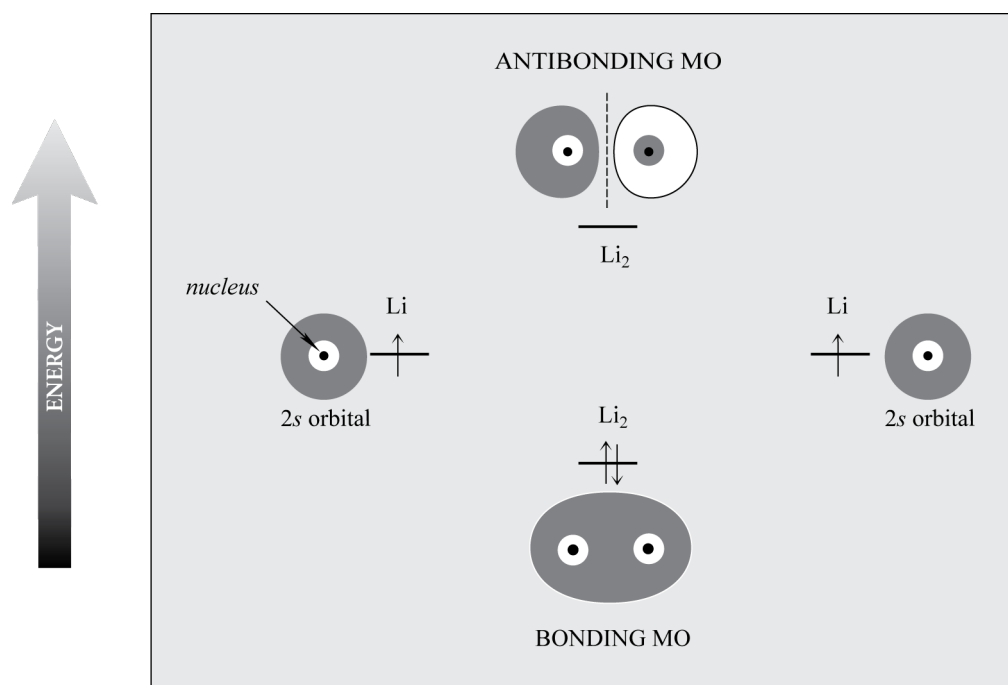


**ERRATA**  
**Study Guide and Solutions Manual, Fifth Edition**  
**by Marc Loudon and Joseph G. Stowell**  
**to accompany**  
**Organic Chemistry, 5th Edition, by Marc Loudon**  
**Date of this release: April 30, 2012**

Items marked with an asterisk (\*) were corrected in the second printing.

**Chapter 1**

- p. 2            In the second line from the bottom, the expression should be  $4.8 \times 10^{-10}$ , not  $4.8 \div 10^{-10}$ .
- p. 10          Figure SG1.5b is wrong. The answer to Problem 1.19(c) is correct, but the accompanying Figure SG1.5b should be as follows:



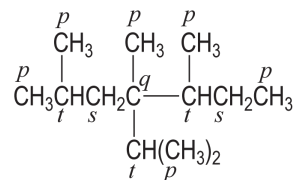
- p. 12          In the solution to Problem 1.32(a), in the 6th line, the reduction in %  $s$  character should be 2.8%. This error propagates to the remaining calculations. Here is a corrected answer beginning with line 6:

$2.2/0.78 = 2.8\%$ . Therefore, the hybrid orbitals in the N—H bonds have  $25\% - 2.8\% = 22.2\%$   $s$  character. Since there are three such bonds, they account for  $(3)(22.2\%) = 66.6\%$  of an  $s$  orbital. The unshared pair contains the rest of the  $s$  character:  $33.4\%$  of an  $s$  orbital. In terms of  $p$  character, each N—H bond contains  $100\% - 22.2\% = 77.8\%$   $p$  character. The N—H bonds contain a total of  $(3)(77.8\%) = 233.4\%$  (that is 2.33)  $p$  orbitals; the lone pair contains the remaining  $p$  character, or  $3 - 2.33 = 0.67$  of a  $p$  orbital. Therefore, the hybridization of the hybrid orbitals in the N—H bonds is  $s^{22.2}p^{77.8}$ . Normalizing to an  $s$  character of 1, the hybridization of these orbitals is  $sp^{3.5}$ , and the hybridization of the lone-pair orbital is  $s^{0.33}p^{0.67}$ , or  $sp^{2.0}$ .

