Chapter 21 Even Answers

2. 3.65×10^4 N

4. $Nm\dfrac{2v \sin \theta}{t}$; $Nm\dfrac{2v \sin \theta}{A\,t}$

6. 5.05×10^{-21} J / molecule

8. 477 m / s

10. (a) 2.28 kJ (b) 6.22×10^{-21} J

14. 7.52 L

16. (a) 209 J (b) zero (c) 317 K

18. (a) 0.719 kJ / kg · K (b) 0.811 kg (c) 233 kJ (d) 327 kJ

20. $13.5PV$

22. (a) $C = \dfrac{n_1C_1 + n_2C_2}{n_1 + n_2}$ (b) $C = \sum_{i=1}^{m} n_iC_i \;/ \sum_{i=1}^{m} n_i$

24. (a) 0.118 (b) 2.35 (c) $Q = 0$, $\Delta E_{\text{int}} = 135$ J, $W = -135$ J

26. (a) 5.15×10^{-5} m^3 (b) 560 K (c) 2.24 K

28. (a) 28.0 kJ (b) 46.1 kJ
(c) Isothermal process, $P_f = 10.0$ atm; Adiabatic process, $P_f = 25.1$ atm

30. (b) $2.19V_i$ (c) $3T_i$ (d) T_i (e) $0.830P_iV_i$

34. more rotational and vibrational states

36. zero, 2.70×10^{20}

38. (a) 1.03 (b) ^{35}Cl

40. 132 m / s

42. (a) 2.01×10^4 K (b) 9.01×10^2 K

44. (a) 7.27×10^{-20} J / molecule (b) 2.21 km / s (c) 3510 K

46. (a) 5.63×10^{18} m, 1.00×10^9 yr (b) 5.63×10^{12} m, 1.00×10^3 yr

48. 193 molecular diameters

50. (a) 7.88×10^{26} molecules (b) 37.9 kg (c) 6.07×10^{-21} J / molecule
(d) 503 m / s (e) and (f) 7.98 MJ

52. (a) $3.65v$ (b) $3.99v$ (c) $3.00v$ (d) $106(mv^2 / V)$ (e) $7.98mv^2$

54. (a) See Instructor's manual (b) ≈ 510 m / s
(c) 575 m / s, 624 m / s, (d) 44%

56. (a) 0.514 m^3 (b) 2.06 m^3 (c) 2.38×10^3 K (d) 4.80×10^5 J (e) 2.28 MJ

58. (b) 344 m / s (c) v_{mp}, v_{av}, and v_{rms} are all somewhat larger

60. 0.296 C°

64. (b) 5.47 km

66. 1.60×10^4 K