

Textbook Errata

Pg 6-7. Electron, Proton, and neutron masses are inconsistent with the table in the Appendix. Use the values in the Appendix.

Pg 9. Example 2.2 solution equation

$$m(O) = \frac{1}{100} \left[\gamma(^{16}O) \cdot m(^{16}O) + \gamma(^{17}O) \cdot m(^{17}O) + \gamma(^{18}O) \cdot m(^{18}O) \right]$$

Pg 10. The first equation has the exponent missing a minus sign. The mass should be 1.99268×10^{-23} g.

Pg 14. In Eq. (2.13) E should be E_{total} , in order to match the text above it. Regardless, a photon has no rest mass, so kinetic energy equals the total energy.

Pg 15. Equation 2.19 is missing the powers on the energy terms. The correct equation is:

$$\lambda = \frac{hc}{\sqrt{E_{total}^2 - E_{rest}^2}}$$

Pg 20. Last sentence of second paragraph up from bottom of the page. Should read "Since the daughter nucleus produced in electron capture is the same as the nucleus formed in β^+ -decay, these two processes often compete with one another."

Pg 31. Figure 2.8, the ordinate axis should have a 7 between the 6 and 8.

Pg 46. In problem 6 the third line of the table is for ^{238}U not ^{235}U .

Pg 64. The upper value on the ordinate axis of figure 3.4 should be 10^1 , not 10^a .

Pg 67. The third line of text in example 3.9 should read "is known at" not "is known as".

Pg 69. The brackets in equation 3.28 are incorrect. It should be:

$$E' = \frac{E}{(A+1)^2} \left[\cos \vartheta + \sqrt{A^2 - \sin^2 \vartheta} \right]^2$$

Pg 82. Many of the values in Table 3.4 are inconsistent with the tables in the Appendix. Use the values in the Appendix.

Pg 92. The comments under figure 3.16 should refer to Eq. (3.59), not Eq. (3.53).

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Pg 103. Equation 3.79 has a large blank space that is misleading it should read as,

$$R = R_a \left(\frac{\rho_a}{\rho} \right) \sqrt{\frac{M}{M_a}} = 3.2 \times 10^{-4} \frac{\sqrt{M}}{\rho} R_a.$$

Pg 105. Equation 3.82, the exponent in Eq. (3.72) should be negative. $I = I_0 e^{-\left(\frac{\mu}{\rho}\right)(\rho x)}$.

Pg 157. The values in Table 4.2 are missing.

Pg 237. Equation (5.19) is missing a minus sign and should read $\nabla^2 \phi - \frac{1}{L^2} \phi = \frac{-s}{D}$.

Pg 252. At the end of the first paragraph of section 5.9 should read "... Maxwellian Function (see Section 2.13)," not "... (see Section 2.12)," Also, both Eqns. (5.49) and (5.51) are missing an energy term E in them. These equations should read:

$$\phi(E) = n(E)v(E) = \frac{2\pi nE}{(\pi kT)^{3/2}} \left(\frac{2}{m}\right)^{1/2} e^{-E/kT}, \text{ and}$$

$$\phi_T = \frac{2\pi n}{(\pi kT)^{3/2}} \left(\frac{2}{m}\right)^{1/2} \int_0^\infty E e^{-E/kT} dE = \frac{2n}{\sqrt{\pi}} \left(\frac{2kT}{m}\right)^{1/2} \text{ respectively.}$$

Pg 254. On the 10th line of text the reference to Eq. (3.38) should be Eq. (3.44).

Pg 255. On the third line from the top the diffusion coefficient D should be \bar{D} to indicate that it has been averaged over the thermal group.

Pg 258. Equation (5.67) is missing a minus sign and should read $\nabla^2 \phi_T - \frac{1}{L_T^2} \phi_T = \frac{-\Sigma_1 \phi_1}{\bar{D}}$.

Pg 265. problem #26 Should read, "Calculate for natural uranium at room temperature . . ."

Pg 267. Table 6.1, the first element of the last row should read ²³⁹Pu not ²³⁹P.

Pg 268. The first equation on the page is missing a v. It should read: $B^2 = \frac{1}{D} \left(\frac{1}{k} v \Sigma_f - \Sigma_a \right)$.

Pg 268. Paragraph beginning "Physically, Eq. (6.6) may be interpreted as follows." Change sentence 3 to read "Since all neutrons in a generation are either absorbed or leak from the reactor, then the denominator must also be equal to the number born in the previous generation."

Pg 267 and pg 271. The right hand side of Eq. 6.1 and the equation at the top of pg 271 should be positive.

