

Chapter 6

RETEACHING

ELECTRON CONFIGURATIONS

Atoms are made of protons, electrons, and neutrons. The atomic number of an element indicates the number of protons in the nucleus of each atom of the element, as well as the number of electrons in the atom. Different numbers of electrons fill different energy sublevels within an atom. Each s sublevel can hold a maximum of two electrons. Each p sublevel can hold up to six electrons. Each d sublevel can hold up to ten

electrons. Each f sublevel can hold a maximum of 14 electrons. Electrons are placed into orbitals and energy levels in a definite filling order; $1s$, then $2s$, then $2p$, and so on, as shown by the arrow diagram you studied in an earlier chapter.

Electron configurations reveal the number of electrons in each sublevel at each energy level. For example, lithium, with three electrons, has the configuration $1s^2 2s^1$.

Answer the following questions.

1. Write the electron configurations for the elements that have the following atomic numbers:

- a. 8 $1s^2 2s^2 2p^4$
 b. 10 $1s^2 2s^2 2p^6$
 c. 19 $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
 d. 26 $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$
 e. 39 $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^1$
 f. 48 $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^{10}$

2. Complete the table below given the electron configurations shown.

Electron configuration	Group	Period	Metal, nonmetal, or metalloid	Number of electrons	Name
$1s^2 2s^2 2p^1$	13	2	Non metal	5	Boron
$1s^2 2s^2$	2	2	metal	4	Beryllium
$1s^2 2s^2 2p^6 3s^1$	1	3	metal	11	Sodium
$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$	5	4	transition metal	23	Vanadium
$1s^2 2s^2 2p^6 3s^2 3p^5$	17	3	non metal	17	Chlorine