CHM 130: Chapter 5 Blackboard Homework Questions

1. Check all of the following from John Dalton's Model that were later proven wrong:
   a. An element is composed of tiny, indivisible, indestructible particles called atoms.
   b. All atoms of an element are identical and have the same properties.
   c. Atoms may combine in more than one ratio to form different compounds.
   d. Atoms of different elements combine to form compounds.
   e. Compounds contain atoms in small whole number ratios.

2. Check all of the following that were attributed to J. J. Thomson:
   a. discovery of the proton
   b. discovery of the electron
   c. discovery of the neutron
   d. discovery of the atomic nucleus
   e. Plum-pudding Model of the Atom
   f. Alpha-scattering Experiment

3. Check all of the following that were determined because of Rutherford's Alpha-scattering Experiment:
   a. Atoms are mostly empty space.
   b. Protons are positively charged.
   c. Neutrons are electrically neutral.
   d. An atom is about ten thousand times larger than its nucleus.
   e. Protons are concentrated in the atomic nucleus.

4. Check all of the statements below that are true:
   a. James Chadwick won the Noble Prize for the discovery of the neutron.
   b. Eugen Goldstein was responsible for the discovery of the electron.
   c. Rutherford's Alpha-scattering Experiment led to the discovery of the atomic nucleus.
   d. William Crookes was responsible for the discovery of the proton.
   e. In the Plum-pudding Model of the Atom, the pudding represents the protons.

5. Check all of the statements below that are true:
   a. Protons have a +1 charge.
   b. Electrons have no charge.
   c. Atoms are mostly empty space.
   d. Protons and neutrons are located inside the nucleus.
   e. Almost all of the mass of an atom comes from the protons and neutrons.
   f. Isotopes vary in the number of protons.
   g. In a neutral atom, the number of protons equals the number of electrons.

6. How many protons, neutrons, and electrons are present in cobalt-60 (Co-60)?

7. How many protons, neutrons, and electrons are present in silicon-29?

8. How many protons, neutrons, and electrons are present in chlorine-37?

9. How many protons, neutrons, and electrons are present in magnesium-26?

10. Isotopes vary in their number of _____.
    a. protons b. neutrons c. electrons d. atomic number e. element symbol

11. Use the atomic weight reported on the Periodic Table to determine the most abundant naturally occurring element for silicon:
    a. silicon-28 b. silicon-29 c. silicon-30

12. Use the atomic weight reported on the Periodic Table to determine the most abundant naturally occurring element for copper (Cu):
    a. copper-63 b. copper-65
13. Use the atomic weight reported on the Periodic Table to determine the most abundant naturally occurring element for iron (Fe):
    a. iron-54 b. iron-56 c. iron-57 d. iron-58
14. Use the Periodic Table to determine which of the following elements are radioactive and unstable. (Check all that apply.)
    a. Ra b. C c. Po d. W e. Kr f. Cf g. Pb h. Ac i. I j. Rb
15. Which one of the following statements below is correct?
    a. As wavelength increases, frequency increases.
    b. As wavelength increases, energy increases.
    c. As frequency increases, energy increases.
    d. As frequency decreases, wavelength decreases.
    e. As frequency decreases, energy decreases.
16. Check all of the statements below that are correct:
    a. A quantum is a bundle of energy.
    b. A photon is bundle of energy in the form of light.
    c. Red light at 700 nm is higher in energy than blue light at 400 nm.
    d. An electron absorbs energy when it drops from energy level 5 down to energy level 2.
    e. As electrons in an atom drop from higher energy levels down to lower energy levels, they give off a unique emission line spectrum (also called an "atomic fingerprint").
17. Use Figure 5.9 on page 121 of your textbook to determine which color light has the highest energy.
    a. violet light at 400 nm
    b. blue-green light at 500 nm
    c. green light at 550 nm
    d. yellow-orange light at 600 nm
    e. red light at 700 nm
18. Check all of the statements below that are correct:
    a. An s orbital can only hold 2 electrons.
    b. A 2p orbital can only hold 10 electrons.
    c. The 2s orbital is filled before electrons are put in the 2p orbital.
    d. The 3p orbital is filled before electrons are placed in the 4s orbital.
    e. The lowest energy sublevels are always filled before the higher energy sublevels.
19. The electron configuration for oxygen is _____.
20. The electron configuration for sodium is _____.
21. The electron configuration for chlorine is _____.
22. Give the element symbol for the element with the electron configuration: $\mathbf{1s^2\ 2s^2\ 2p^5}$
23. Give the element symbol for the element with the electron configuration: $\mathbf{1s^2 2s^2 2p^6 3s^2 3p^6 4s^1}$
24. Give the element symbol for the element with the electron configuration: $\mathbf{1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1}$
25. Give the element symbol for the element with the electron configuration: $\mathbf{1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6}$