"Grade or Education" = 1

CHEM 2060/01
Summer 2019
Final Exam
Chapters 1 - 17

1. Which of the following statements about carbohydrates is **CORRECT**?

__ A. Polysaccharides are polymers of amino acids linked by glycosidic bonds.

__ B. An aldose is a sugar which is an aldehyde in its cyclic hemiacetal form.

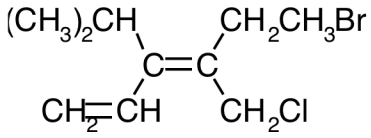
__ C. A Fischer projection is a cyclic representation of a sugar drawn as either a 5-membered or a 6-membered ring.

__ D. Type 1 diabetes occurs when the liver fails to respond to insulin and thereby allows blood sugar levels to get too high.

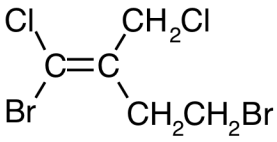
__ E. Glycogen is a branched carbohydrate found in the liver which has α1,4 glycosidic linkages and branches at carbon 6

Rationale:
Problem 14.17

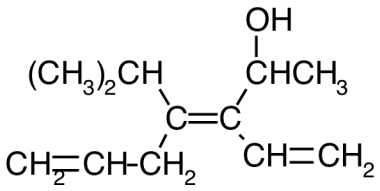
2. Figure out whether each of the letter-referenced structures below has the E configuration or the Z configuration. Choose the **correct** statement about these structures from the multiple choices.



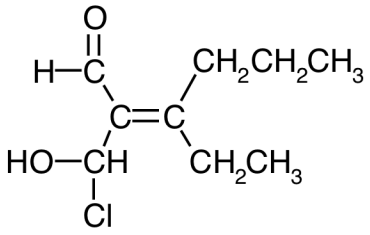
A



C



B



D

__ A. **A** has the E configuration.

__ B. **B** has the E configuration.

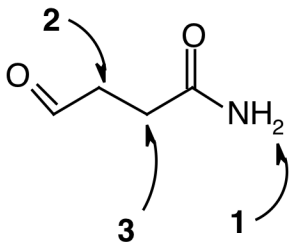
__ C. **D** has the Z configuration.

__ D. **C** has the Z configuration.

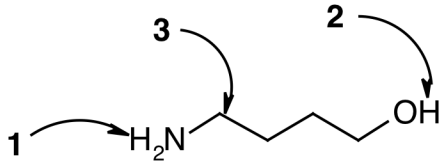
__ E. None of the other choices is correct.

Rationale:
Problem 4.54

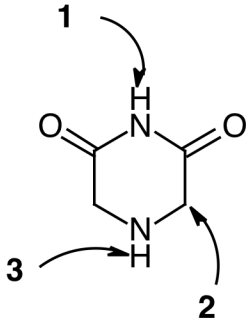
3. Identify the most acidic hydrogen(s) in each of the compounds whose structures are shown below. Pick the choice which correctly identifies the most acidic hydrogen(s) in one of these compounds.



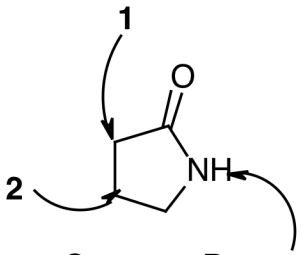
Structure **A**



Structure **B**



Structure **C**



Structure **D**

__ A. In Structure **D** the hydrogens attached to the carbon pointed to by arrow **2** are the most acidic.

__ B. In Structure **A** the hydrogens attached to the carbon pointed to by arrow **3** are the most acidic.

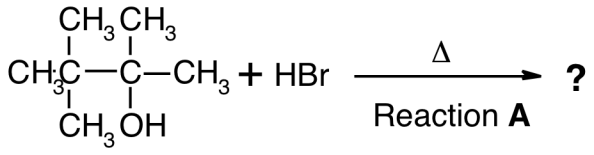
__ C. In Structure **B** the hydrogens pointed to by arrow **1** are the most acidic.

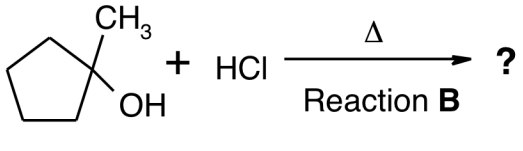
__ D. In Structure **A** the hydrogens pointed to by arrow **1** are the most acidic.

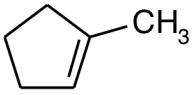
__ E. In Structure **C** the hydrogen pointed to by arrow **1** is the most acidic.

Rationale:
Problem 13.1

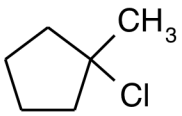
4. What are the major products of the reactions shown below?



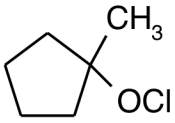




1



2



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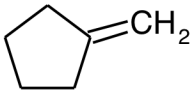

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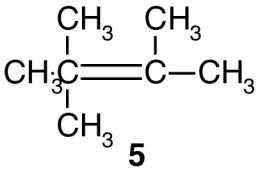

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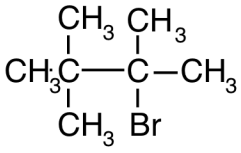

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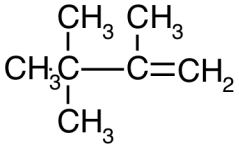
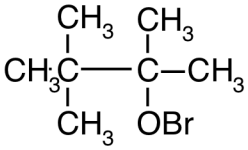


7



8

__ A. The major product of Reaction **A** is **8** and the major product of Reaction **B** is **2**.

__ B. The major product of Reaction **A** is **6** and the major product of Reaction **B** is **2**.

__ C. The major product of Reaction **A** is **7** and the major product of Reaction **B** is **1**.

__ D. The major product of Reaction **A** is **5** and the major product of Reaction **B** is **4**.

__ E. The major product of Reaction **A** is **5** and the major product of Reaction **B** is **3**.

Rationale:
Problem 9.5

5. Use the Genetic Code Table at the back of this quiz to determine the sequence of **AMINO ACIDS** coded by the m-RNA sequence 5'-UCA CCU GUG AAC-3'. Choose this **AMINO ACID** sequence from the multiple choices below.

