Chapter 19 Even Answers

2. (a) 1.06 atm (b) –124˚C
6. $T_C = (1.33°\text{C}/\text{S}°)T_S + 20.0°\text{C}$
8. (a) 1337 K, 2933 K (b) 1596 C˚=1596 K
10. 1.20 cm
12. (a) –179˚C (attainable) (b) –376˚C (below 0 K, unattainable)
14. 0.313 m
16. 0.548 gal
18. (a) 99.8 mL (b) about 6% of the acetone's volume change
20. (a) increase (b) 1.603 cm
22. 199 kN
24. (a) 437˚C (b) 3000˚C; No, aluminum melts at 660˚C.
26. 884 balloons
28. 1.61 MPa (15.9 atm)
30. (a) 900 K (b) 1200 K
32. (a) 1.17×10^{-3} kg (b) 11.5 mN (c) 1.01 kN
(d) The molecules must be moving very fast.
34. 7.11 m
36. $m_1 - m_2 = \dfrac{P_0 VM}{R}\left(\dfrac{1}{T_1} - \dfrac{1}{T_2}\right)$
38. between 10 and 100 kg
40. 2.41×10^{11} molecules
42. (a) 2.24 m (b) 9.16 atm
44. 0.523 kg
46. decreases by 0.0943 Hz
48. (b) $\alpha_{\text{glass}} << \beta_{\text{Hg}}$
50. (a) 0.169 m (b) 1.35×10^5 Pa
52. (a) $\theta = L_i(\alpha_2 - \alpha_1)\dfrac{\Delta T}{(r_2 - r_1)}$ (b) $\theta \to 0$ as $\Delta T \to 0$ or $\alpha_1 \to \alpha_2$
(c) It bends the other way.
54. (a) $A = 1.85 \times 10^{-3}/\text{C}°$, $R_0 = 50.0\ \Omega$ (b) 422˚C
56. (a) 0.340% (b) 0.480%
58. (b) $1.33\ \text{kg}/\text{m}^3$
60. (a) $P(N_2)$ = 79.1 kPa, $P(O_2)$ = 21.2 kPa, $P(Ar)$ = 940 Pa, $P(CO_2)$ = 33.3 Pa
(b) $1.22\ \text{kg}/\text{m}^3$ (c) 29.0 g/mol
62. $\beta_{\text{predicted}} = 3.66 \times 10^{-3}/\text{K}$; Experimentally $\beta_{\text{He}} = 3.665 \times 10^{-3}/\text{K}$, $\beta_{\text{air}} = 3.67 \times 10^{-3}/\text{K}$
64. $y = L\sqrt{2\alpha\,\Delta T}$
66. (a) 7.10 mm (b) 297 K (or 24˚C)
68. 125 N, -4.20×10^{-5} m
70. 4.54 m