

**CHEM 1311**  
**Homework**  
**Periodicity**

1. (2.32) Determine the following for red vs. violet light:
  - a. higher frequency
  - b. Longer wavelength
  - c. Greater energy
  
2. (2.33) Determine the following for infrared vs. ultraviolet light:
  - a. higher frequency
  - b. Longer wavelength
  - c. Greater energy
  
3. (2.36) Calculate the wavelength in meters of ultraviolet light with  $\nu = 5.5 \times 10^{15} \text{ s}^{-1}$ .
  
4. (2.65) Give the orbital designations of electrons having the following quantum numbers:
  - a.  $n = 3, l = 0, m_l = 0$
  - b.  $n = 2, l = 1, m_l = 1$
  - c.  $n = 4, l = 3, m_l = -2$
  - d.  $n = 4, l = 2, m_l = 0$
  
5. (2.78) According to the Aufbau principle, which orbital is filled immediately after each of the following in a multielectron atom?
  - a. 4s
  - b. 3d
  - c. 5f
  - d. 5p
  
6. (2.79) According to the Aufbau principle, which orbital is filled immediately before each of the following in a multielectron atom?
  - a. 3p
  - b. 4p
  - c. 4f
  - d. 5d
  
7. (2.80) Give the expected ground-state electron configurations for the following elements:
  - a. Ti
  - b. Ru
  - c. Sn
  - d. Sr
  - e. Se
  
8. (2.81) Give the expected ground-state electron configurations for the following elements:
  - a.  $Z = 55$
  - b.  $Z = 40$
  - c.  $Z = 80$
  - d.  $Z = 62$
  
9. (2.92) Order the following atoms according to increasing atomic radius: S, F, O
  
10. (2.93) Find the atom in each of the following pairs with the larger radius:
  - a. Na or K
  - b. V or Ta
  - c. V or Zn
  - d. Li or Ba