__ A. Gly Thr Pro Stop

__ B. Asp Thr Pro Stop

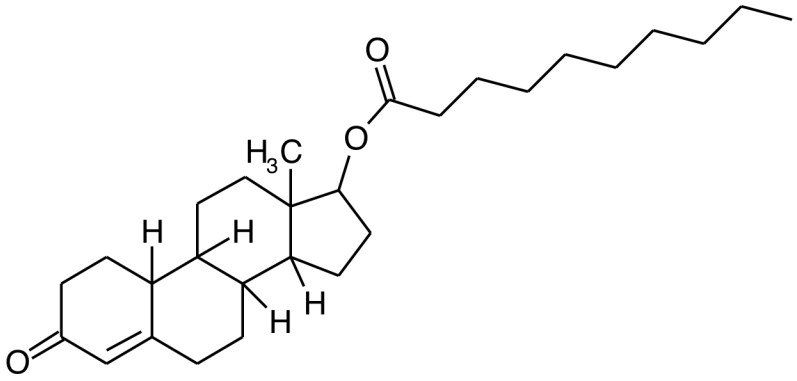
__ C. 3'-AGU GGA CCC UUG-5'

__ D. Ser Pro Val Asn

__ E. Asn Val Pro Ser

Rationale:
Problem 17.8

6. Shown in the figure below is the molecular structure of deca-durabolin, an anabolic steroid which is abused by some athletes in order to enable them to rapidly build muscle mass. What is the maximum number of stereoisomers deca-durabolin can have?



deca-durabolin

__ A. 64

__ B. 256

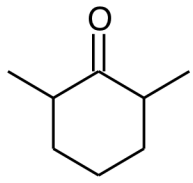
__ C. 1024

__ D. 512

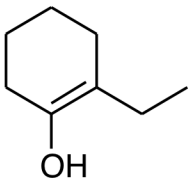
__ E. 128

Rationale:
Problem 4.32(b)

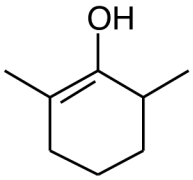
7. Find the enol tautomers of structures **A**, **B**, and **C** below from among the labelled structures to the right of structures **A**, **B**, and **C**. Pick the **correct** statement from the multiple choices.



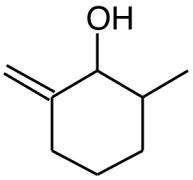
A



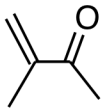
A1



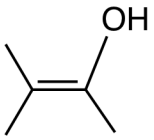
A2



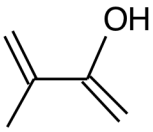
A3



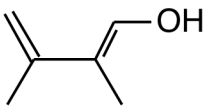
B



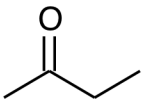
B1



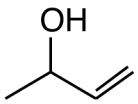
B2



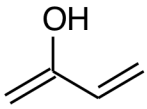
B3



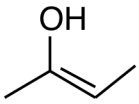
C



C1



C2



C3

__ A. **A1** is the enol tautomer of **A**.

__ B. **B2** is the enol tautomer of **B**.

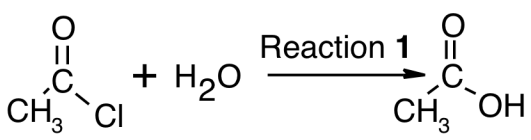
__ C. **B1** is the enol tautomer of **B**.

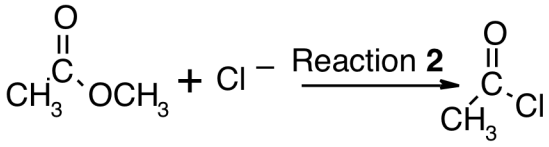
__ D. **A3** is the enol tautomer of **A**.

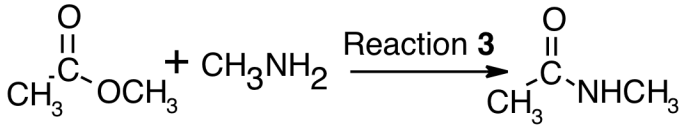
__ E. **C1** is the enol tautomer of **C**.

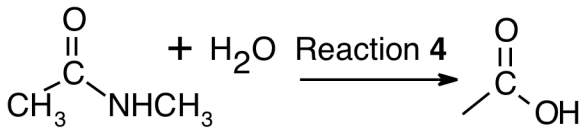
Rationale:
Problem 13.6

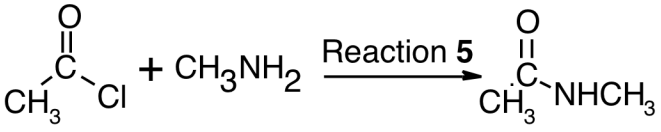
8. Which of the following reactions **will** give the carbonyl products shown? User the pKa table below the reactions to help you solve this problem.

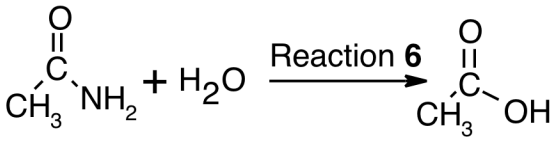












Formula	pKa		Formula	pKa		Formula	pKa
HCl	-7		CH_3OH	15.5		CH_3NH_2	40
H_3O^+	-1.7		$CH_3OH_2^+$	-2.5		$CH_3NH_3^+$	10.7
H_2O	15.7		NH_3	36		NH_4^+	9.4
HO^-	52					CH_3COOH	4.76

__ A. Reactions **2**, and **4** will give the carbonyl products shown.

__ B. Reactions **1**, **2**, and **3** will give the carbonyl products shown.

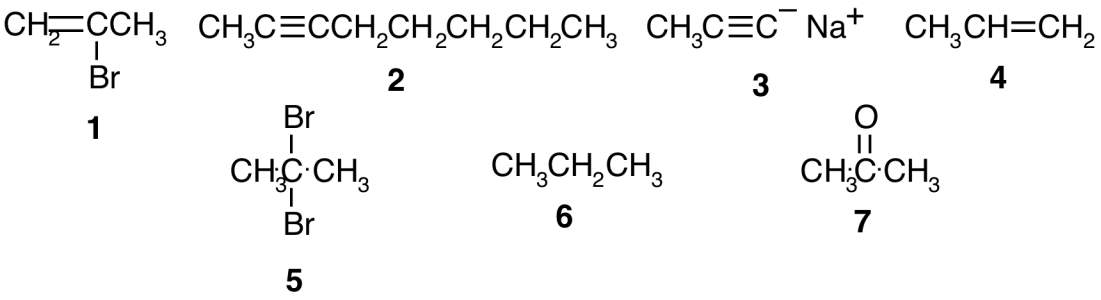
__ C. Reactions **1**, **3**, and **5** will give the carbonyl products shown.

__ D. Reactions **1**, and **2** will give the carbonyl products shown.

__ E. Only reaction **4** will give the carbonyl product shown.

Rationale:
Problem 11.48

9. Using the numbered structures below for reference figure out what would be (the structure of) the major product of the reaction of one mole of propyne with each of the reagents given in the multiple choices. Which choice gives the **correct** product structure for a given reagent in this reaction?



