Section 5.2 *continued*

In your textbook, read about the Heisenberg uncertainty principle.

For each item in Column A, write the letter of the matching item in Column B.

Column A	Column B
_____ **10.** The modern model of the atom that treats electrons as waves	**a.** Heisenberg uncertainty principle
_____ **11.** States that it is impossible to know both the velocity and the position of a particle at the same time	**b.** Schrödinger wave equation
_____ **12.** A three-dimensional region around the nucleus representing the probability of finding an electron	**c.** quantum mechanical model of the atom
_____ **13.** Originally applied to the hydrogen atom, it led to the quantum mechanical model of the atom	**d.** atomic orbital

Answer the following question.

14. How do the Bohr model and the quantum mechanical model of the atom differ in how they describe electrons?

_____

_____

_____

In your textbook, read about hydrogen's atomic orbitals.

In the space at the left, write the term in parentheses that correctly completes the statement.

_____ **15.** Atomic orbitals (do, do not) have an exactly defined size.

_____ **16.** Each orbital may contain at most (two, four) electrons.

_____ **17.** All s orbitals are (spherically shaped, dumbbell shaped).

_____ **18.** A principal energy has (n, n^2) energy sublevels.

_____ **19.** The maximum number of (electrons, orbitals) related to each principal energy level equals $2n^2$.

_____ **20.** There are (three, five) equal energy p orbitals.

_____ **21.** Hydrogen's principal energy level 2 consists of (2s and 3s, 2s and 2p) orbitals.

_____ **22.** Hydrogen's principal energy level 3 consists of (nine, three) orbitals.

Section 5.3 Electron Configuration

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		↑↓	↑↓	↑↓	↑↓	↑↓	