

CHAPTER 1 SOLUTIONS

Answers reported to 2-3 significant digits.

1.1

$$a) 10 \frac{m^2 \cdot J \cdot s}{s^3} \left(\frac{m^2 \cdot J \cdot s}{32.174 \cdot J \cdot s} \right) = 0.31 J \cdot s$$

$$10 \frac{m^2 \cdot J \cdot s}{s^3} \left(\frac{1kg}{2.20462 \cdot J \cdot s} \right) \left(\frac{12 \cdot 54 \text{cm}}{1 \text{m}} \right) \left(\frac{2.54 \text{cm}}{1 \text{m}} \right) \left(\frac{1000 \text{N}}{1 \text{kg}} \right) = 1.4 \times 10^6 \frac{\text{J} \cdot \text{cm}^3}{\text{s}^3} = 1.4 \times 10^6 \text{ dyne}$$

$$b) 204 \cdot Pa \left(\frac{1000 \cdot Pa \cdot m}{10 \cdot Pa} \right) \left(\frac{1 \text{m}}{1.01325 \times 10^6 \cdot Pa} \right) = 0.20 \text{m}$$

$$204 \cdot Pa \left(\frac{14.696 \frac{J \cdot s}{m^2}}{101.3256 \cdot Pa} \right) = 2.9 \frac{J \cdot s}{m^2}$$

$$c) T(^{\circ}F) = 1.8T(^{\circ}C) + 32$$

$$70^{\circ}F = 1.8T(^{\circ}C) + 32$$

$$T(^{\circ}C) = 21^{\circ}C$$

$$T(^{\circ}F) = 1.8T(K) + 459.67$$

$$70^{\circ}F = 1.8T(K) + 459.67$$

$$T(K) = 294K$$

$$d) 100 \frac{m^2 \cdot J \cdot s}{s^3} \left(\frac{1kg}{2.20462 \cdot J \cdot s} \right) \left(\frac{2.54 \text{cm}}{1 \text{m}} \right)^2 \left(\frac{1 \text{m}}{100 \text{cm}} \right)^2 = 0.029 \frac{kg \cdot m^2}{s^3}$$

$$\frac{kg \cdot m^2}{s^3} = N \cdot m = J$$

$$0.029 \frac{kg \cdot m^2}{s^3} = 0.029J$$

$$0.029J \left(\frac{0.23904 \text{cal}}{1J} \right) = 0.0070 \text{cal}$$

$$e) m = 1500 \cdot J$$

$$m = m \cdot g = 1500 \cdot J \left(32.174 \frac{J}{s^2} \right) \left(\frac{m^2 \cdot J \cdot s}{32.174 \cdot J \cdot s - J^2} \right) = 1500 \cdot J$$

Bioengineering Fundamentals Solution Manual

R. Praveen Kumar, B. Bharathiraja

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Solution's Manual - Basic Transport Phenomena in Biomedical Engineering Taylor & Francis Group, 2012-01-15

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