__ A. propyne reacted with $CH_3CH_2CH_2CH_2CH_2Br$ gives **2**.

__ B. propyne reacted with $NaNH_2$ gives **4**.

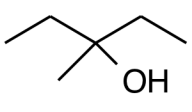
__ C. propyne reacted with H_2/Lindlar catalyst gives **6**.

__ D. propyne reacted with H_3O^+ gives **7**.

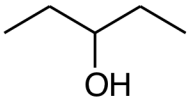
__ E. propyne reacted with excess H_2, Pd/C gives **4**.

Rationale:
Problem 6.42

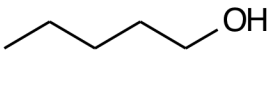
10. What products will be obtained from the reaction of 3-methyl-3-pentanol (**A** below), 3-pentanol (**B** below), and 1-pentanol (**C** below) with HOCl? Find the structures of the products of these reactions among the numbered figures below. Choose the **correct** statement from the multiple choices.



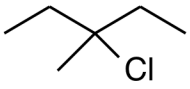
A



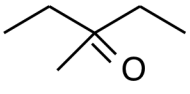
B



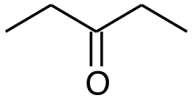
C



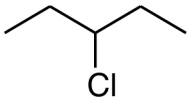
1



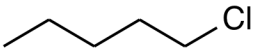
2



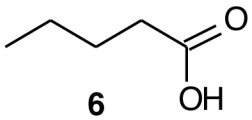
3



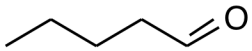
4



5



6



7

__ A. **C** and HOCl will form product **5**.

__ B. **A** and HOCl will form product **1**.

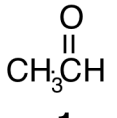
__ C. **B** and HOCl will form product **4**.

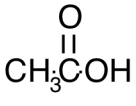
__ D. **C** and HOCl will form product **6**.

__ E. **A** and HOCl will give no reaction.

Rationale:
Problem 9.14

11. What products would be formed by the reaction of acetyl chloride with the reagents specified in the multiple choices? Pick the choice which gives a correct product of the specified reaction.


1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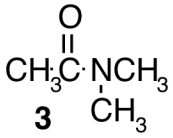
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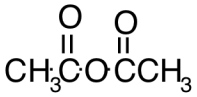
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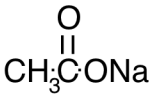
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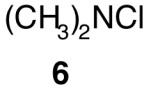
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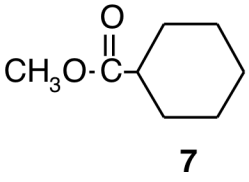
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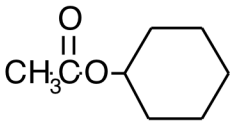
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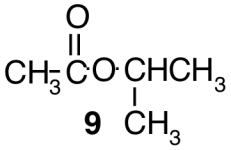
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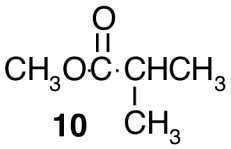

10

__ A. **6** would be formed from the reaction of acetyl chloride and excess dimethylamine.

__ B. **9** would be formed from the reaction of acetyl chloride and isopropyl alcohol.

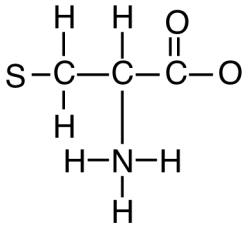
__ C. **7** would be formed from the reaction of acetyl chloride and cyclohexanol.

__ D. **5** would be formed from the reaction of acetyl chloride and sodium acetate.

__ E. **1** would be formed from the reaction of acetyl chloride and aqueous HCl.

Rationale:
Problem 11.34

12. Draw the missing lone-pair electrons and assign the missing formal charges for the structure shown below. Select the **correct** statement about your completed structure from the multiple choices.



cysteine, pH 9.5

__ A. The topmost oxygen (with the double bond to carbon below it) has three lone pairs of electrons.

__ B. The sulfur has a formal charge of –1.

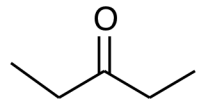
__ C. The rightmost oxygen has a formal charge of +1.

__ D. The nitrogen has one lone pair of electrons.

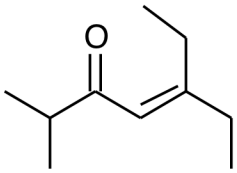
__ E. The rightmost oxygen has two lone pairs of electrons.

Rationale:
Problem 1.54

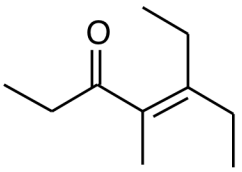
13. With 3-pentanone (structure below) as the reactant find the product of an aldol condensation from among the numbered structures shown below.



3-pentanone



1



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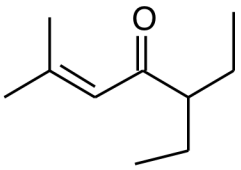

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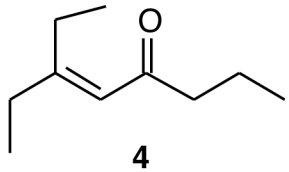

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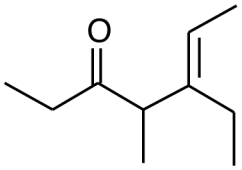


5

__ A. **4**

__ B. **2**

__ C. **1**

__ D. **3**

__ E. **5**

Rationale:
Problem 13.34

14. Arrange the following alkyl halides in order from most reactive to least reactive in an S_N1 reaction: 1-bromo-1-methylcyclohexane, 1-bromohexane, bromocyclohexane. Pick the choice which gives this order.

__ A. 1-bromohexane > 1-bromo-1-methylcyclohexane > bromocyclohexane

__ B. bromocyclohexane > 1-bromohexane > 1-bromo-1-methylcyclohexane

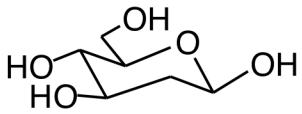
__ C. 1-bromohexane > bromocyclohexane > 1-bromo-1-methylcyclohexane

__ D. 1-bromo-1-methylcyclohexane > bromocyclohexane > 1-bromohexane

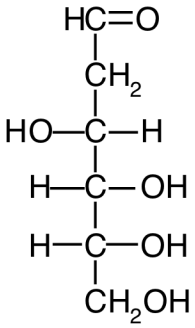
__ E. 1-bromo-1-methylcyclohexane > 1-bromohexane > bromocyclohexane

Rationale:
Problem 8.13

15. Choose the number (**2** - **6**) corresponding to the structure of the open-chain form of the cyclic saccharide whose structure is numbered **1** below. Structures **2** - **6** are Fischer projections.



