

Concept Review

Section: Electron Configuration

In the blanks at the left of each word or phrase, write the letter of the expression on the right that is most closely related.

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|------------------------------------|---|
| _____ 1. electromagnetic spectrum | a. the spectrum of a few colors seen through a prism made when high-voltage current is passed through a tube of hydrogen gas at low pressure |
| _____ 2. electron configuration | b. the lowest energy state of a quantized system |
| _____ 3. excited state | c. a state in which an atom has more energy than it does at its ground state |
| _____ 4. ground state | d. a number that specifies the properties of electrons in an atom |
| _____ 5. Hund's rule | e. the arrangement of electrons in an atom |
| _____ 6. line-emission spectrum | f. a region in an atom where there is a high probability of finding electrons |
| _____ 7. orbital | g. states that two particles of a certain class cannot be in the exact same energy state |
| _____ 8. Pauli exclusion principle | h. the present-day model of the atom, in which electrons are located in orbitals |
| _____ 9. quantum number | i. states that the structure of each successive element is obtained by adding one proton to the nucleus of the atom and one electron to the lowest-energy orbital that is available |
| _____ 10. quantum theory | j. all of the frequencies or wavelengths of electromagnetic radiation |
| _____ 11. aufbau principle | k. what occurs when light strikes a metal and electrons are released |
| _____ 12. photoelectric effect | l. states that for an atom in the ground state, the number of unpaired electrons is the maximum possible and these unpaired electrons have the same spin |

Concept Review *continued*

Complete each statement below by writing the correct word or words in the spaces.

- 13.** All electromagnetic radiation, including visible light, can be thought of as moving _____.
- 14.** As the frequency of a wave increases, the wavelength _____.
- 15.** To define the region in which electrons can be found, scientists have assigned four _____ numbers to each electron.

Answer the following items in the space provided.

- 16.** Using the quantum theory, how does one determine the location of an atom's electrons?

- 17.** Compare the Rutherford, Bohr, and quantum models of an atom.

Concept Review *continued*

- 18.** Explain how the wavelengths of light emitted by an atom provide information about electron energy levels.

- 19.** List the four quantum numbers, and describe their significance.

- 20.** Use the Pauli exclusion principle and the aufbau principle to write the electron configuration for the following atoms.

a. Chlorine

b. Nitrogen

c. Calcium