

Chemistry 121-Worksheet 3

Evolution of the Atomic Theory and the Structure of the Atom

1. Which of the following about atomic structure is false?
 - a. The electrons occupy a very large volume compared to the nucleus.
 - b. Almost all of the atom's mass is concentrated in the nucleus.
 - c. The protons and neutrons in the nucleus are very tightly packed.
 - d. In a neutral atom, the number of protons always equals the number of neutrons.

2. If Thompson's model of the atom had been correct, Rutherford would have observed,
 - a. Alpha particles going through the foil with little to no deflection.
 - b. Alpha particles greatly deflected by the metal foil
 - c. Alpha particles bouncing off the metal foil.
 - d. Positive particles formed in the foil.

3. Rutherford's experiment was important because it showed that
 - a. Radioactive elements give off alpha particles
 - b. Gold foil can be made to be only a few atoms thick
 - c. The mass of an atom is uniformly distributed throughout the atom.
 - d. Most of an atom's mass is located in a small, dense nucleus.

4. Which of the following is not true?
 - a. Ions are formed by adding electrons to a neutral atom.
 - b. Ions are formed by changing the number of neutrons in the nucleus.
 - c. Ions are formed by removing electrons from a neutral atom.
 - d. An ion can have a positive or negative charge.

5. Which statement correctly describes the difference between the ^{12}C , ^{13}C and ^{14}C isotopes of carbon?
 - a. They have the same number of protons but different numbers of electrons.
 - b. They have the same number of neutrons but different numbers of electrons.
 - c. They have the same number of electrons but different numbers of protons.
 - d. They have the same number of protons but different numbers of neutrons.

6. In Thomson's experiment, why was the glowing beam repelled by a negatively charged plate?

Because electrons are negatively charged and therefore are repelled by other negative charges and attracted to positive charges.

7. A $^{24}\text{Mg}^{+2}$ cation has how many protons and electrons?

10 electrons and 12 protons

8. A $^{32}\text{S}^{-2}$ anion has how many protons, neutrons and electrons?

16 protons and 18 electrons

9. A ^{37}Cl atom has how many protons, neutrons, and electrons?

17 protons, 17 electrons, 20 neutrons

10. How many neutrons are in an atom of lead (Pb) with a mass number of 208.

126 neutrons