27. $v_t = 1630$ m/s; $T = 5.78 \times 10^5$ s
29. Jupiter ($m = 1.9 \times 10^{27}$ kg)
33. $\mathbf{F_2}$
37. 26 N•m
39. 12 m/s
41. 220 N
43. 1800 N•m
45. 2.0×10^2 N
47. 72%
49. **a.** 2.25 days
b. 1.60×10^4 m/s
51. **a.** 6300 N•m
b. 550 N
53. 6620 N; no ($F_c = 7880$ N)

CHAPTER 8

Practice A, p. 279

1. **a.** 3.57×10^3 kg/m^3
b. 6.4×10^2 kg/m^3
3. 9.4×10^3 N

Practice B, p. 282

1. **a.** 1.48×10^3 N
b. 1.88×10^5 Pa
3. **a.** 1.2×10^3 Pa
b. 6.0×10^{-2} N

8 Review, pp. 288–291

9. 2.1×10^3 kg/m^3
15. 6.28 N
21. 1.01×10^{11} N
23. 6.11×10^{-1} kg
25. 17 N, 31 N
27. **a.** 1.0×10^3 kg/m^3
b. 3.5×10^2 Pa
c. 2.1×10^3 Pa
29. 1.7×10^{-2} m
31. 0.605 m
33. 6.3 m
35. **a.** 0.48 m/s^2
b. 4.0 s
37. 1.7×10^{-3} m

CHAPTER 9

Practice A, p. 303

1. −89.22°C, 183.93 K
3. 37.0°C, 39°C
5. −195.81°C, −320.5°F

Practice B, p. 311

1. 755 J
3. 0.96 J

Practice C, p. 316

1. 47°C
3. 390 J/kg•°C

9 Review, pp. 322–325

9. 57.8°C, 331.0 K
25. **a.** 2.9 J
b. It goes into the air, the ground, and the hammer.
31. 25.0°C
33. **a.** $T_R = T_F + 459.7$, or $T_F = T_R - 459.7$
b. $T = \frac{5}{9} T_R$, or $T_R = \frac{9}{5} T$
35. **a.** $T_{TH} = \frac{3}{2} T_C + 50$, or $T_C = \frac{2}{3}(T_{TH} - 50)$
b. −360° TH
37. 330 g
39. 5.7×10^3 J/min = 95 J/s

CHAPTER 10

Practice A, p. 338

1. **a.** 6.4×10^5 J
b. -4.8×10^5 J
3. 3.3×10^2 J

Practice B, p. 346

1. 33 J
3. 1.00×10^4 J
5. 1.74×10^8 J

Practice C, p. 355

1. 0.1504
3. **a.** 0.247
b. 4.9×10^4 J
5. 755 J

10 Review, pp. 360–363

3. b, c, d, e
9. 1.08×10^3 J; done by the gas
15. **a.** none (Q, W, and $\Delta U > 0$)
b. $\Delta U < 0$, $Q < 0$ for refrigerator interior ($W = 0$)
c. $\Delta U < 0$ ($Q = 0$, $W > 0$)
17. **a.** 1.7×10^6 J, to the rod
b. 3.3×10^2 J; by the rod
c. 1.7×10^6 J; it increases
27. 0.32
29. **a.** 188 J
b. 1.400×10^3 J

CHAPTER 11

Practice A, p. 371

1. **a.** 15 N/m
b. less stiff
3. 2.7×10^3 N/m

Practice B, p. 379

1. 1.4×10^2 m
3. 3.6 m

Practice C, p. 381

1. 2.1×10^2 N/m
3. 39.7 N/m
5. **a.** 1.7 s, 0.59 Hz
b. 0.14 s, 7.1 Hz
c. 1.6 s, 0.62 Hz

Practice D, p. 387

1. 0.081 m ≤ λ ≤ 12 m
3. 4.74×10^{14} Hz