**Chapter 2**

- p. 17          In the first display, the condensed formula for isopentane should have two, not three, methyl groups. It should be  $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_3$ .

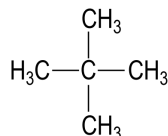
- p. 20 In Problem 2.10(a), one carbon has two labels. The correct label should be *t*. The correct structure is



**4-isopropyl-2,4,5-trimethylheptane**

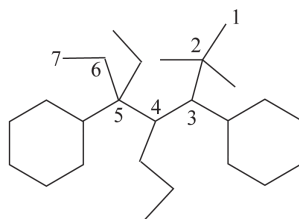
- p. 21 The name in the solution to Problem 2.13(a) has incorrect numbers. The name should be 1,1,2,4-tetraethyl-3-methylcyclobutane.

- p. 22 The correct IUPAC name for neopentane is 2,2-dimethylpropane.



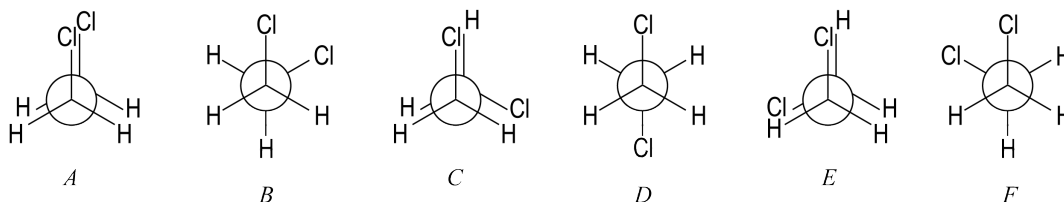
**2,2-dimethylpropane**

- p. 23 In Problem 2.32(a), the substituent name “dimethyl” should be cited before “propyl.”



**3,5-dicyclohexyl-5-ethyl-2,2-dimethyl-4-propylheptane**

- p. 24 In the solution to Problem 2.37a, An H and a Cl should be interchanged on conformation *E*:



### Chapter 3

- p. 36 Although the solution to the problem is correct, there are two errors leading up to it. First, the initial equation is wrong (font errors by the compositor):

$$K_{\text{eq}} = 10^{-\Delta G^\circ/2.30RT} = 10^{-(-2.93)/5.71} = 10^{0.513} = 3.26$$

Then, in the second equation below the table, there is a superfluous “=” sign and a minor numerical error; the equation should read

$$x^2 - 0.607x + 0.02 = 0$$

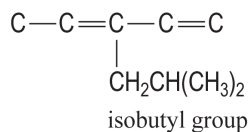
The correct quadratic expression and the solution follow from this.

- p. 44 In Solution 3.46, second equation, the AH in the denominator of the first factor should be in brackets to indicate concentration, *i.e.*, [AH].

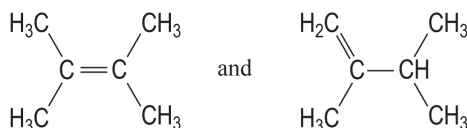
$$K_{\text{AH}}/K_{\text{BH}} = \frac{[\text{A}^-][\text{H}_3\text{O}^+]}{[\text{AH}]} \times \frac{[\text{BH}]}{[\text{H}_3\text{O}^+][\text{B}^-]} = \frac{[\text{BH}][\text{A}^-]}{[\text{AH}][\text{B}^-]} = K_{\text{eq}}$$

## Chapter 4

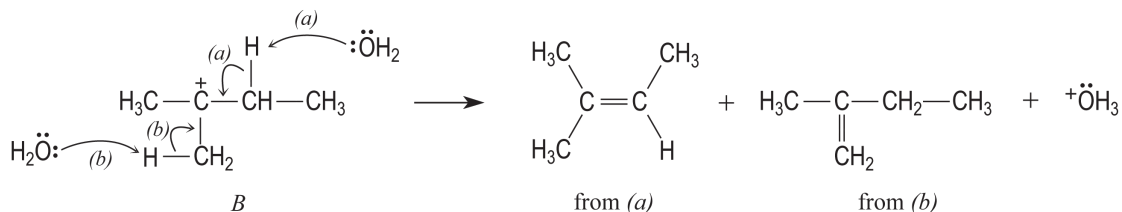
- p. 46 The first structure in Study Guide Link 4.2, under point 1, has too many carbons. It should have six carbons; omit the carbon on the right. This structure should be



