-butoxide and [18]-crown-6 in ether. React the product of the second step with tetraethyltin, $(CH_3CH_2)_4Sn$, and tetrakistriphenylphosphinepalladium, $(Ph_3P)_4Pd$, to produce the third-step product. React the third-step product with H_2SO_4 and water to produce the final product.

Rationale:
Chapter 11 Problem 32b

Answer Key

"Grade or Education" = 1

CHEM 2261/01
Summer 12
Final Exam
Chapters 1-12, 15

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

19. A
20. E
21. B
22. E
23. B
24. E
25. E
26. C
27. E
28. E
29. E
30. B
31. A
32. D
33. B
34. D
35. B
36. E
37. C
38. A
39. E
40. A