Unit 6: Thermochemistry, States of Matter and Intermolecular Forces

Chapter 10: Causes of Change

10.1: Energy Transfer

(Practice on pg. 342)

1. 97 J **2.** 1.3 mol **3.** 2.2×10^2 J **4.** 197 K

(Section Review on pg. 344)

9. 29.2 kJ **10.** 14.6 kJ **11.** 0.52 mol **12.** 358 K
13. 295 K **14.** 0.234 J/(K • g) **15.** 0.864 J/(K • g) **18.** 100 J/(K • mol)
19. 0.6 J/(K • g)

10.2: Using Enthalpy

(Practice on pg. 346)

1. 2.60 kJ/mol **2.** 5.05 kJ/mol **3.** 3.6×10^2 J/mol

(Practice on pg. 347)

1. −2.56 kJ/mol **2.** -7.13×10^2 J/mol **3.** -2.8×10^2 J/mol

(Section Review on pg. 349)

4. −9.6°C or −9.6 K **5.** 3.2°C or 3.2 K; 120 J/mol **6.** −23.1°C or −23.1 K; −1.74 kJ/mol
7. 27.1°C or 27.1 K; 3.69 kJ/mol **8.** 186.9 J; −1.09 K **9.** 42.8 J/(K • mol)

10.3: Changes in Enthalpy During Chemical Reactions

(Practice on pg. 356)

1. −57.2 kJ **2.** −890.2 kJ

(Practice on pg. 357)

1. −1428.6 kJ; exothermic **2.** −64.5 kJ; exothermic

(Section Review on pg. 357)

1. 298.15 K **4.** $\Delta H = 178.5$ kJ/mol **5.** −818.6 kJ
6. Molar Enthalpy for the Vaporization of Water, $\Delta H_{vap} = 44$ kJ/mol

(Chapter Review on pg. 370−372)

22. 7.0 kJ **23.** 23 J **24.** −5.0 kJ **25.** −1.8 kJ **26.** −511.3 kJ **27.** −1637 kJ
28. $\Delta H = 470.5$ kJ for the equation (4 mol of Fe produced); $\Delta H_{rxn} = 117.6$ kJ/mol of Fe produced
29. −2813 kJ **36.** 40 kJ (not exothermic) **40.** −296.7 kJ/mol

(Standardize Test Prep on pg. 374 & 375)

1. B **2.** H **3.** C
4. Because the nitrogen molecule is the normal form of the element nitrogen, its standard enthalpy of formation is defined as zero.
5. Omit **6.** Omit **7.** Omit **8.** Omit **9.** Omit **10.** C
11. The molar heat capacity is about 25 J/(K• mol) for each atom in a mole of the ionic compound.
12. F **13.** 150.6 J

Chapter 11: States of Matter and Intermolecular Foces

(Chapter Review on pg. 408−411)
Answers to Phase Diagram problems are on pg. 879 (in the Appendix E section) of the textbook.

60. 100°C
61. Any coordinate in the liquid zone (for example: 50°C and 100 kPa)
62. Any coordinate on the liquid-vapour line (for example: 100°C and 101 kPa)
63. Any coordinate in the vapour zone (for example: 100°C, 0.61 kPa)
64. 101 kPa

(Standardize Test Prep on pg. 412 & 413)

1. D **2.** H **3.** C
4. The energy causes the molecules to move further apart as intermolecular attractions are broken.
5. All forces that affect the particles, even the London dispersion forces on non-polar molecules, involve the interaction of electrons and electrical charges.
6. Sublimation is a phase change between solid and gas phases. Like evaporation, it is an equilibrium process that is affected by the partial pressure of the vapour above the solid.
7. H **8.** D **9.** Omit **10.** G **11.** A **12.** Omit **13.** 373 K