

Errata for the Fourth edition of Physics for the Biological Sciences by Hallett, Hunt, McFarland, Renninger, Stinson and Sullivan.

Last updated September 28, 2006 (changes in red):

Pg 1-3 1st paragraph 3rd line, laga should read **large**

Pg I-7, index, “Siemen (unit)” should be “Siemens (unit)”

Pg 2-6 Reference to 2-2 should be 2-3

Pg 3-4

X-rays: With wavelengths between **approximately** 10^{-8} m ...

Ultraviolet (UV) rays: These wavelengths lie between **about** 4×10^{-7} m and 10^{-8} m (**400** nm and 10 nm) ...

Visible light: This narrow region ... vision. The wavelength range is **roughly** from 4×10^{-7} m

Infrared: In the wavelength region from approximately 6.9×10^{-7} m (**690** nm) to ...

Pg 3-20, Table 3-3, line 2, column 2, “56.6” should be “**57.6**”

Pg 3-38, problem 3-5, last line, “ r_2 ” should be “ **r_1** ”

Pg 4-12, figure 4-4 as well as page 4-17, figure 4-10 and page 4-45, problem 4-13, the shown structure of the retinal is incorrect, as it should have H instead of CH_3 at C_3 and misses two CH_3 groups in the ring. Please see Figure 5-6 (page 5-5) for the correct structure of retinal, in which all C- CH_3 bonds are shown as lines pointing away from the ring and the backbone.

Pg 4-22, 3rd line after example 4-7, states that “absorption peak in retinal is at 510 nm”, but in fact the position of this peak is highly dependent on the environment and ranges from 360 nm in organic solvents to 630 nm in proteins.

Pg 4-22, 4th line of section 4.7, “Fig. 4-12a” should be “Fig. 4-12**b**”

Pg 4-29, 1st paragraph, 2nd and 3rd line state that “For chlorophyll a the peak of the absorption is at 428 nm”, but in fact, that peak corresponds to the transition to higher excited states, which is normally forbidden for other molecules. The absorption peak corresponding to the transition to the lowest excited state is at ~660 nm, as stated in Example 4-10.

Pg 4-29, 4th paragraph, 2nd line, “Hydrogen lamps are usually used” should be “Hydrogen, **mercury, or xenon** lamps are usually used”

Pg 4-31, figure 4-18, “ I_x-dI ” should be “ I_x+dI ”

Pg 4-41, 2nd paragraph, 3rd last line, states that “this [singlet] state has little chance to react”, but there are exceptions to this rule. In rhodopsins, the photochemical reaction of retinal isomerization is very fast ($<10^{-12}$ s) and proceeds from the singlet excited state.

Pg 4-45, figure for problem 4-11, the position of the thin arrow is at $3/8\lambda$, as stated in the study guide.

Pg 4-45, problem 4-13, last line. Please add the sentence “Ignore the effect of the bond angles.”

Pg 4-45, question 4-16, “four diagrams” should be “six diagrams”

Pg 4-47 Answer to problem 4.13 is missing units:
It should be

$$\begin{aligned} |\psi|^2 &= \frac{2}{\ell} \sin^2 \left(\frac{n\pi x}{\ell} \right) \\ &= \frac{2}{11(0.15 \text{ nm})} \sin^2 \left(\frac{(1)\pi \left(\frac{3}{11} \ell \right)}{\ell} \right) \\ &= 0.69 \text{ nm}^{-1} \end{aligned}$$

Pg 5-8

The extinction coefficient of rhodopsin is

$$\begin{aligned} \varepsilon &= 5.2 \times 10^4 \frac{L}{\text{mol cm}} \\ &\text{(not } 10^{-4} \text{)} \end{aligned}$$

Pg 6-22, example 6-8, 5th line from the end of the example, “number of atoms is” should be “number of atoms **which will eventually decay in the individual’s body** is”

Pg 6-25, example 6-10, 3rd line, “The range of” should be “The penetration depth of”

Pg 6-28, second paragraph, 4th line from the end, “Alpha-emitters are use” should be “Alpha-emitters are used”

Pg 7-21

Eq. [7-27b] should have a + sign, not a – sign.

$$\vec{v}_{AC} = \vec{v}_{AB} + \vec{v}_{BC}$$

Pg 7-22 Example 7-9 Solution should have a + sign, not a – sign.

$$\vec{v}_{BS} = \vec{v}_{BW} + \vec{v}_{WS}$$

Pg 7-27 Problem 7-26 The 3rd line of the question states “..and direction 47.0E measured from...” That should be “..and direction 47.0° measured from...”

Pg 9-43, Question 9-13, third line, “rads” should be “rad/s”

Pg 12-25 In Fig. for problem 12-7, replace $A_1 = (1/2)A_2$ with $A_2 = (1/2)A_1$

Pg 12-26 12-8 should read 2.00×10^4 Pa, **not 10^5**

Pg 13-38, 2nd last line before Example 13-13, “25.5 atm” should be “25.3 atm”

Pg 15-17, box 15-2, 5th line, “in place of siemen” should be “in place of siemens”

Pg 15.25, second answer 15-14, " $1.2 \times 10^2 \Omega$ " should be " $3.8 \times 10^2 \Omega$ "

Pg 15-25, answer 15-7, " 0.50Ω " should be " 0.50 A "