- p. 57 In the solution to Problem 4.13(a), the  $\Delta H^\circ$  value  $4.06 \text{ kcal mol}^{-1}$  should be negative.
- p. 57 In the solution to Problem 4.15, below the three lines of text, every occurrence of the word “1-hexene” should be replaced with “1-heptene.” (The calculations are correct for 1-heptene; only the name is wrong.)
- p. 57 In the solution to Problem 4.21(a), the second structure is missing a hydrogen. The solution should be



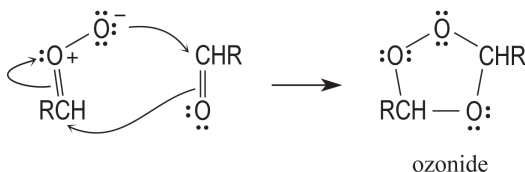
- p. 60 In the solution to Problem 4.36(a), the first alkene product (derived from process *a*) has too many carbons; it should be as shown below:



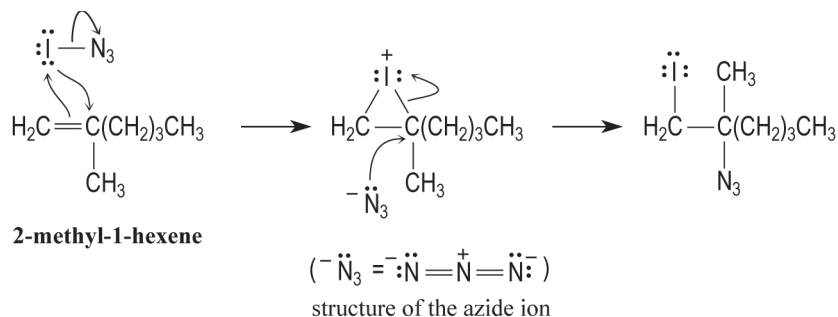
- p. 67 In the mechanism at the top of the page, the product of step (a) should have two Hs on carbon-5; that is, the H that was added in this step was inadvertently omitted.

## Chapter 5

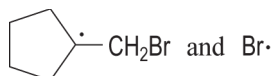
- p. 78 The tail of the curved arrow in the reaction at the top of the page should be on the double bond, as follows:



- p. 85 In the solution to Problem 5.2(c), the solution to Problem 5.2(b) was given instead. The correct solution is



- p. 89 In the first structure of the solution to Problem 5.22(a), the unpaired electron dot is missing. The display should be



- p. 90 In the solution to Problem 5.27(o), because HI does not undergo free-radical addition, the product should be the same as the product of 5.27(n), i.e., the tertiary iodide.

- p. 90 In Problem 5.32(a), on the last line at the bottom of the page, the alkene is incorrectly named. It should be 3-ethyl-2-pentene. (Its correct name and structure is shown at the top of p. 91.)

- p. 95 In the computation in the solution to Problem 5.41(a), there are two errors. First, the proper heat of formation of the ethyl radical, given in the first paragraph, should be used; and, second, the  $\Delta H_f^\circ$ (ethanethiol) is negative, i.e., it should be  $-46.2 \text{ kJ mol}^{-1}$ . (This is a text error.) The proper computation, then, is

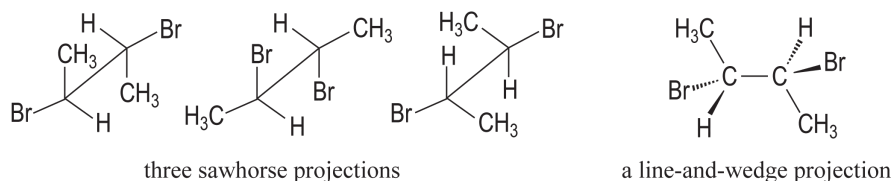
$$\Delta H^\circ = \Delta H_f^\circ(\cdot\text{SH}) + \Delta H_f^\circ(\cdot\text{CH}_2\text{CH}_3) - \Delta H_f^\circ(\text{ethanethiol}) = (143.1 + 121.3) - (-46.2) = 310.6 \text{ kJ mol}^{-1}$$

This is very close to the accepted C—S bond energy of ethanethiol.

