

Electron Configuration Homework Answers

1. How many electron shells contain s-orbitals?
2. Which electron shells contain d-orbitals?
3. Name the types of orbitals present in the second electron shell.
4. How many p-orbitals are able to be filled in a shell?
5. How many d-orbitals are able to be filled in a shell?
6. What is the total number of electrons able to fit in:
 - a. The first electron shell?
 - b. The third electron shell?
7. Give a brief definition for the following terms:
 - a. Sub-shell
 - b. Electron shell
 - c. Orbital
8. What is the relationship between number of valence electrons and atomic reactivity?

Electron Configuration Homework Answers

9. Order the orbitals in increasing level of energy

a. 2p, 1s, 2s, 3p, 3s

b. 3d, 4s, 4d, 4p, 5s,

c. 4f, 5p, 5f, 5d, 6s, 6p, 7s

10. Which of the following notations for nickel obey Aufbau's principle?

a. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$

b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$

c. $1s^2 2s^2 3s^2 4s^2 2p^6 3p^6 3d^8$

d. $1s^2 2s^2 2p^6 3p^6 3s^2 3d^8 4s^2$

11. Which of the following is the correct notation for Calcium according to Aufbau's principle?

a. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

b. $1s^2 2s^2 2p^6 3p^6 3s^2 4s^2$

c. $1s^2 2s^2 3s^2 4s^2 2p^6 3p^6$

d. None of the above

12. In your own words explain Aufbau's principle. Use an example to help illustrate your explanation.

Electron Configuration Homework Answers

1. How many electron shells contain s-orbitals?
All four electron shells
2. Which electron shells contain d-orbitals?
Electron shells 3, and 4
3. Name the types of orbitals present in the second electron shell.
S and p orbitals
4. How many p-orbitals are able to be filled in a shell?
3
5. How many d-orbitals are able to be filled in a shell?
5
6. What is the total number of electrons able to fit in:
 - a. The first electron shell?
2
 - b. The third electron shell?
8
7. Give a brief definition for the following terms:
 - a. Sub-shell
A subdivision of an electron shell which is separated by orbitals
 - b. Electron shell
The energy level at which particular electrons exist
 - c. Orbital
The space around the nucleus of an atom of which there is the greatest chance of locating an electron.
8. What is the relationship between number of valence electrons and atomic reactivity?
The number of valence electrons determines whether atoms will gain or lose electrons to become stable (have a full valence shell).
Elements which have the same number of valence electrons have similar chemical properties.

Electron Configuration Homework Answers

9. Order the orbitals in increasing level of energy

a. 2p, 1s, 2s, 3p, 3s

1s, 2s, 2p, 3s, 3p

b. 3d, 4s, 4d, 4p, 5s,

4s, 3d, 4p, 5s, 4d,

c. 4f, 5p, 5f, 5d, 6s, 6p, 7s

5p, 6s, 4f, 5d, 6p, 7s, 5f,

10. Which of the following notations for nickel obey Aufbau's principle?

a. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$

b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$

c. $1s^2 2s^2 3s^2 4s^2 2p^6 3p^6 3d^8$

d. $1s^2 2s^2 2p^6 3p^6 3s^2 3d^8 4s^2$

11. Which of the following is the correct notation for Calcium according to Aufbau's principle?

a. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

b. $1s^2 2s^2 2p^6 3p^6 3s^2 4s^2$

c. $1s^2 2s^2 3s^2 4s^2 2p^6 3p^6$

d. None of the above

12. In your own words explain Aufbau's principle. Use an example to help illustrate your explanation.

Electron shells closer to the nucleus are filled up first as they have lower energy levels.

For example electrons will occupy the 3p sub-shell before filling the 4s sub-shell.