Chapter 7 Homework Solutions

10/14/15

2.  a) $5 < 2 < 6 < 4 < 1 < 3$  
    b) $3 < 1 < 4 < 6 < 2 < 5$  
    c) $3 < 1 < 4 < 6 < 2 < 5$

9.  $E = (6.626 \times 10^{-34} \text{ J} \cdot \text{s})(3.8 \times 10^{10} \text{ s}^{-1}) = 2.5 \times 10^{-23} \text{ J}$

11. blue > yellow > red

13. \[
v = \frac{(1.33 \text{ MeV})(10^6 \text{ eV/MeV})(1.602 \times 10^{-19} \text{ J/eV})}{6.626 \times 10^{-34} \text{ J} \cdot \text{s}} = 3.22 \times 10^{20} \text{ s}^{-1}
\]

17. absorption: a, d  
    emission: b, c

24. b > c > a > d

34. \[
100 \text{ pm} = \frac{6.626 \times 10^{-34} \text{ J} \cdot \text{s}}{(142 \text{ g})(\text{velocity})} \Rightarrow \text{velocity} = \frac{(6.626 \times 10^{-34} \text{ J} \cdot \text{s})(1 \text{ kg} \cdot \text{m}^2/\text{s}^2)}{(142 \text{ g})(\frac{1 \text{ kg}}{1000 \text{ g}})} = 4.67 \times 10^{-33} \text{ m/s}
\]

41. a) 9  
    b) 3  
    c) 5  
    d) 5 (1s, 2s, 3x 2p)

43. a) 3, 2, 1, 0, -1, -2, -3  
    b) 1, 0, -1 (not the best worded example, but the 1s and 2s orbitals would have an $m_r$ of zero, which is included in the set for the $p$-orbitals)  
    c) 1, 0, -1

47. a) 6, 4  
    b) 4, 0  
    c) 3, 2

49. a) yes
   There are many ways to correct each of the following, but here are some possible choices  
   b) 2, 1, +1 or 3, 2, 1  
   c) 7, 1, 0 (or -1 or +1) or 7, 2, 2 (the $\ell$ value could be any value between 6 & 2)  
   d) 3, 1, 1 or 3, 2, -2