

Appendix B:

SELECTED ANSWERS

Chapter 1

1. 884 m
3. a) 10.7 s
5. -9.00 m/s^2
7. a) 2.2 m/s
9. a) 28.3 m/s
11. 0.36 s
13. 25.9 m
- A1. $3.78 \times 10^8 \text{ m}$
- A3. a) 16.61 m/s
b) 37.16 mi/h
- A5. Tortoise wins by 47 s
- A7. 5 s
- A9. -19 500 m
- A13. a) 1.11 s
b) The same
- A15. 3.9 m/s^2

Chapter 2

1. 145 km south
3. 50. N forward
5. 175 m/s northeast
7. 6360 km
9. Horizontal: 752 N
Vertical: 274 N
11. 40.0 m/s
13. 37° to horizontal
15. 465 m
- A1. a) 1450 km south
b) 1650 km
- A3. 4.1 m/s
 76° east of north
- A5. 14.1 m
 45° north of west
- A7. Horizontal: 50. N
Vertical: 42 N
- A9. 4.2 m
- A11. 13.4 m/s
- A13. 1.2 m (does not clear)

Chapter 3

3. 4500 N
5. a) -34 000 N
7. 102 N
9. a) 78 N
11. 0.20
13. 14.5 N
15. 10 600 N
17. 1860 N
19. Culp: $1.5 \times 10^7 \text{ N/m}^2$
Vance: $1.0 \times 10^6 \text{ N/m}^2$
21. a) $.0079 \text{ m}^2$
b) 0.050 m
- A1. 50. N
- A3. -1400 N
- A5. 100 N
- A7. 0.20
- A9. 17.7 N

- A11. 625 N
- A13. 0.080 N
- A15. a) 37 500 N
b) 75 000 N/m^2

Chapter 4

1. $4.91 \times 10^9 \text{ kg}\cdot\text{m/s}$
3. a) 3750 N
b) $1.5 \times 10^6 \text{ N}$
c) 400 times as great
5. 11.3 m/s
7. a) 9.0 m/s
9. 10. m/s
11. 215 m/s
13. 9.42 m/s
- A1. $1470 \text{ kg}\cdot\text{m/s}$
- A3. 6080 N
- A5. 50 000 N
- A7. 1.04 m/s
- A9. -0.22 m/s
- A11. 17 004 m/s

Chapter 5

1. a) 1430 J
3. 4 N
5. 600 J
7. 17.4 m/s
9. 24.5 m/s
11. 7.7
13. 280 N
15. a) 6.0
b) 4.4
c) 73%
- A1. 18 800 J
- A3. a) 1 610 000 J
b) 53 700 W
c) 1 040 000 J
- A5. 12 J
- A7. a) 1.6 J
- A9. 15 200 m
- A11. 38
- A13. 3

Chapter 6

1. 0.034 s
3. a) 1.6 m/s
5. a) 0.63 m/s
7. a) Jessica: 1.3 m/s
Julie 0.94 m/s
b) 0.15 m/s^2
9. 2.5 m/s
11. $1.50 \times 10^{-15} \text{ N}$
13. 0.12 N·m
15. a) 17 N up
17. Anita: 384 N up
Orin: 246 N up
19. $9.74 \times 10^{37} \text{ kg}\cdot\text{m}^2$
21. $5.4 \times 10^{-8} \text{ kg}\cdot\text{m}^2$

23. 5.6 m/s
- A1. 0.6 s
- A3. 3.8 m
- A5. a) 2.2 m/s
b) 35 N
- A7. a) $5.9 \times 10^{-3} \text{ m/s}^2$
b) $3.5 \times 10^{22} \text{ N}$ toward sun
c) $3.5 \times 10^{22} \text{ N}$ toward Earth
- A9. Outstretched: 12 N·m
Bent: 5.6 N·m
- A11. $1.5 \times 10^{-4} \text{ kg}\cdot\text{m}^2$
- A13. 18 m/s

Chapter 7

1. Twice as large.
3. a) $9.78 \times 10^{-8} \text{ N}$
b) $1.63 \times 10^{-8} \text{ N}$
5. $4.2 \times 10^{21} \text{ m}$
7. $1.67 \times 10^{-9} \text{ m/s}^2$
9. a) $9.9 \times 10^{30} \text{ kg}$
b) 5.0 times
11. a) 618 000 m/s
13. a) $2.58 \times 10^{-4} \text{ m/s}$
- A1. 1/8100
- A3. $4.1 \times 10^{-47} \text{ N}$
- A5. a) $1.66 \times 10^{-3} \text{ N}$
- A7. a) $4.9 \times 10^{23} \text{ kg}$
- A9. $1.33 \times 10^{-9} \text{ m/s}^2$
- A11. a) 1340 N
b) 3560 m/s

Chapter 8

1. 2 m/s
3. 28 h
5. Albert 33 y
Henry 39.6 y
7. 13.0 m
9. a) 94 450 km
11. $1.0 \times 10^{-3} \text{ kg}$
- A1. 15 m/s same direction
- A3. 8.3 y
- A5. 1390 m
- A7. 10^{68} J

Chapter 9

1. a) $710. \text{ kg/m}^3$
3. $1.76 \times 10^{-3} \text{ kg}$
5. $1.3 \times 10^8 \text{ N/m}^2$
7. $5.3 \times 10^{-3} \text{ m}^2$
9. a) $3.0 \times 10^{-6} \text{ m}$
11. $4.2 \times 10^6 \text{ Pa}$
13. 1330 kg/m^3
15. 1.61 N
17. 0.50 m
19. Decreases by 314 m^3
21. 0.015 m^3
- A1. 880 kg/m^3

