

Solutions to Electron Configurations Practice Worksheet

In the space below, write the unabbreviated electron configurations of the following elements:

1. sodium $1s^2 2s^2 2p^6 3s^1$
2. magnesium $1s^2 2s^2 2p^6 3s^2$
3. iron $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$
4. potassium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
5. selenium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^4$

In the space below, write the abbreviated electron configurations of the following elements:

6. cobalt $[\text{Ar}] 4s^2 3d^7$
7. silver $[\text{Kr}] 5s^2 4d^9$
8. tellurium $[\text{Kr}] 5s^2 4d^{10} 5p^4$
9. radium $[\text{Rn}] 7s^2$
10. lawrencium $[\text{Rn}] 7s^2 5f^{14} 6d^1$

Determine what elements are denoted by the following electron configurations:

11. $1s^2 2s^2 2p^6 3s^2 3p^4$ Sulfur
12. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1$ rubidium
13. $[\text{Kr}] 5s^2 4d^{10} 5p^3$ antimony
14. $[\text{Xe}] 6s^2 4f^{14} 5d^6$ osmium
15. $[\text{Rn}] 7s^2 5f^{11}$ einsteinium

Explain what is wrong with the following electron configurations:

16. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4d^{10} 4p^6$ The 3d level should come after the 4s level.
17. $1s^2 2s^2 2p^6 3s^3 3d^5$ The 3s level cannot hold 3 electrons.

Solutions to "Electron Configurations"

1. chlorine

2. calcium

3. gallium

4. I used the principal quantum number on the outermost electrons to determine the row on the periodic table where the element is located. I then counted the electrons, starting from the left side of that row until I reached the number of electrons that was indicated in the configuration.

5. phosphorus

6. calcium

7. scandium

8. iodine

9. argon

10. lead

Electron Configurations - Solutions

Note: The electron configurations in this worksheet assume that lanthanum (La) is the first element in the 4f block and that actinium (Ac) is the first element in the 5f block. If your periodic table doesn't agree with this, your answers for elements near the f-orbitals may be slightly different.

- 1) oxygen $1s^2 2s^2 2p^4$
- 2) sodium $1s^2 2s^2 2p^6 3s^1$
- 3) iron $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$
- 4) bromine $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$
- 5) barium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2$
- 6) nitrogen $1s^2 2s^2 2p^3$
- 7) chlorine $1s^2 2s^2 2p^6 3s^2 3p^5$
- 8) argon $1s^2 2s^2 2p^6 3s^2 3p^6$
- 9) cobalt $[Ar] 4s^2 3d^7$
- 10) silver $[Kr] 5s^2 4d^9$
- 11) tellurium $[Kr] 5s^2 4d^{10} 5p^4$
- 12) iodine $[Kr] 5s^2 4d^{10} 5p^5$
- 13) cesium $[Xe] 6s^1$
- 14) $1s^2 2s^2 2p^6 3s^2 3p^4$ sulfur
- 15) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1$ rubidium
- 16) $[Kr] 5s^2 4d^{10} 5p^3$ antimony
- 17) $[Xe] 6s^2 4f^{14} 5d^6$ osmium
- 18) $[Xe] 6s^2$ barium

These electron configurations have mistakes, determine what is wrong.

- 19) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4d^{10} 4p^5$ not valid (take a look at "4d")
- 20) $1s^2 2s^2 2p^6 3s^2 3d^5$ not valid (3p comes after 3s)
- 21) $[Ra] 7s^2 5f^8$ not valid (radium isn't a noble gas)
- 22) $[Xe]$ not valid (an element can't be its own electron configuration)