1



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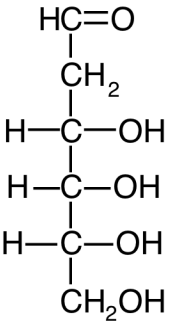

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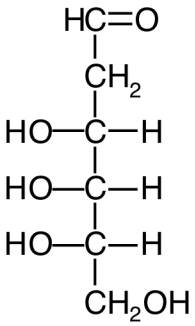

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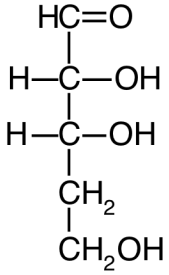

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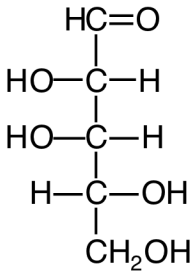


6

__ A. **2**

__ B. **5**

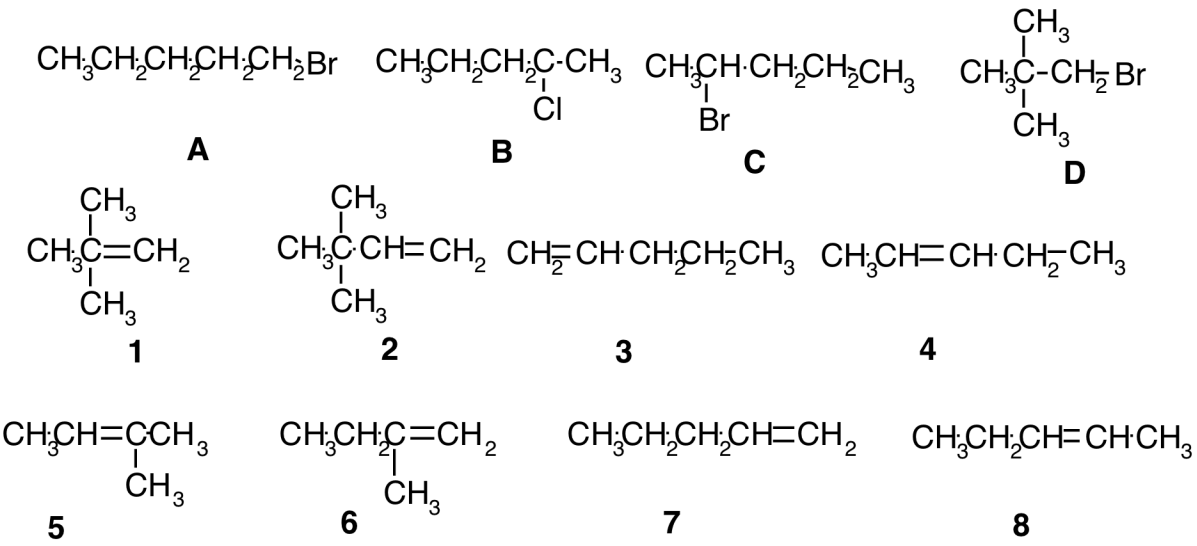
__ C. **6**

__ D. **4**

__ E. **3**

Rationale:
Problem 14.22

16. What would be the major elimination product (if any) obtained from the E2 reaction of each of the alkyl halides shown below (structures **A** - **D**) with hydroxide ion? Pick the **correct** statement from the multiple choices.



A **B** **C** **D**

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

5 **6** **7** **8**

__ A. Elimination of **D** with hydroxide gives product **1**.

__ B. Elimination of **C** with hydroxide gives product **4**.

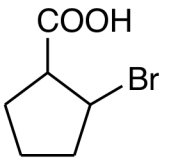
__ C. Elimination of **C** with hydroxide gives product **3**.

__ D. Elimination of **B** with hydroxide gives product **3**.

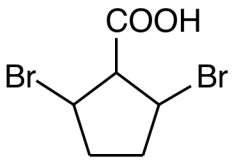
__ E. Elimination of **A** with hydroxide gives product **8**.

Rationale:
Problem 8.18

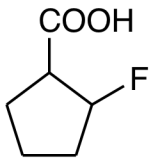
17. Which species in each of the following pairs is more acidic? Pick the **correct** statement from the multiple choices.



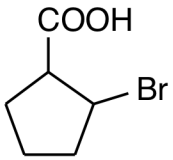
a1



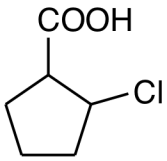
a2



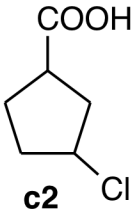
b1



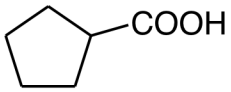
b2



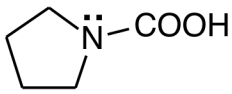
c1



c2



d1



d2

__ A. None of the other choices is correct.

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

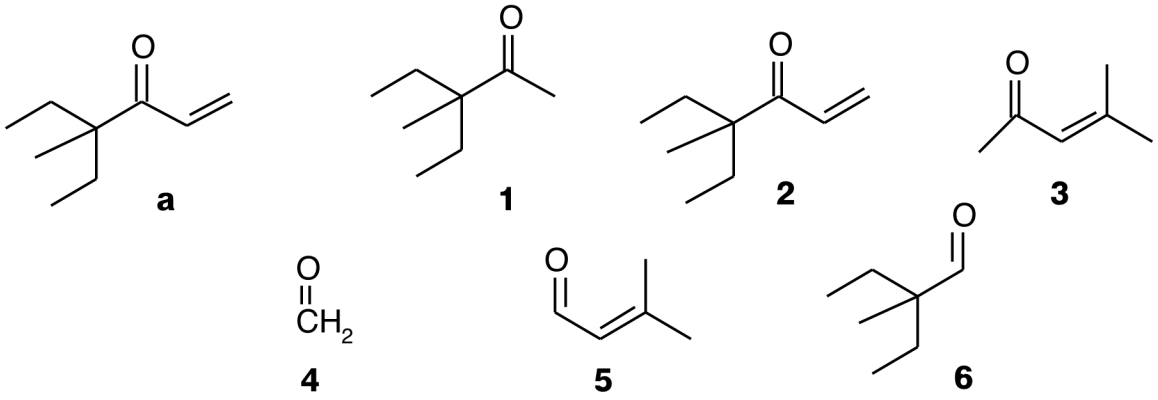
__ C. **b2** is more acidic than **b1**.

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

__ E. **c2** is more acidic than **c1**.

Rationale:
Problem 7.14

18. Pick the choice which **correctly** describes how compound **a** can be synthesized via an aldol condensation using reagents that have the numbered structures shown below.



__ A. Compound **a** can be synthesized by heating compound **5** and compound **6** together in a strongly basic aqueous solution.