- A3. Silver: $10\,500\text{ kg/m}^3$
 Earth: 5540 kg/m^3
 A5. $1.5 \times 10^{-3}\text{ m}$
 A7. b) 21 m
 A9. a) $9.0 \times 10^3\text{ N}$
 b) 10. N
 A11. a) 3.03 times bigger

Chapter 10

1. 122°F
 3. a) -148°C
 b) -234°F
 5. 437°C
 7. b) $3.96 \times 10^{-4}\text{ m}^3$
 9. 347 000 J
 11. 31.8°C
 13. 9630 J
 15. $3.9 \times 10^6\text{ J}$
 A1. Hottest: 462°C
 Coldest: -218°C
 A3. $2.0 \times 10^{-3}\text{ m}$
 A5. $3.1 \times 10^{-4}\text{ m}^2$
 A7. 1990 cm^3
 A9. 79.7°C
 A11. 0.019 kg
 A13. 1300 J

Chapter 11

1. 0.67 s
 3. a) 200 N/m
 5. a) 0.63 s
 7. 2 s
 9. a) 3.1 s
 11. 0.65 m
 A1. 0.0023 s
 A3. 20 N/m
 A5. a) 0.5441 s
 A7. 6.28 s
 A9. b) 0.0400 m

Chapter 12

1. 0.013 m
 3. 0.4 m/s
 5. 188 Hz
 7. b) -5.26 m/s
 9. 813 Hz
 11. 0.300 m
 13. 394.0 Hz
 A1. 0.0085 m
 A3. a) 0.688 m
 A5. 40 m
 A7. a) Toward: 501.5 Hz
 Away: 498.5 Hz
 b) 3.0 Hz
 A9. 15.0 m/s
 A11. 20.4 m/s
 A15. 628 m/s

Chapter 13

1. 19 700 s
 3. $3.80 \times 10^{-7}\text{ m}$
 5. 40°
 7. a) -36 cm
 9. 28.9°
 11. 1.39
 A1. 260 s

- A3. 20°
 A5. c) -12.0 cm
 A7. a) ∞
 A9. b) alcohol: $2.21 \times 10^8\text{ m/s}$
 water: $2.26 \times 10^8\text{ m/s}$
 A11. 20.7°
 A13. a) 42.5°

Chapter 14

1. 11.1 cm
 3. a) 0.0508 m
 5. a) 20 times
 b) 30 cm
 7. 8 times
 9. b) 2.7 diopters
 11. 0.40 m
 13. a) $8.8 \times 10^{-4}\text{ m}$
 15. $2.4 \times 10^{-6}\text{ m}$
 A1. 12.0 cm
 A3. 2.4 cm
 A5. 24 cm
 A7. 0.17 m
 A9. a) -4.0 diopters
 b) 0.29 m
 A11. -0.17 diopters
 A13. 7130 m

Chapter 15

1. $1.3 \times 10^{-3}\text{ N}$
 3. $7.0 \times 10^{-13}\text{ C}$
 5. 10. m
 7. $1.9 \times 10^{13}\text{ N/C}$
 9. $18 \times 10^5\text{ N/C}$ to the right
 11. 8800 V
 13. $4.0 \times 10^{-3}\text{ m}$
 A1. $1.5 \times 10^{-11}\text{ N}$
 A3. $4.2 \times 10^{-13}\text{ C}$
 A5. a) 0.043 m
 A7. $1.3 \times 10^7\text{ N/C}$
 A9. a) 0.14 m
 A11. 450 000 J
 A13. 600 000 V

Chapter 16

1. 10 800 s
 3. 27.5 Ω
 5. 1.52 V
 7. $2.0 \times 10^4\text{ V}$
 9. 0.8 A
 11. a) 240 V
 c) 18 A
 13. a) 1.5 A
 b) 80 Ω
 15. \$8.10
 17. a) 3 Ω
 b) 4 A
 19. Series: 10. V
 Parallel: 120 V
 21. a) 5 Ω
 b) 85 Ω
 A1. a) 15 600 s
 A3. 100. Ω
 A5. $5 \times 10^{-9}\text{ A}$
 A7. 14.17 A
 A9. $\$1.2 \times 10^6$

- A11. 0.25 A
 A13. a) 3.0 Ω
 b) 12 A

Chapter 17

1. $4.2 \times 10^{-14}\text{ N}$
 3. a) $6.0 \times 10^{-3}\text{ T}$
 5. a) Zero
 b) $1.4 \times 10^{-5}\text{ Wb}$
 7. $8.4 \times 10^{-8}\text{ V}$
 9. a) 12 V
 A1. $1.1 \times 10^{-10}\text{ N}$
 A3. $8.6 \times 10^{-14}\text{ N}$
 A5. a) $1.3 \times 10^{-3}\text{ N}$
 b) zero
 A7. a) $1.1 \times 10^{-5}\text{ V}$
 A9. a) 4800 V

Chapter 18

1. 2.15 eV
 3. 1040 nm
 5. 150 000 m/s
 7. a) 1.96 eV
 b) $5.22 \times 10^{-7}\text{ m}$
 9. 823 nm
 11. a) 657 nm Red
 b) 488 nm Greenish Blue
 c) 445 nm Violet
 13. 1.85×10^{16} atoms
 15. 1.13×10^{14} atoms
 A1. $2.9 \times 10^{20}\text{ Hz}$
 A3. 2.42 eV
 A5. $1.7 \times 10^{-19}\text{ m}$
 A7. Sodium: 1.68 eV Yes
 Iron: 0.244 eV Yes
 Gold: -0.676 eV No
 A9. 7.72 eV
 A11. 2.18×10^4 atoms
 A13. 8.18×10^{24} atoms