Unit 4 Modern Atomic Theory

1. What is a continuous spectrum?
2. Which of the following are continuous? Which are quantized
   a. milk from a cow
   b. buying milk from a store
   c. tires in a bicycle factory
   d. outdoor temperature
3. What experimental evidence led to the belief that electron energies are quantized in an atom?
4. What is an orbital? Sketch a “p” orbital and an “s” orbital.
5. How many electrons can occupy
   a. the 2^{nd} energy level
   b. the 2p sublevel
   c. a 2s orbital?
6. Identify each element by its electron configuration
   a. $1s^2 2s^2 s2p^5$
   b. $1s^2 2s^2 2p^6 3s^1$
   c. $[Ne]3s^2 3p^5$
7. Write complete electron configurations for
   a. nitrogen
   b. sulfur
   c. bromine
8. Draw detailed energy diagrams for
   a. nitrogen
   b. sulfur
   c. sodium
   d. silicon
9. Redo 7. using “inert gas notation”
10. What are valence electrons? How many valence electrons for
    a. chlorine
    b. oxygen
    c. carbon
    d. potassium
11. What group number is represented by the following valence electron configurations
    a. $ns^2 np^4$
    b. ns^1
12. What is shielding?
13. What is effective nuclear charge?
14. Why do atoms get larger as you go down a group?
15. Why do atoms get smaller as you go across a period?
16. What is ionization energy? Why does ionization energy decrease down a group?