__ B. Compound **a** can be synthesized by heating compound **1** and compound **4** together in a strongly basic aqueous solution.

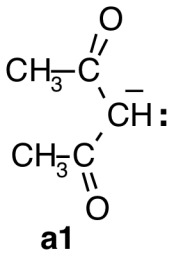
__ C. Compound **a** can be synthesized by heating compound **2** and compound **4** together in a strongly basic aqueous solution.

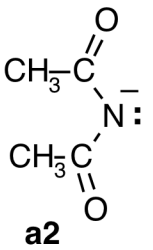
__ D. Compound **a** can be synthesized by heating compound **4** and compound **6** together in a strongly basic aqueous solution.

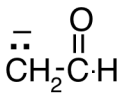
__ E. Compound **a** can be synthesized by heating compound **3** and compound **5** together in a strongly basic aqueous solution.

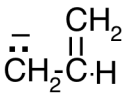
Rationale:
Problem 13.45

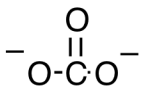
19. Which species in each pair is more stable? Pick the **correct** statement from the multiple choices.

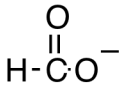

a1

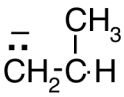

a2

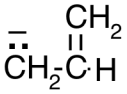

b1


b2


c1


c2


d1


d2

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

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

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

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

__ E. None of the other choices is correct.

Rationale:
Problem 7.45

20. For each of the acid-base reactions in the multiple choices, compare the pKa values of the acids on either side of the reaction arrows to see if the equilibrium for the reaction lies in the direction indicated (ie. to the right). Pick the choice which **correctly** indicates the direction the reaction shifts (from standard conditions) to achieve equilibrium.

Formula	pKa	Formula	pKa	Formula	pKa
HCl	-7	CH_3OH	15.5	CH_3NH_2	40
H_3O^+	-1.7	$CH_3OH_2^+$	-2.5	$CH_3NH_3^+$	10.7
H_2O	15.7	CH_3COOH	4.8	NH_4^+	9.4

__ A. $NH_4^+ + HO^- \rightarrow NH_3 + H_2O$

__ B. $CH_3COOH + H_2O \rightarrow CH_3COO^- + H_3O^+$

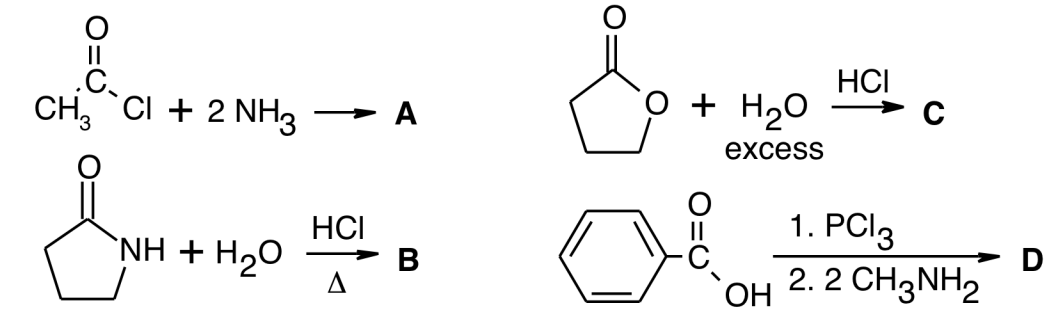
__ C. $NH_3 + H_2O \rightarrow NH_4^+ + HO^-$

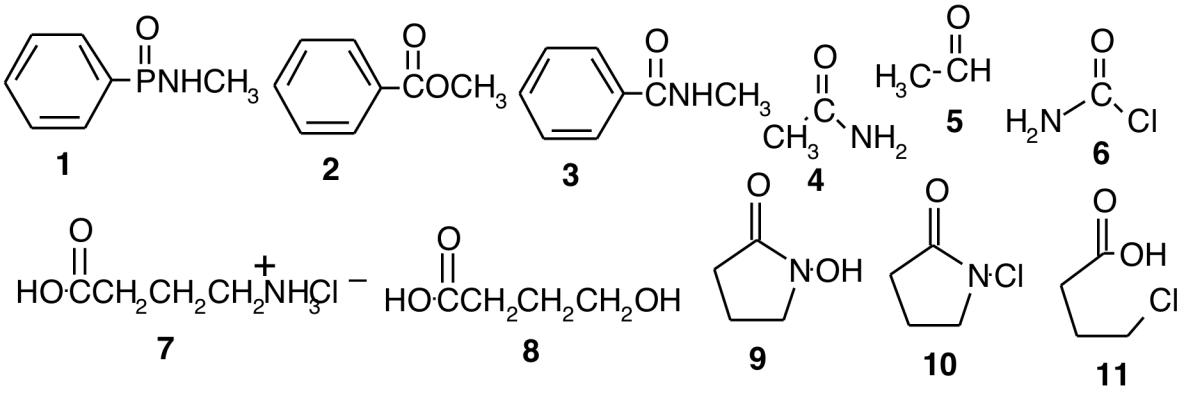
__ D. $CH_3COO^- + NH_4^+ \rightarrow CH_3COOH + NH_3$

__ E. $CH_3NH_2 + H_2O \rightarrow CH_3NH_3^+ + HO^-$

Rationale:
Problem 2.14

21. What are the products of the following reactions? Find the structures of these products from among the numbered structures and pick the choice which indicates a **correct** product selection.





__ A. **C** is **11**

__ B. **B** is **9**

__ C. **D** is **3**

__ D. **B** is **10**

__ E. **A** is **6**

Rationale:
Problem 11.49

22. Which of the choices is **TRUE** about the protein structural hierarchy level involved in the structural features described?

__ A. The α and β subunits of hemoglobin fit together to make a 3^0 structure.

__ B. Disulfide bridges help to create the 2^0 structure of a protein.

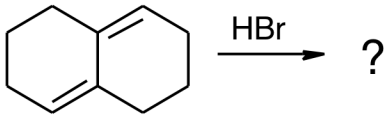
__ C. Hydrophobic interactions are involved in the 1^0 and 2^0 structures of a protein.

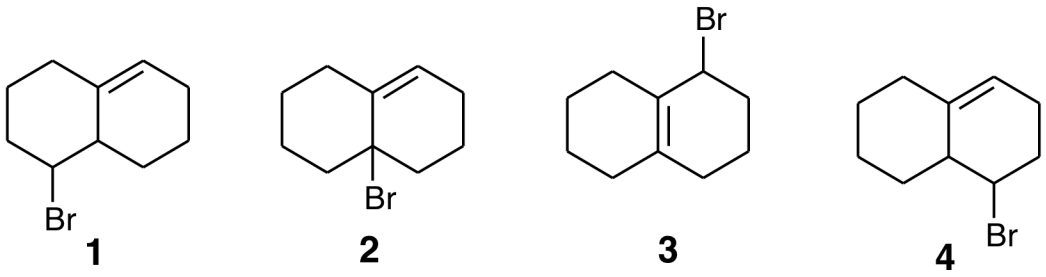
__ D. Hydrogen bonding can be involved in creating the 2^0, 3^0, and 4^0 structure of a protein.