## Chapter 6

- p. 107 In the solution to Problem 6.14(c), only the first line is of text is correct. The structure and the line below it actually correspond to part (a) and should not be in the answer to this part.

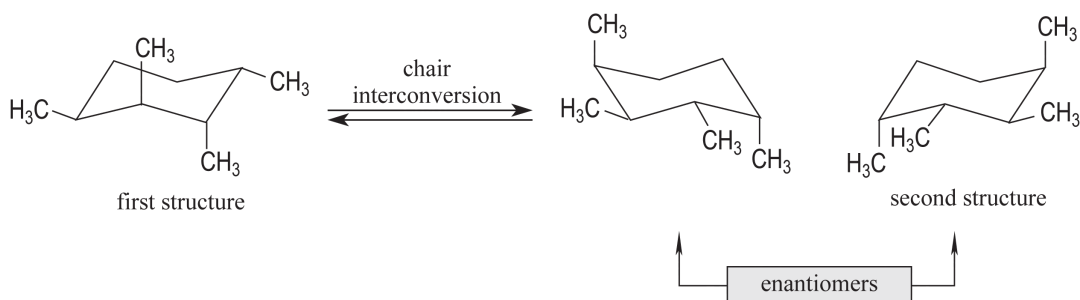
- p. 109 In Problem 6.24(a), the line-and-wedge projection is incorrect. It should be as follows:



## Chapter 7

- p. 125 In the long comment in the center of the page, near the end of the second-to-last line, change the word “increased” to “decreased,” to read: “These two changes—decreased entropy in the axial ...”

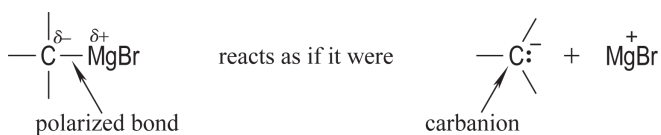
- p. 137 The last display in Problem 7.54(b) is wrong. It should be as follows:



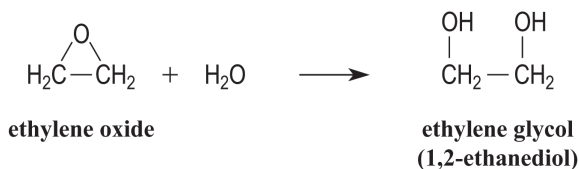
## Chapter 8

p. 143 In the first display under Study Guide Link 8.1, the structure should have one less carbon; it should be  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{—Br}$ .

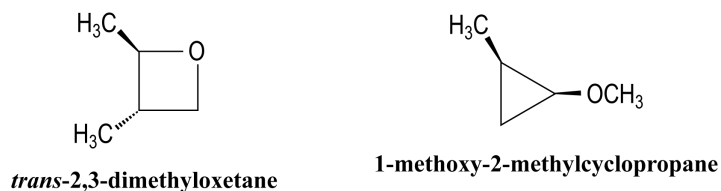
p. 148 The caption under the display for part 4.b. should say “carbanion” rather than “carbocation:



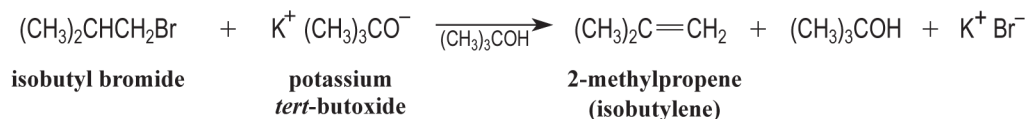
p. 149 In the last display on the page, the caption of the product is wrong. The equation should be



p. 155 The first structure only has four carbons. The structures in the answer should read as follows:

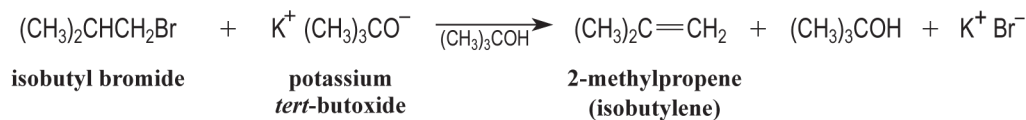


p. 171 The display for the solution to Problem 9.22(c) is incorrect. It should be the following:

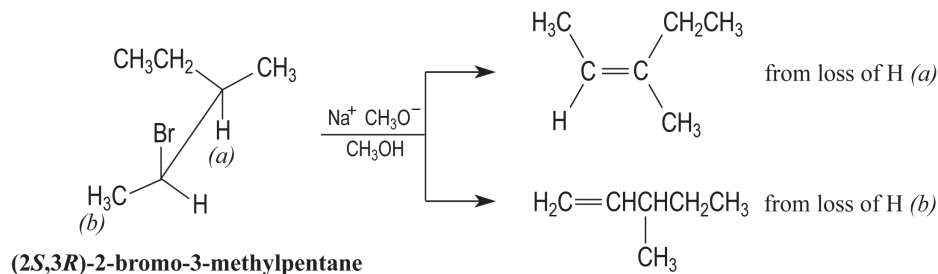


## Chapter 9

p. 171 In the solution to Problem 9.22(c), the explanation is correct but the equation is not. The correct equation is



- p. 176 In the solution to Problem 9.45(a), the structure of the second product is missing a CH. The corrected figure should be as follows:

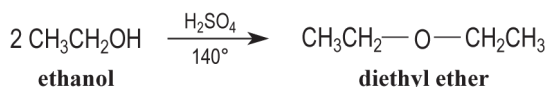


### Chapter 10

- p. 201 In the solution to Problem 10.30(a), the ethanol formed should be the *S* enantiomer. The structure shown is correct but is labeled incorrectly. Because the *pro*-(*R*) position of ethanol is actually occupied by an H and the *pro*-(*S*) position by deuterium, then the enantiomer formed is *S*.

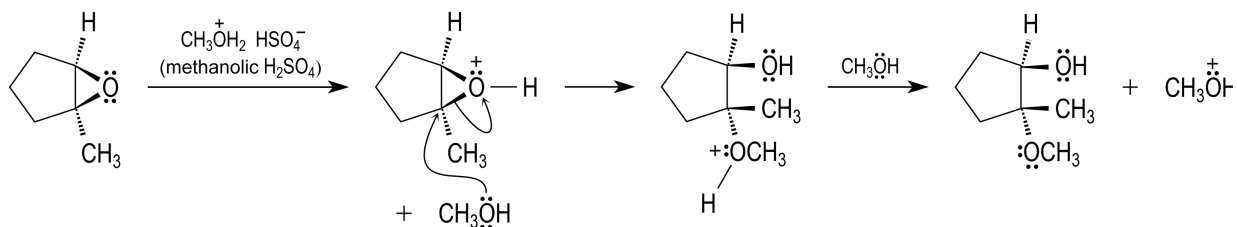
### Chapter 11

- p. 214 In the display under C.1., the caption under ethanol is incorrect, and the product has one too many oxygens. The correct display is



- p. 215 In part D.1., The caption under the product should be “cyclopentene oxide”, or “1,2-epoxycyclopentane.”

- p.220 In part 3.b. (the first equation on the page), the stereochemistry of the last structure is incorrect. The correct equation is



- p. 241 In the solution to Problem 11.69, part (b), substitute the word *strong* for the word *poor* in the last sentence to read: “. . .aziridine is too strong a base. . .”

