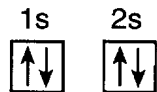


Orbital Notation

1. Which orbital notation represents a noble gas in the ground state?

- A) $\boxed{\uparrow\downarrow}$ B) $\boxed{\uparrow\downarrow}$ $\boxed{\uparrow\downarrow}$
 $1s^2$ $1s^2$ $2s^2$
- C) $\boxed{\uparrow\downarrow}$ $\boxed{\uparrow\downarrow}$ $\boxed{\uparrow\uparrow\uparrow}$
 $1s^2$ $2s^2$ $2p^3$
- D) $\boxed{\uparrow\downarrow}$ $\boxed{\uparrow}$ $\boxed{\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow}$
 $1s^2$ $2s^1$ $2p^6$

2. The orbital notation of an atom in the ground state is



Which atom is represented by this notation?

- A) C B) N C) B D) Be
3. Which atom in the ground state has three half filled orbitals?
- A) P B) Si C) Al D) Li
4. Which orbital notation correctly represents a noble gas in the ground state?

- A) $\begin{array}{c} S \\ \boxed{\uparrow} \end{array}$ $\begin{array}{c} P \\ \boxed{\uparrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \end{array}$
- B) $\begin{array}{c} S \\ \boxed{\uparrow\downarrow} \end{array}$ $\begin{array}{c} P \\ \boxed{\uparrow\downarrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \end{array}$
- C) $\begin{array}{c} S \\ \boxed{\uparrow\downarrow} \end{array}$ $\begin{array}{c} P \\ \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\downarrow} \end{array}$
- D) $\begin{array}{c} S \\ \boxed{\uparrow\downarrow} \end{array}$ $\begin{array}{c} P \\ \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\downarrow} \quad \boxed{\uparrow} \end{array}$

5. What is the total number of unpaired electrons in an atom of oxygen in the ground state?

- A) 6 B) 2 C) 8 D) 4

6. In the ground state, which element's atoms have five completely filled orbitals?

- A) Li B) B C) C D) Ne

7. Which atom in the ground state has only one unpaired electron in its valence shell?

- A) aluminum B) silicon
 C) phosphorus D) sulfur

8. What is the total number of unpaired electrons in an atom of nickel in the ground state?

- A) 0 B) 2 C) 3 D) 4

9. Which orbital notation represents a boron atom in the ground state?

- A) $\begin{array}{c} 1s \\ \boxed{\uparrow} \end{array}$ $\begin{array}{c} 2s \\ \boxed{\uparrow\downarrow} \end{array}$ $\begin{array}{c} 2p \\ \boxed{\uparrow} \quad \boxed{} \quad \boxed{} \end{array}$
- B) $\begin{array}{c} 1s \\ \boxed{\uparrow\downarrow} \end{array}$ $\begin{array}{c} 2s \\ \boxed{\uparrow\downarrow} \end{array}$ $\begin{array}{c} 2p \\ \boxed{\uparrow} \quad \boxed{} \quad \boxed{} \end{array}$
- C) $\begin{array}{c} 1s \\ \boxed{\uparrow\downarrow} \end{array}$ $\begin{array}{c} 2s \\ \boxed{} \end{array}$ $\begin{array}{c} 2p \\ \boxed{\uparrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \end{array}$
- D) $\begin{array}{c} 1s \\ \boxed{\uparrow\downarrow} \end{array}$ $\begin{array}{c} 2s \\ \boxed{\uparrow} \end{array}$ $\begin{array}{c} 2p \\ \boxed{\uparrow} \quad \boxed{\uparrow} \quad \boxed{} \end{array}$

10. Which electron notation represents the valence electrons of a phosphorus atom in the ground state?

- A) s $\begin{array}{c} p \\ \boxed{\uparrow\downarrow} \quad \boxed{\uparrow} \quad \boxed{} \end{array}$
- B) $\begin{array}{c} \boxed{\uparrow\downarrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \end{array}$
- C) $\begin{array}{c} \boxed{\uparrow} \quad \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\downarrow} \quad \boxed{} \end{array}$
- D) $\begin{array}{c} \boxed{\uparrow\downarrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow\downarrow} \quad \boxed{} \end{array}$

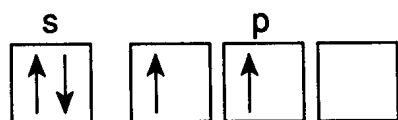
11. Which orbital notation correctly represents the outermost principal energy level of oxygen in the ground state?

- A) S $\begin{array}{c} P \\ \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\uparrow} \quad \boxed{\uparrow\uparrow} \quad \boxed{} \end{array}$
- B) $\begin{array}{c} \boxed{\uparrow\uparrow} \quad \boxed{\uparrow\uparrow} \quad \boxed{\uparrow\uparrow} \quad \boxed{} \end{array}$
- C) $\begin{array}{c} \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\downarrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \end{array}$
- D) $\begin{array}{c} \boxed{\uparrow\downarrow} \quad \boxed{\uparrow\uparrow} \quad \boxed{\uparrow} \quad \boxed{\uparrow} \end{array}$

12. The total number of completely filled s orbitals of a sodium atom in the ground state is

- A) 1 B) 2 C) 3 D) 5

13. The diagram below represents the orbital notation of an atom's valence shell in the ground state.



The diagram could represent the valence shell of

- A) Li B) Si C) Al D) Cl

14. Which is the orbital notation for the electrons in the third principal energy level of an argon atom in the ground state?

- A) $3s$ $\uparrow\downarrow$ $3p$ $\uparrow\uparrow\uparrow$ $3d$ $\uparrow\uparrow\uparrow\uparrow\uparrow$
- B) $\uparrow\downarrow$ $\uparrow\downarrow\uparrow\downarrow$ $\square\square\square\square$
- C) $\uparrow\downarrow$ $\uparrow\downarrow\uparrow\uparrow$ $\uparrow\uparrow\square\square$
- D) $\uparrow\downarrow$ $\uparrow\downarrow\uparrow\downarrow$ $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$