__ E. Glu-Arg sidechain interactions can be involved in creating 1^0 and 2^0 structure.

Rationale:
Problem 16.29

23. What are the products of the reaction shown below, assuming that one equivalent of HBr is used in the reaction?

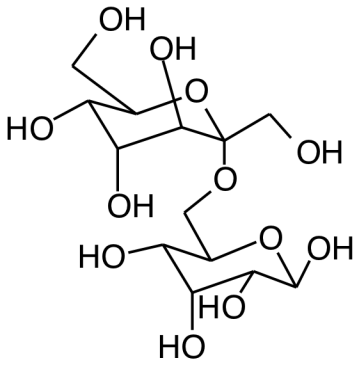




__ A. **2** and **3**
__ B. **1** and **2**
__ C. **3** and **4**
__ D. **2** and **4**
__ E. **1** and **3**

Rationale:
Problem 7.19

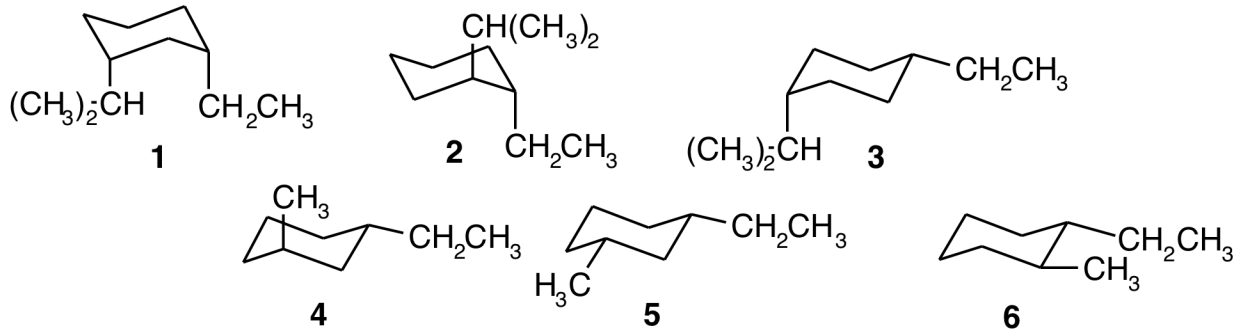
24. Choose the correct designations for the type of glycosidic bond and types of monosaccharide units that appear in the disaccharide whose structure is shown below.



__ A. β,α-2,6 glycosidic bond joining a ketoheptose to an aldohexose
__ B. α-1,6 glycosidic bond joining a ketohexose to an aldoheptose
__ C. β-2,6 glycosidic bond joining a ketoheptose to an aldohexose
__ D. α-1,5 glycosidic bond joining a ketohexose to an aldohexose
__ E. α-2,6 glycosidic bond joining a ketoheptose to an aldohexose

Rationale:
Problem 14.25

25. Draw the two chair conformers of each of the cyclohexanes named in the multiple choices. Examine the numbered figures below to see if the structure of the **less stable** conformer of the cyclohexane named in one of the multiple choices matches the structure number given in that multiple choice. Pick the choice which **correctly** matches **all** of the feature of the structure of the **less stable** conformer of the named cyclohexane with a numbered figure. (Hint: check to see if cis or trans is correct, check the substituent names, check the position numbers, and check the axial and equatorial positions of the substituents.)



__ A. **3** is the structure of the less stable conformer of trans-1-ethyl-3-isopropylcyclohexane.

__ B. **4** is the structure of the less stable conformer of trans-1-ethyl-3-methylcyclohexane.

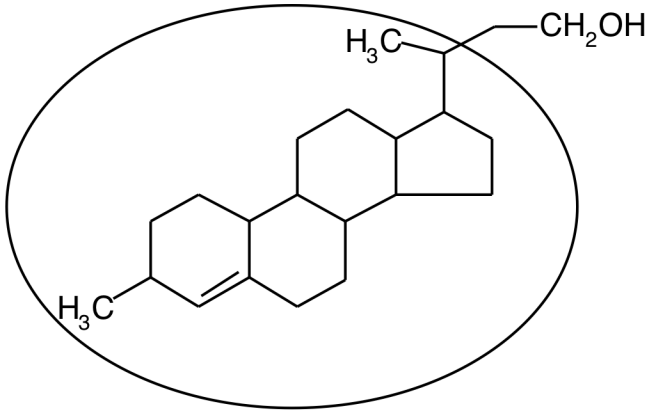
__ C. **5** is the structure of the less stable conformer of cis-1-ethyl-3-methylcyclohexane.

__ D. **6** is the structure of the less stable conformer of cis-1-ethyl-2-methylcyclohexane.

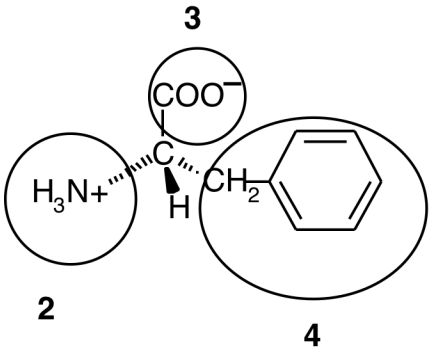
__ E. **1** is the structure of the less stable conformer of cis-1-ethyl-4-isopropylcyclohexane.

Rationale:
Problem 3.57

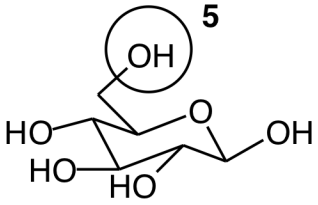
26. Structures of three molecular substances are shown below. Portions of these structures are circled and numbered. Decide whether each of the circled regions is hydrophobic or hydrophilic and then choose the **CORRECT** statement from the multiple choices.



1



2 4



__ A. Region 1 is hydrophobic.

__ B. Region 5 is hydrophobic.

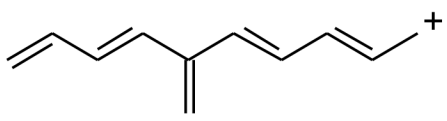
__ C. Region 3 is hydrophobic.

__ D. Region 2 is hydrophobic.

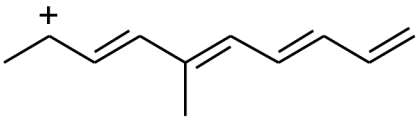
__ E. Region 4 is hydrophilic.

