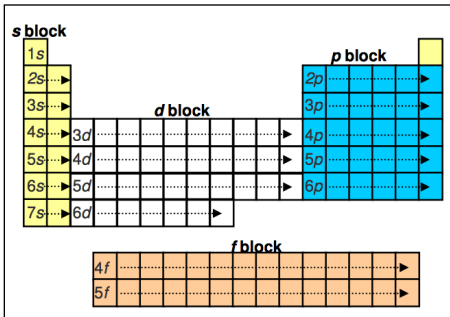
name: _____ date: _____

electron configuration - practice problems

An electron configuration is a list of the sub-levels that contain electrons for a given element. The sub-level designation is followed by a superscript number showing the number of electrons are found in that sub-level. For example, the element sodium, with the electron configuration of **$1s^2 2s^2 2p^6 3s^1$** contains electrons in the **1s**, the **2s**, the **2p**, and the **3s** sub-levels and has a total of 11 electrons. The orbitals of an atom fill in a specific sequence. The pattern in which sub-levels fill is seen on periodic table when it is sectioned into the **s** block, **p** block, **d** block, and **f** block. The rows of each block are labeled as well.



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

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

Sb $^{36}[Kr] 5s^2 4d^{10} 5p^3$

energy level

$1\mathbf{s}^2\ 2\mathbf{s}^2\ 2\mathbf{p}^6\ 3\mathbf{s}^1$

sub-level # of e$^-$

Electron configurations can also be abbreviated by writing the element symbol for the previous noble gas in brackets, followed by the remaining valence (outer shell) electrons. For example, rather than writing all of the electrons in antimony, the first 36 electrons are represented by $^{36}[Kr]$.

Write the name and symbol for the atoms with the following electron configurations.

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

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

3. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^7$

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

5. $^{86}[Rn] 7s^2 5f^9$

6. $^{54}[Xe]\ 6s^2 4f^{14} 5d^{10} 6p^2$

Write complete electron configurations for the following substances.

7. nitrogen

8. magnesium

9. niobium

10. nickel

11. tin

12. chlorine

Write abbreviated electron configurations for the following elements.

13. arsenic

14. thulium

15. rubidium

16. einsteinium

17. platinum

18. molybdenum

19. sulfur

20. zirconium

21. argon

22. iron

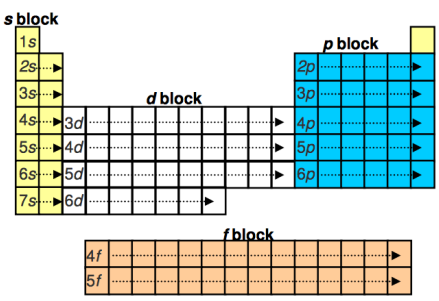
23. polonium

24. bohrium

name: **suggested answers** date: _____

electron configuration - practice problems

An electron configuration is a list of the sub-levels that contain electrons for a given element. The sub-level designation is followed by a superscript number showing the number of electrons are found in that sub-level. For example, the element sodium, with the electron configuration of **$1s^2 2s^2 2p^6 3s^1$** contains electrons in the **1s**, the **2s**, the **2p**, and the **3s** sub-levels and has a total of 11 electrons. The orbitals of an atom fill in a specific sequence. The pattern in which sub-levels fill is seen on periodic table when it is sectioned into the **s** block, **p** block, **d** block, and **f** block. The rows of each block are labeled as well.



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

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

Sb $^{36}[Kr] 5s^2 4d^{10} 5p^3$

energy level

$1\mathbf{s}^2\ 2\mathbf{s}^2\ 2\mathbf{p}^6\ 3\mathbf{s}^1$

sub-level # of e⁻

Electron configurations can also be abbreviated by writing the element symbol for the previous noble gas in brackets, followed by the remaining valence (outer shell) electrons. For example, rather than writing all of the electrons in antimony, the first 36 electrons are represented by $^{36}[Kr]$.

Write the name and symbol for the atoms with the following electron configurations.

1. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^4$ (selenium)
2. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^1$ (cesium)
3. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^7$ (rhodium)
4. $1s^2 2s^2 2p^6 3s^2 3p^1$ (aluminum)
5. $^{86}[Rn] 7s^2 5f^9$ (berkelium)
6. $^{54}[Xe]\ 6s^2 4f^{14} 5d^{10} 6p^2$ (lead)

Write complete electron configurations for the following substances.

7. nitrogen $1s^2 2s^2 2p^3$
8. magnesium $1s^2 2s^2 2p^6 3s^2$
9. niobium $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^3$
10. nickel $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^8$
11. tin $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^2$
12. chlorine $1s^2 2s^2 2p^6 3s^2 3p^5$

Write abbreviated electron configurations for the following elements.

13. arsenic $^{18}[Ar]\ 4s^2 3d^{10} 54p^3$
14. thulium $^{54}[Xe]\ 6s^2 4f^{13}$
15. rubidium $^{36}[Kr]\ 5s^1$
16. einsteinium $^{86}[Rn] 7s^2 5f^{11}$
17. platinum $^{54}[Xe]\ 6s^2 4f^{14} 5d^8$
18. molybdenum $^{36}[Kr]\ 5s^2 4d^4$
19. sulfur $^{10}[Ne]\ 3s^2 3p^4$
20. zirconium $^{36}[Kr]\ 5s^2 4d^2$
21. argon $^{18}[Ar]$
22. iron $^{18}[Ar]\ 4s^2 3d^6$
23. polonium $^{54}[Xe]\ 6s^2 4f^{14} 5d^{10} 6p^4$
24. bohrium $^{86}[Rn]\ 7s^2 5f^{14} 6d^5$