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Pg 270. In example 6.1 the first two equations have errors these should read,

$$f = \frac{\Sigma_{aF}}{\Sigma_a} = \frac{\Sigma_{aF}}{\Sigma_{aF} + \Sigma_{aS}}, \text{ not } f = \frac{\Sigma_{aF}}{\Sigma_a} = \frac{\Sigma_{aF}}{\Sigma_{aF} + \sigma_{aS}}, \text{ and}$$

$$f = \frac{1}{1 + \Sigma_{aS}/\Sigma_{aF}} = \frac{1}{1 + N_S \sigma_{aS}/N_F \Sigma_{aF}}, \text{ not } f = \frac{1}{1 + \Sigma_{aF}/\Sigma_{aF}} = \frac{1}{1 + N_S \sigma_{aF}/N_F \Sigma_{aF}}.$$

Pg 276. The equation at the top of the page should read

$$\phi = A \frac{\sin Br}{r} + C \frac{\cos Br}{r}, \text{ not } \phi = A \frac{\sin BR}{r} + C \frac{\cos BR}{r}, \text{ and Eq. (6.31) should read}$$

$$\phi = A \frac{\sin Br}{r}, \text{ not } \phi = A \frac{\sin BR}{r}.$$

Pg 277. If d is small, making the small reactor approximation, Eq. (6.35) should read

$$\phi = \frac{P}{4E_R \Sigma_f R^2} \frac{\sin(\pi r/R)}{r} \text{ not } \phi = \frac{P}{4E_R \Sigma_f R^2} \frac{\sin(\pi r/\tilde{R})}{r}.$$

Pg 278. Equation (6.39) should read $\phi(\tilde{R}) = AJ_0(B\tilde{R})$ not $\phi(\tilde{R}) = AJ_0(Br)$.

Pg 279. The integral formula should read $\int_0^x J_0(x')x' dx' = xJ_1(x)$ not $\int xJ_0(x')x' dx' = xJ_1(x)$. In the next the 1.35 factor should read 1.36 and finally in Eq. (6.42) the factor 0.738 should read 0.737.

Pg 280. The buckling in the second equation that varies with z should be set as B_z^2 not B^2 . Also the caption for Table 6.2 should read "...(Assuming d is small)" not "...(Assuming D is small)".

Pg 284. The answer in the 5th equation should read: $\tilde{R}_c = \pi \sqrt{\frac{384}{261-1}} = 48.5 \text{ cm}$.

Pg 293. Equation (6.86) should read $m_F = Z \frac{\bar{\sigma}_{aM} VM_F N_M}{\bar{\sigma}_{aF} N_A}$ not $m_F = Z \frac{\bar{\sigma}_{aM} VM_F}{\bar{\sigma}_{aF} N_A}$.

Pg 294. In the solution to example 6.5 line 1, B_2 should read B^2 .

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Pg 296. In the second paragraph the relationship $H = 1.82R$ should read $H = 1.85R$ or

$$\frac{H}{R} = \sqrt{2\pi}/J_0^{-1}(0).$$

Pg 299. The second term on the right hand side of Eq. (6.98) should be squared. This equation

should read $AD_c \left(\frac{B \cos BR}{R} - \frac{\sin BR}{R^2} \right) = -AD_r \left(\frac{1}{RL_r} - \frac{1}{R^2} \right) e^{-R/L_r}$.

Pg 304. In the second line, the fuel absorption cross section should read 687 b, not 681 b.

Pg 316-318. In Eq. (6.119), Table 6.6, twice in the text on page 317, and once on page 318 the symbol ζ_M is used to denote a change in lethargy rather than the previously defined symbol ξ_M .

Pg 436. The solution to Example 8.7 in the second part is missing a “T” in the equation for the maximum clad temperature.

Pg 475. Equation 9.10 should read: $\dot{H} = \dot{D}xW_R$.

Pg 500. The information for nuclear power plants here is outdated. If you live within 50 miles of a power plant you will receive approximately 0.009 mrem in addition to the other natural and man made sources. This value was provided by the EPA as of Dec. 3, 2002. Worker doses at nuclear power plants individual dose is 200 mrem and is decreasing as of the year 2000. Smokers doses are estimated by the Department of Energy are 1300 mrem.

Pg 526. In Eq. 9.44 and 9.45, the exponents should be negative.

Pg 538. The solution to Example 10.5 in the next to last line of the text should read “and so $\Sigma_{RT} = \dots$ ”

Pg 592. The equation in the middle of the page should have the quantity in brackets squared.

Pg 738. The isotopic abundances for ${}^6\text{Li}$ and ${}^7\text{Li}$ should be 7.42 a/o for ${}^6\text{Li}$ and 92.5 a/o for ${}^7\text{Li}$. Also, the second ${}^{12}\text{C}$ should read ${}^{13}\text{C}$. In addition, the note on σ_f in the last column should refer to the 0.0253 eV comment, not the 1/v comment. The symbol “ \ddagger ” should read “ \dagger ”.

Pg 740. The scattering cross-section for Hydrogen in Table II.3 is 21.0 barns, not a blank.

Pg 759. the J_0x Bessel function is incorrect in two places. The correct evaluations should read $J_0(1.0) = 0.7652$ not 0.7625 and $J_0(3.4) = -0.3643$ not -0.6343.