

Unit XI Answers

Pg 344

8. 8. 6.3 J/mole K 9. 29.2 kJ 10. 14.6 kJ 11. 0.52 mole
12. 358 K 13. 295 K

Pg 349

4. -9.6 K 5. 3.2 K 6. 1.74 kJ/mole 7. 3690 J/mole
8. -1.09 K 9. 42.8 J/mole K

Pg 357

4. 178.5 kJ 5. -818.6 kJ
6. The molar enthalpy of vaporization for water.
7. Exothermic reactions are more likely to occur than endothermic reactions.

Pg 367

3. enthalpy – H, entropy – S, Gibbs Free Energy – G $\Delta G = \Delta H - T\Delta S$
4. ΔH negative, ΔS positive, ΔG negative
5. ΔH positive, ΔS negative, ΔG positive
6. ΔG can be calculated from ΔH and ΔS or from ΔG_f° values of products and reactants.
7. -146.5 J/K 8. -50.7 kJ
9. 182.1 kJ nonspontaneous 10. -120 kJ spontaneous 11. -60 kJ
12. The value must be positive and an amount more than 30 J/K

Pgs 370-374

27. 35.2J/mole K 28. 26 J/mole K 29. 7040 J 30. 23 J
31. -5030 J 32. -1800 J 33. -330 kJ; -180 kJ; -510 kJ
34. 470.5 kJ 35. 117.6 J 36. -2813 kJ 37. -663 J/K
38. 175 J/K 39. -345 kJ spontaneous
40. 11 kJ temperatures above 63 °C would be spontaneous 41. -227.9kJ spontaneous
42. -42 kJ, spontaneous
43. The energy values are usually listed per mole. The coefficients represent the mole ratios, so to determine the correct energy for the equation the coefficients must be multiplied by the energy values.
44. 40 kJ endothermic 45. -57 kJ 46. molar heat capacity requires moles, not mass.

47. positive
48. It has 4 times the number of atoms
49. As the temperature increases the $T\Delta S$ term becomes more important in $\Delta G = \Delta H - T\Delta S$
50. -296.7 kJ/mole
51. -184.614 kJ; yes
52. 2793 kJ/mole
53. 1) 115 kJ; nonspontaneous 2) -101 kJ; spontaneous 3) -310 kJ; spontaneous
54. $\Delta G = 474$ kJ and 196 kJ; neither would be spontaneous
55. 108.7 J/K