Section 5.3 Electron Configurations

In your textbook, read about ground-state electron configurations.

Use each of the terms below just once to complete the passage.

Aufbau principle	electron configuration	ground-state electron configuration	Hund's rule
lowest	Pauli exclusion principle	spins	stable

The arrangement of electrons in an atom is called the atom's **(1)**_____. Electrons in an atom tend to assume the arrangement that gives the atom the **(2)**_____ possible energy. This arrangement of electrons is the most **(3)**_____ arrangement and is called the atom's **(4)**_____.

Three rules define how electrons can be arranged in an atom's orbitals. The **(5)**_____ states that each electron occupies the lowest energy orbital available. The **(6)**_____ states that a maximum of two electrons may occupy a single atomic orbital, but only if the electrons have opposite **(7)**_____. **(8)**_____ states that single electrons with the same spin must occupy each equal-energy orbital before additional electrons with opposite spins occupy the same orbitals.

Complete the following table.

Element	Atomic Number	Orbitals					Electron Configuration
		1s	2s	$2p_x$	$2p_y$	$2p_z$	
9. Helium							$1s^2$
10.	7						
11. Neon		↑↓	↑↓	↑↓	↑↓	↑↓	

Section 5.3 *continued*

Answer the following questions.

12. What is germanium's atomic number? How many electrons does germanium have?

_____

13. What is noble-gas notation, and why is it used to write electron configurations?

_____

_____

_____

_____

14. Write the ground-state electron configuration of a germanium atom, using noble-gas notation.

_____

In your textbook, read about valence electrons.

Circle the letter of the choice that best completes the statement or answers the question.

15. The electrons in an atom's outermost orbitals are called

a. electron dots. **b.** quantum electrons. **c.** valence electrons. **d.** noble-gas electrons.

16. In an electron-dot structure, the element's symbol represents the

a. nucleus of the noble gas closest to the atom in the periodic table.

b. atom's nucleus and inner-level electrons.

c. atom's valence electrons.

d. electrons of the noble gas closest to the atom in the periodic table.

17. How many valence electrons does a chlorine atom have if its electron configuration is $[Ne]3s^2 3p^5$?

a. 3 **b.** 21 **c.** 5 **d.** 7

18. Given boron's electron configuration of $[He]2s^2 2p^1$, which of the following represents its electron-dot structure?

a. •Be• **b.** •$\dot{\text{B}}$• **c.** $\ddot{\text{B}}$: **d.** $\ddot{\text{B}}\text{e}$

19. Given beryllium's electron configuration of $1s^2 2s^2$, which of the following represents its electron-dot structure?

a. •Be• **b.** •$\dot{\text{B}}$• **c.** $\ddot{\text{B}}$: **d.** $\ddot{\text{B}}\text{e}$

20. Which electrons are represented by the dots in an electron-dot structure?

a. valence electrons **c.** only s electrons

b. inner-level electrons **d.** both a and c