

1. 71 J
2. 42.9 °C
3. 1°C
4. -2060 kJ
5. 158.0 kJ
6. $-899.0 \frac{\text{kJ}}{\text{mol}}$
7. $-48.6 \frac{\text{kJ}}{\text{mol BaSO}_4}$
8. A) $5.96 \times 10^{14} \text{ s}^{-1}$ B) $-3.95 \times 10^{-19} \text{ J}$
9. 2
10. A) $l = 0, 1, 2, \text{ or } 3$ B) $m_l = -2, -1, 0, 1, \text{ or } 2$ C) 32 D)

$$n = 4, l = 2, m_l = -2, m_s = +\frac{1}{2}$$

$$n = 4, l = 2, m_l = -2, m_s = -\frac{1}{2}$$

$$n = 4, l = 2, m_l = -1, m_s = +\frac{1}{2}$$

$$n = 4, l = 2, m_l = -1, m_s = -\frac{1}{2}$$

$$n = 4, l = 2, m_l = 0, m_s = +\frac{1}{2}$$

$$n = 4, l = 2, m_l = 0, m_s = -\frac{1}{2}$$

$$n = 4, l = 2, m_l = 1, m_s = +\frac{1}{2}$$

$$n = 4, l = 2, m_l = 1, m_s = -\frac{1}{2}$$

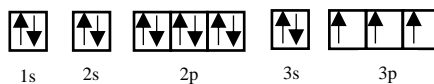
$$n = 4, l = 2, m_l = 2, m_s = +\frac{1}{2}$$

$$n = 4, l = 2, m_l = 2, m_s = -\frac{1}{2}$$

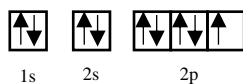
E) C

11.

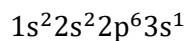
A. P (orbital box)



B. N^{2-} (orbital box)



C. Na (spdf)



D. Cr (spdf)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$
E. Mn^+ (noble gas)	$[Ar] 4s^1 3d^5$
F. Sg (noble gas)	$[Rn] 7s^2 5f^{14} 6d^4$

12. A) 1 B) 6

13. A) Si B) Li C) O^{2-} D) S^{2-}

14. In, Al, N, F

15. A) between the second and third B) between the fifth and sixth C) between the sixth and seventh

16. Boron losing an electron corresponds to it losing its only electron in the high energy 2p subshell, whereas beryllium losing an electron corresponds to knocking the electron out of the filled 2s subshell.