### Chapter 13

- p. 260 In the third line above the structure, omit the phrase “on p. XR.” This was meant to be a cross-reference to the tables on pp. 262–264.
- p. 265 In the solution to Problem 13.4(a), the units of 21,100 should be gauss (as they are in the problem in the text), not Hz. The answer to Problem 13.4(b) was omitted. The operating frequency is 600 MHz, and the chemical shift of the CH<sub>3</sub> protons of dimethoxymethane is 2011 Hz.
- p. 266 In the solution to Problem 13.9(a), the spectrum consists of four resonances, not two.
- \*p. 267 In the comment below the solution to Problem 13.13, the cross-reference for more precise chemical-shift estimates should be to Further Exploration 13.1 on p. 259.
- \*p. 280 In the solution to Problem 13.60, the answer to part (b) is missing, and is as follows:

The two lines at low temperature have different intensities because the diastereomers are present in different amounts. The intensity of each resonance is proportional to the amount of the conformation of which it is characteristic. *A priori*, if the conformations are equally probable, the resonance of the conformations with the gauche methyl groups should be twice as strong as that of the conformation with anti methyls. The actual intensities will likely differ from this 2:1 ratio in accordance with the relative stabilities of the conformations.

#### Chapter 14

p. 291 In the solution to Problem 14.19, the product alkene should have two methyl groups:  $(\text{CH}_3)_3\text{C}=\text{CH}_2$ .

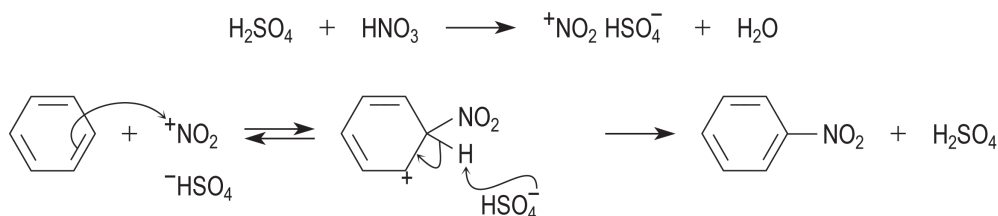
#### Chapter 15

p. 314 In the first line of the solution to Problem 15.27(c), omit the word “is,” to read: “... because it places ...”

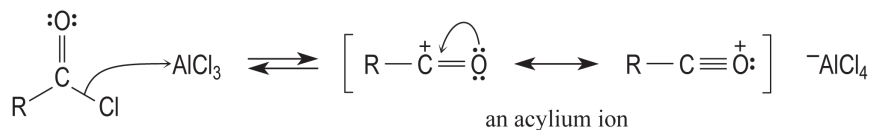
p. 315 The last paragraph of the solution to Problem 15.31(a) should be deleted. A calculation of the  $\pi$ -electron energy, though not requested, is as follows: 2 electrons occupy  $\pi_1$  ( $4\beta$ ) and 2 each occupy  $\pi_2$  and  $\pi_3$  ( $4 \times 0.62\beta = 2.48\beta$ ) for a total  $\pi$ -electron energy of  $6.48\beta$ .

#### Chapter 16

p. 337 A positive charge should be added to the second structure in the second equation at the top of the page, and the negative charge should be on oxygen. These two equations should now read as follows:

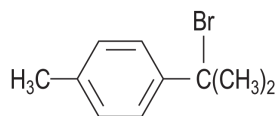


p. 338 In the equation at the bottom of the page (part E.2.a) exchange the R and the Cl so that the curved arrow on the left is correct. The curved arrow on the right is also incorrect. The corrected equation should be



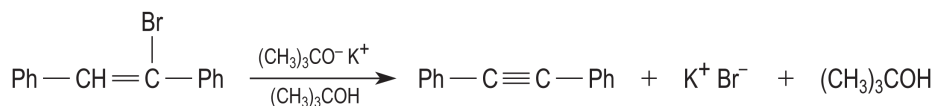
#### Chapter 17

p. 378 In the solution to Problem 17.37(f), the benzylic carbon should not have a hydrogen.



