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) sodium $1s^2 2s^2 2p^6 3s^1$

2) iron $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^6$

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

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

5) neptunium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^2 5f^5$

6) cobalt **[Ar]** $4s^2 3d^7$

7) silver **[Kr]** $5s^2 4d^9$

8) tellurium **[Kr]** $5s^2 4d^{10} 5p^4$

9) radium **[Rn]** $7s^2$

10) lawrencium **[Rn]** $7s^2 5f^{14} 6d^1$

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) [Kr] $5s^2 4d^{10} 5p^3$ **antimony**

14) [Xe] $6s^2 4f^{14} 5d^6$ **osmium**

15) [Rn] $7s^2 5f^{11}$ **einsteinium**

16) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4d^{10} 4p^5$ **not valid (take a look at "4d")**

17) $1s^2 2s^2 2p^6 3s^3 3d^5$ **not valid (3p comes after 3s)**

18) [Ra] $7s^2 5f^8$ **not valid (radium isn't a noble gas)**

19) [Kr] $5s^2 4d^{10} 5p^5$ **valid**

20) [Xe] **not valid (an element can't be its own electron configuration)**

Electron Configurations Worksheet

Write the complete ground state electron configurations for the following:

1) lithium _____

2) oxygen _____

3) calcium _____

4) titanium _____

5) rubidium _____

6) lead _____

7) erbium _____

Write the abbreviated ground state electron configurations for the following:

8) helium _____

9) nitrogen _____

10) chlorine _____

11) iron _____

12) zinc _____

13) barium _____

14) polonium _____

Electron Configurations Worksheet - Answers

Write the complete ground state electron configurations for the following:

1) lithium $1s^2 2s^1$

2) oxygen $1s^2 2s^2 2p^4$

3) calcium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

4) titanium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$

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

6) lead $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^2$

7) erbium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{12}$

Write the abbreviated ground state electron configurations for the following:

8) helium $1s^2$ (this one cannot be abbreviated)

9) nitrogen [He] $2s^2 2p^3$

10) chlorine [Ne] $3s^2 3p^5$

11) iron [Ar] $4s^2 3d^6$

12) zinc [Ar] $4s^2 3d^{10}$

13) barium [Xe] $6s^2$

14) polonium [Xe] $6s^2 4f^{14} 5d^{10} 6p^4$

Name_____Per_____

Chemistry I Practice - "Electron Configurations"

Use the following electron configurations and your periodic table to identify the element:

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

4. Describe the method that you used to solve problems **1 - 3**. Be specific.

Use the following clues to identify the element. Show any figuring in the space below.

5. This element has a 3p sublevel that contains 3 electrons.

6. This element has a 4s sublevel with 2 electrons for its outermost electrons.

7. This element has 1 electron in its 3d sublevel.

8. This element has 5 electrons in its 5p sublevel

9. This element has a completely filled 3p sublevel for its outermost electrons.

10. This element has 2 electrons in its 6p sublevel.

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