

Electron Configuration Worksheet

Answers

1. Write the ground state electron configuration for a neutral atom of sodium. $1s^2 2s^2 2p^6 3s^2$

2. Write the ground state electron configuration for a neutral atom of strontium.

$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2$

3. If each orbital can hold a maximum of two electrons, how many can each of the following hold?

i. 2s 2 ii. 5p 6 iii. 4f 14 iv. 3d 10 v. 4d 10

4. What is the shape of an s orbital? Spherical

5. What is the shape of a p orbital? Dumb-bell shaped

6. Use noble gases to write the abbreviated electron configurations of the following?

i. Li $[\text{He}] 2s^1$ ii. B $[\text{He}] 2s^2 2p^1$

iii. O $[\text{He}] 2s^2 2p^4$ iv. Mg $[\text{Ne}] 3s^2$

v. Cl $[\text{Ne}] 3s^2 3p^5$ vi. V $[\text{Ar}] 4s^2 3d^3$

vii. Se^{2-} $[\text{Ar}] 4s^2 3d^{10} 4p^6$ viii. Cr^{2+} $[\text{Ar}] 3d^4$

ix. I $[\text{Kr}] 5s^2 4d^{10} 5p^6$ x. Ag $[\text{Kr}] 5s^1 4d^{10}$

7. An ion of an isotope has a 2+ charge, an atomic mass of 56.9397 amu, 2 electrons at the $n = 4$ energy level, and 13 electrons at the $n = 3$ energy level.

a. Write down its electron configuration. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$

b. Identify the ion. Co^{2+}

c. Determine the

i. Atomic number: 27 ii. Mass number: 57

iii. Total number of electrons: 25 iv. Total number of s electrons: 8

v. Total number of p electrons: 12 vi. Total number of d electrons: 5

8. a. What are valence electrons? The outermost electron of an atom

b. Explain how an atom's valence electron configuration determines its place on the periodic table. It determines what family/group the element is in.

c. List the number of valence electrons of the following atoms.

i. potassium 1 ii. magnesium 2 iii. carbon 4 iv. nitrogen 5



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2. Write the ground state electron configuration for a neutral atom of strontium.

3. If each orbital can hold a maximum of two electrons, how many can each of the following hold?

i. 2s _____ ii. 5p _____ iii. 4f _____ iv. 3d _____ v. 4d _____

4. What is the shape of an s orbital? _____

5. What is the shape of a p orbital? _____

6. Use noble gases to write the abbreviated electron configurations of the following?

i. Li _____ ii. B _____

iii. O _____ iv. Mg _____

v. Cl _____ vi. V _____

vii. Se^2 _____ viii. Cr^{2+} _____

ix. I _____ x. Ag _____

7. An ion of an isotope has a 2+ charge, an atomic mass of 56.9397 amu, 2 electrons at the $n = 4$ energy level, and 13 electrons at the $n = 3$ energy level.

a. Write down its electron configuration. _____

b. Identify the ion. _____

c. Determine the

i. Atomic number: _____ ii. Mass number: _____

iii. Total number of electrons: _____ iv. Total number of s electrons: _____

v. Total number of p electrons: _____ vi. Total number of d electrons: _____

8. a. What are valence electrons? _____

b. Explain how an atom's valence electron configuration determines its place on the periodic table. _____

c. List the number of valence electrons of the following atoms.

i. potassium _____ ii. magnesium _____ iii. carbon _____ iv. nitrogen _____