Rationale:
Problem 15.9

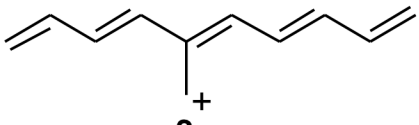
27. Find the numbers under all of the structures which are valid resonance structures of the ion labelled **A** below.



A



1



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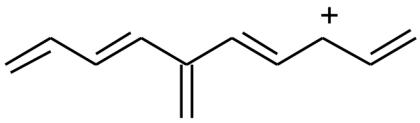

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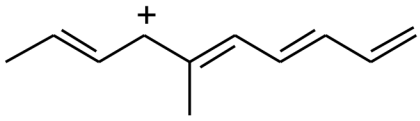

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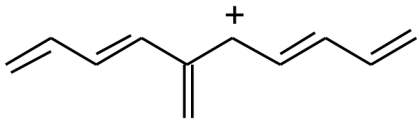


5

__ A. **1, 2, 3**
__ B. **1, 2, 4**
__ C. **1, 5**
__ D. **4, 5**
__ E. **2, 3, 5**

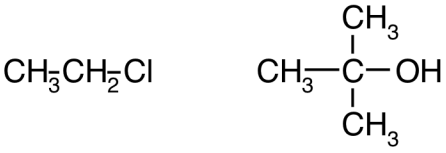
Rationale:
Problem 7.34

28. Find the amino acids mentioned in the choices below in the amino acid tables at the back of this quiz. Figure out which pole (+ or **-**) each amino acid would migrate to in an electric field at blood pH 7.4. Which of the choices below is **CORRECT**?

__ A. Lysine will migrate to the **–** pole at a pH of 7.4.
__ B. Lysine will not migrate to either pole at a pH of 7.4.
__ C. Glutamic acid will migrate to the **-** pole at a pH of 7.4.
__ D. Arginine will migrate to the **+** pole at a pH of 7.4.
__ E. Glutamic acid will not migrate to either pole at a pH of 7.4.

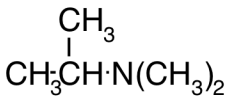
Rationale:
Problem 16.4

29. Figure out whether the functional group in each of the lettered structures below is primary, secondary, or tertiary. Choose the **correct** statement from the multiple choices.



A

B



C

__ A. The functional group in structure **C** is secondary.

__ B. The functional group in structure **B** is primary.

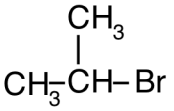
__ C. The functional group in structure **A** is secondary.

__ D. The functional groups in structures **A**, **B**, and **C** are all secondary.

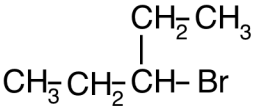
__ E. The functional group in structure **C** is tertiary.

Rationale:
Problem 3.19

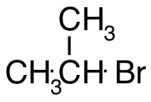
30. Which alkyl halide in each of the pairs of structures shown below would you expect to be more reactive in an S_N2 reaction with a given nucleophile? Pick the choice which gives the **correct** answer for one of these pairs.



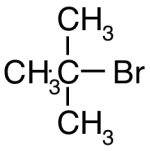
a1



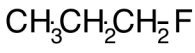
a2



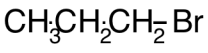
c1



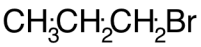
c2



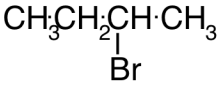
b1



b2



d1



d2

__ A. None of the other choices is correct.

__ B. **a2** is more reactive than **a1** in an S_N2 reaction.

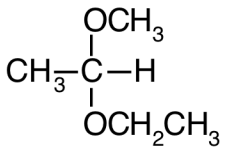
__ C. **c2** is more reactive than **c1** in an S_N2 reaction.

__ D. **b1** is more reactive than **b2** in an S_N2 reaction.

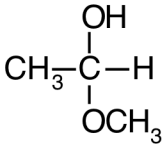
__ E. **d2** is more reactive than **d1** in an S_N2 reaction.

Rationale:
Problem 8.36

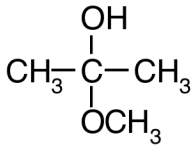
31. Which of the following are hemiacetals? Which of the following are acetals? Pick the **correct** statement from the multiple choices.



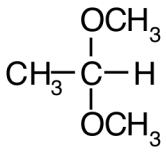
1



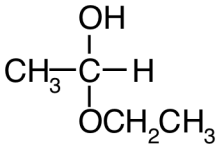
3



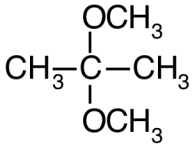
5



2



4



6

__ A. **6** is an acetal.

__ B. **1** is a hemiacetal.

__ C. **2** is a hemiacetal.

__ D. **3** is a hemiacetal.

__ E. **4** is an acetal.

Rationale:
Problem 12.23

32. For each of the acidic compounds shown below whose pK_a values are shown below them figure out which form predominates at the pH values given in the multiple choices and pick the choice which is **correct**.

H_2S	CH_3OOH	HN_3
pKa = 7.00	pKa = 11.5	pKa = 4.7

__ A. CH_3OOH is predominantly in the CH_3OO^- form if pH = 7.4.

__ B. CH_3OOH is predominantly in the CH_3OO^- form if pH = 13.0.

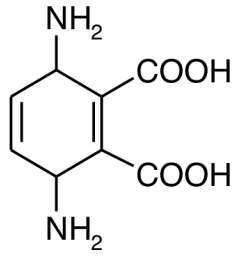
__ C. HN_3 is predominantly in the HN_3 form if pH = 14.

__ D. HN_3 is predominantly in the N_3^- form if pH = 3.

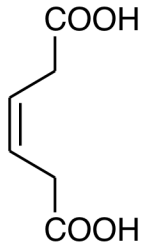
__ E. H_2S is predominantly in the HS^- form if pH = 6.

Rationale:
Problem 2.44

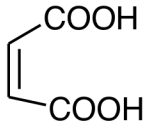
33. How could the compound with structure **A** shown below be synthesized using a Diels-Alder reaction?



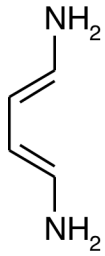
A



1

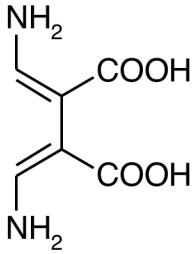


2



3

4



5

6

__ A. React compound **1** with compound **3**.
__ B. None of the other choices is correct.
__ C. React compound **2** with compound **3**.
__ D. React compound **3** with compound **6**.
__ E. React compound **4** with compound **5**.

