$$\frac{C_x - C_0}{C_s - C_0} = 1 - \operatorname{erf}\left(\frac{x}{2\sqrt{Dt}}\right)$$
$$\frac{4.0 \times 10^{23} \,\mathrm{m}^{-3} - 0}{1.0 \times 10^{25} \,\mathrm{m}^{-3} - 0} = 1 - \operatorname{erf}\left(\frac{x}{2\sqrt{Dt}}\right)$$

which reduces to

$$0.9600 = \operatorname{erf}\left(\frac{x}{2\sqrt{Dt}}\right)$$

In order to solve this expression for a value  $\frac{x}{2\sqrt{Dt}}$  of it is necessary to interpolate using data in Table 5.1. Thus

<u>z.</u>	erf(z)
1.4	0.9523
Z.	0.9600
1.5	0.9661

z - 1.4	0.9600 - 0.9523
1.5 - 1.4	0.9661 - 0.9523

From which, z = 1.4558; which is to say

$$1.4558 = \frac{x}{2\sqrt{Dt}}$$

Inasmuch as there are 3600 s/h (= t) and  $x = 0.2 \ \mu m$  (= 2 x 10<sup>-7</sup> m) the above equation becomes

$$1.4558 = \frac{2 \times 10^{-7} \text{ m}}{2\sqrt{(D)(3600 \text{ s})}}$$

which, when solving for the value of D, leads to

$$D = \frac{1}{3600 \text{ s}} \left[ \frac{2 \times 10^{-7} \text{ m}}{(2)(1.4558)} \right]^2 = 1.31 \times 10^{-18} \text{ m}^2/\text{s}$$

Excerpts from this work may be reproduced by instructors for distribution on a not-for-profit basis for testing or instructional purposes only to students enrolled in courses for which the textbook has been adopted. Any other reproduction or translation of this work beyond that permitted by Sections 107 or 108 of the 1976 United States Copyright Act without the permission of the copyright owner is unlawful.