#### Chapter 18

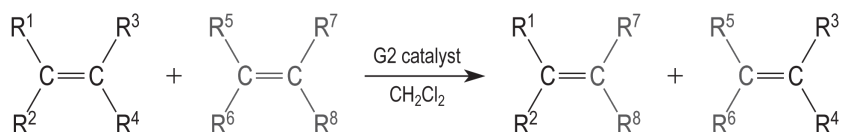
p. 390 In the first reaction on the page, delete the hydrogen from the alkyne carbon.



p. 392 In the first reaction at the top of the page, the product should not contain HBr. The correct reaction is



p. 393 In the general alkene metathesis reaction under part E.1., some groups are mislabeled. The reaction should be

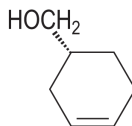


(Note that this ignores the *E* and *Z* stereochemical possibilities.)

p. 401 In the solution to Problem 18.10, the cross-reference on the third line should be to the solution to Problem 18.9(c) [the previous solution], not to 18.10(c).

p. 402 The caption for the structure in the solution to Problem 18.21(c) has a double bond numbered incorrectly; it should read “(4*E*,6*E*)-6-methyl-4,6-octadien-1-ol.”

p. 405 The structure in the solution to Problem 18.26(a) should have a six-membered ring:



(*R*)-(4-cyclohexenyl)methanol

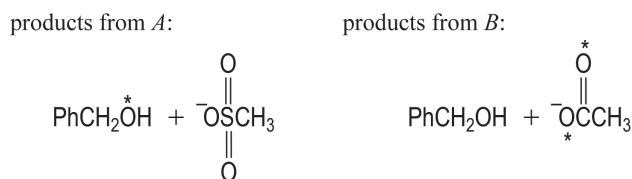
## Chapter 19

\*p. 449 In the solution to Problem 19.2(b), the alternate name of the compound is diisopropyl ketone. (The final “l” is omitted from the “diisopropyl.”)

p. 452 In the solution to Problem 19.13(c), the cross-reference to Study Guide Link 10.1 on line 2 should be to p. 187, not p. 87.

## Chapter 21

p. 521 In the solution to Problem 21.17, delete the oxygen between the methyl and the sulfur. The graphic for this problem should be as follows:



## Chapter 22

p. 556 In the first display at the top of the page (Item B. 1. A.), the product of the second reaction should be the malonate anion,  $\text{:}^-\text{CH}(\text{CO}_2\text{Et})_2$  rather than diethyl malonate itself.

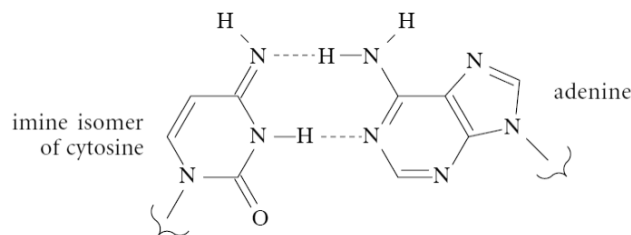


p. 561 In the solution to Problem 22.15, the name of the compound (in both the statement and the caption) should be 2,5-hexanedione.

### Chapter 25

\*p. 690 The solution to Problem 25.48(a) was omitted. The solution is as follows:

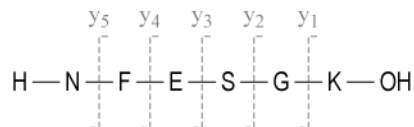
The pairing of an imine isomer of C with A:



### Chapter 26

\*p. 705 The statement of Problem 26.25(b) on text p. 1303 has been corrected, and the answer to the corrected problem is as follows:

26.25 (b) The fragmentation occurs in the following way.



The " $H_2$ " at the amino terminus of each fragment that follows represents two protons added to the residue itself to give the protonated terminal amino group indicated in the problem. For example, the residue mass for K includes a terminal  $\text{—NH—}$ ; a K residue with an amino group at the amino terminus is then  $HK$ ; and a protonated amino-terminal K residue is  $H_2K$ , with a positive charge on the nitrogen. The following fragments should be observed:

$$[H_2K\text{—OH}]^+ \Leftrightarrow 147.1 = y_1$$

$$[H_2G\text{—K—OH}]^+ \Leftrightarrow 204.1 = y_2$$

$$[H_2S\text{—G—K—OH}]^+ \Leftrightarrow 291.1 = y_3$$

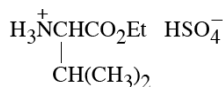
$$[H_2E\text{—S—G—K—OH}]^+ \Leftrightarrow 420.1 = y_4$$

$$[H_2F\text{—E—S—G—K—OH}]^+ \Leftrightarrow 567.2 = y_5$$

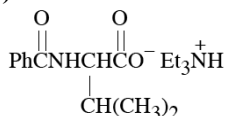
$$[H_2N\text{—F—E—S—G—K—OH}]^+ \Leftrightarrow 681.2 = M + 1$$

