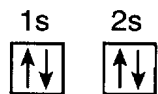


Orbital Notation

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

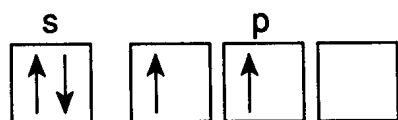
11. Which orbital notation correctly represents the outermost principal energy level of oxygen in the ground state?

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

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) $3s$ $3p$ $3d$
- B)
- C)
- D)

Answer Key
Electron Configurations - Honors

1. **A**
2. **D**
3. **A**
4. **C**
5. **B**
6. **D**
7. **A**
8. **B**
9. **B**
10. **B**
11. **C**
12. **B**
13. **B**
14. **B**