Rationale:
Problem 7.53

34. Choose the **CORRECT** structure **AND** ω designation of linoleic acid ($C_{18:2}^{\Delta 9,12}$).

__ A. Linoleic acid is an ω9 acid with the structure $CH_3(CH_2)_7(CH{=}CHCH_2)_2(CH_2)_3COOH$.
__ B. Linoleic acid is an ω6 acid with the structure $CH_3(CH_2)_4(CH{=}CHCH_2)_2(CH_2)_6COOH$.
__ C. Linoleic acid is an ω9 acid with the structure $CH_3(CH_2)_4(CH{=}CHCH_2)_2(CH_2)_6COOH$.
__ D. Linoleic acid is an ω3 acid with the structure $CH_3(CH_2)_3(CH_2CH{=}CH)_2(CH_2)_7COOH$.
__ E. Linoleic acid is an ω6 acid with the structure $CH_3(CH_2)_7(CH{=}CHCH_2)_2(CH_2)_3COOH$.

Rationale:
Problem 15.16

35. What is the m-RNA sequence which is generated from the template DNA sequence:
3'-CAT TGC AGC GAA-5'?

__ A. 5'-CAU UGC AGC GAA-3'

__ B. 3'-GUA ACG UCG CUU-5'

__ C. 5'-GTA ACG TCG CTT-3'

__ D. 5'-GUA ACG UCG CUU-3'

__ E. 3'-GTA ACG TCG CTT-5'

Rationale:
Problem 17.12

36. Draw the products obtained from the S_N2 reaction of the alkyl halides named in the multiple choices below. Name these products. Which choice **correctly** names the product of the specified reaction?

__ A. (R)-2-bromohexane and methoxide ion gives (R)-2-methoxyhexane.

__ B. bromocyclohexane and hydroxide ion gives 2-bromocyclohexanol.

__ C. (R)-2-bromohexane and methoxide ion gives (S)-2-methoxyhexane.

__ D. 2-bromopentane and methoxide ion gives 2-bromo-2-methoxypentane.

__ E. 3-iodopentane and hydroxide ion gives isopentanol.

Rationale:
Problem 8.5

37. Which of the choices **CORRECTLY** specifies the types of sidechain interactions by which the sidechains of the pairs of amino acids indicated in the multiple choices can interact with one another?

__ A. Phe and Leu sidechains can hydrogen bond with one another.

__ B. Thr and Asp sidechains can interact via a hydrophobic interaction.

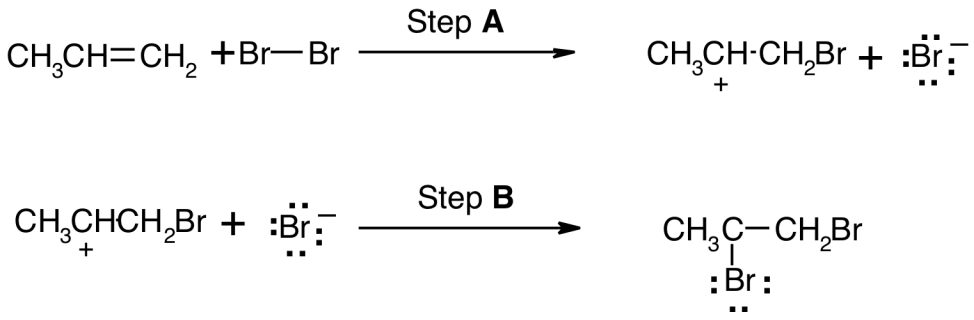
__ C. CysH and CysH sidechains can interact by forming covalent (disulfide) bridges.

__ D. Ala and Val do not have sidechains.

__ E. Arg and His sidechains can form a salt bridge with one another.

Rationale:
Problem 16.30

38. Identify the electrophile and the nucleophile in each of the two reaction steps in the two-step process shown below, and then draw curved arrows on the test page to illustrate the bond-making and bond-breaking processes in these two reaction steps. Choose the answer which is completely correct about one of these two reaction steps



__ A. In Step **A** the leftmost reactant (the alkene) is the nucleophile and the Br-Br is the electrophile. The tail of a curved arrow originates at a Br atom and this arrow points to the rightmost carbon atom in the alkene.

__ B. In Step **B** the leftmost reactant (the cation) is the nucleophile and the Br^- is the electrophile. The tail of a curved arrow originates at a lone pair of electrons on Br^- and this arrow points to the positively-charged carbon in the cation on the left.

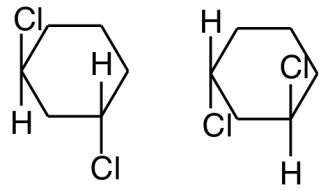
__ C. In Step **B** the leftmost reactant (the cation) is the electrophile and the Br^- is the nucleophile. The tail of a curved arrow originates at a lone pair of electrons on Br^- and this arrow points to the positively-charged carbon in the cation on the left.

__ D. In Step **A** the rightmost reactant (Br-Br) is the nucleophile and the alkene is the electrophile. The tail of a curved arrow originates at a Br in Br-Br and this arrow points to the rightmost carbon in the alkene.

__ E. In Step **B** the leftmost reactant (the cation) is the nucleophile and the Br^- is the electrophile. The tail of a curved arrow originates at the positively-charged carbon and this arrow points to the Br^- ion.

Rationale:
Problem 6.29

39. What is the relationship between the compounds having the structures shown below?



__ A. They are constitutional isomers.

__ B. They are different meso isomers.

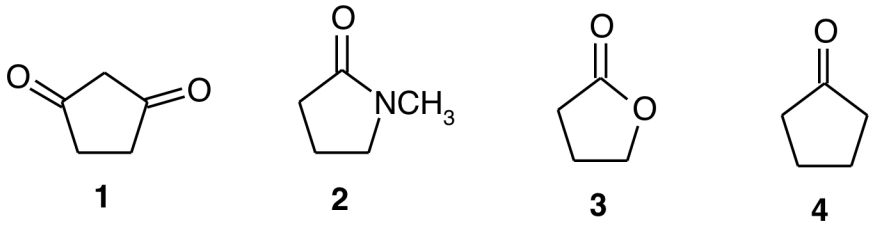
__ C. They are identical.

__ D. They are enantiomers.

__ E. They are diasteriomers.

Rationale:
Problem 4.50

40. Pick the choice which gives the structure numbers of the following compounds arranged in order from strongest acid to weakest acid.



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

__ A. **1 > 4 > 3 > 2**

__ B. **3 > 4 > 1 > 2**

__ C. **1 > 3 > 2 > 4**

__ D. **4 > 3 > 1 > 2**

__ E. **2 > 4 > 3 > 1**

Rationale:
Problem 13.25

Answer Key

"Grade or Education" = 1

CHEM 2060/01
Summer 2019
Final Exam
Chapters 1 - 17

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

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