\*p. 709 The solution to Problem 26.37 for the amino acid valine was omitted. The solutions is as follows:

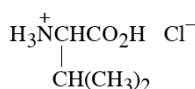
26.37 (a)



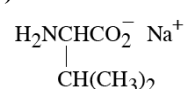
(b)



(c)

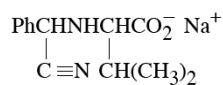


(d)

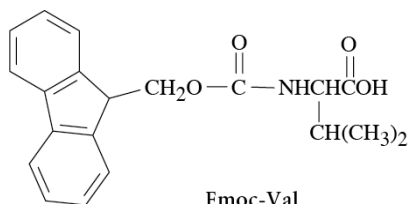


The reaction in (e) is a variation of the first reaction of the Strecker synthesis in which an amine—in this case, the amino acid valine—rather than ammonia is the source of nitrogen. (See Eq. 26.13 on text p. 1280.)

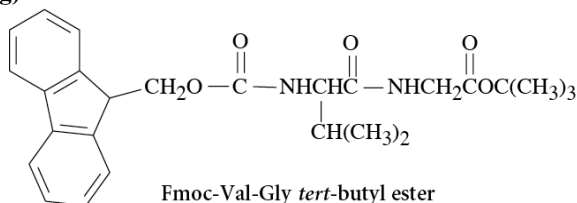
(e)



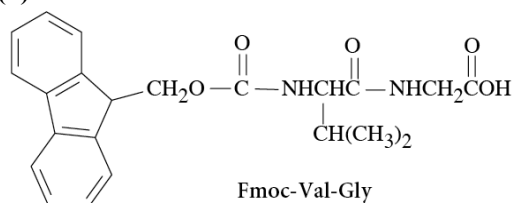
(f)



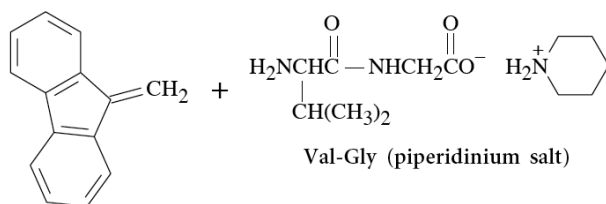
(g)



(h)

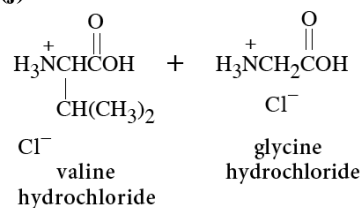


(i)



(reacts further with piperidine)

(j)



\*p. 711

In the solution to Problem 26.46(a), one mass unit should be added to each of the first set of peptides to account for the extra hydrogen—that is, an  $\text{H}_2\text{N}$ — group—at the amino terminus of each. In other words, a hydrogen must be added to the *residue mass*, which only accounts for an  $\text{—NH—}$  group. The corrected set should read as follows:

$$\text{H—A-I-G-A-R}\cdot\text{H}^+\text{—OH} \Rightarrow m/z = 1.0 + 71.0 + 113.1 + 57.0 + 71.0 + 156.1 + 18.0 = 487.2 = M + 1$$

$$[\text{H—A-I-G-A-R}]^+ \Rightarrow m/z = 1.0 + 71.0 + 113.1 + 57.0 + 71.0 + 156.1 = 469.2$$

$$[\text{H—A-I-G-A}]^+ \Rightarrow m/z = 1.0 + 71.0 + 113.1 + 57.0 + 71.0 = 313.1$$

$$[\text{H—A-I-G}]^+ \Rightarrow m/z = 1.0 + 71.0 + 113.1 + 57.0 = 242.1$$

$$[\text{H—A-I}]^+ \Rightarrow m/z = 1.0 + 71.0 + 113.1 = 185.1$$

$$[\text{H—A}]^+ \Rightarrow m/z = 1.0 + 71.0 = 72.0$$