

Electron Configuration Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 - 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. Which type of subshell is filled after 4s in the order of electron configuration?
 - A. 4p
 - B. 5s
 - C. 3d
 - D. 4d
2. Determine the element with the electron configuration [Xe] 6s² 4f¹⁴ 5d⁵.
 - A. Tantalum (Ta)
 - B. Tungsten (W)
 - C. Rhenium (Re)
 - D. Osmium (Os)
3. Which quantum number describes the orientation of an orbital in space?
 - A. Principal quantum number (n)
 - B. Spin quantum number (s)
 - C. Magnetic quantum number (m_l)
 - D. Angular momentum quantum number (l)
4. Which quantum number describes the shape of the orbital?
 - A. Principal quantum number (n)
 - B. Spin quantum number (s)
 - C. Angular momentum quantum number (l)
 - D. Magnetic quantum number (m)
5. What is the electron configuration of Phosphorus?
 - A. [Ne] 3s² 3p³
 - B. [Ne] 3s² 3p²
 - C. [Ne] 3s² 3p⁴
 - D. [Ne] 3s² 3p⁵

6. How many electrons are required to fill the 3p subshell?
- A. 3
 - B. 6
 - C. 2
 - D. 4
7. What is the electron configuration for an atom of Neon (Ne)?
- A. $1s^2 2s^2 2p^4$
 - B. $1s^2 2s^2 2p^5$
 - C. $1s^2 2s^2 2p^6$
 - D. $1s^2 2s^2 2p^3$
8. What is the electron configuration notation for the element with atomic number 26?
- A. $[\text{Ar}] 4s^2 3d^7$
 - B. $[\text{Ar}] 4s^2 3d^4$
 - C. $[\text{Ar}] 4s^2 3d^6$
 - D. $[\text{Ar}] 4s^1 3d^6$
9. What is the element corresponding to the electron configuration $[\text{Kr}] 5s^2 4d^{10} 5p^5$?
- A. Antimony (Sb)
 - B. Tellurium (Te)
 - C. Iodine (I)
 - D. Xenon (Xe)
10. Which element has the electron configuration $[\text{Ar}] 4s^2 3d^2$?
- A. Vanadium (V)
 - B. Titanium (Ti)
 - C. Iron (Fe)
 - D. Cobalt (Co)

Answers

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1. C
2. C
3. C
4. C
5. C
6. B
7. C
8. C
9. C
10. B

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Explanations

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1. Which type of subshell is filled after 4s in the order of electron configuration?

- A. 4p
- B. 5s
- C. 3d**
- D. 4d

The order in which subshells are filled in electron configurations follows the Aufbau principle, which states that electrons occupy the lowest energy orbitals first. After the 4s subshell is filled, the next subshell to be filled is the 3d subshell. Although the 3d subshell begins at the same principal quantum number ($n=3$) as the 4s subshell, d orbitals have a higher energy than s orbitals when considering their placement in the periodic table. However, in the actual filling sequence, the 4s subshell is filled first due to its lower energy in the context of the ground state electron configuration for elements. After all available 4s electrons are placed, the next available orbitals include the 3d subshell. This is based on the energy level and the stability of the electron configuration. It is important to note that the 5s subshell, located at a higher principal quantum level than 4s, cannot be filled before 3d due to the gap in energy, thus it does not come after the 4s subshell in terms of filling order. Similarly, the 4p and 4d subshells also come later in the

2. Determine the element with the electron configuration [Xe] 6s² 4f¹⁴ 5d⁵.

- A. Tantalum (Ta)
- B. Tungsten (W)
- C. Rhenium (Re)**
- D. Osmium (Os)

The provided electron configuration, [Xe] 6s² 4f¹⁴ 5d⁵, indicates that the element has a total of 75 electrons. This configuration suggests that after reaching the xenon core, the element adds 2 electrons in the 6s subshell, 14 in the 4f subshell, and 5 in the 5d subshell. To break down the steps: 1. The [Xe] core represents the electron configuration for xenon, which has 54 electrons. 2. Adding the 2 electrons in the 6s subshell brings the total to 56. 3. Adding the 14 electrons in the 4f subshell brings the total to 70. 4. Finally, adding the 5 electrons in the 5d subshell results in a total of 75 electrons. The element with 75 electrons on the periodic table is Rhenium (Re). Therefore, the electron configuration [Xe] 6s² 4f¹⁴ 5d⁵ corresponds correctly to Rhenium, confirming it as the answer. The other elements (Tantalum, Tungsten, and Osmium) have different electron configurations and atomic

3. Which quantum number describes the orientation of an orbital in space?

- A. Principal quantum number (n)**
- B. Spin quantum number (s)**
- C. Magnetic quantum number (m_l)**
- D. Angular momentum quantum number (l)**

The correct choice is the magnetic quantum number, which provides information about the orientation of an orbital within a given subshell. Each subshell has a specific number of orbitals that can occupy different positions in space, and the magnetic quantum number specifies these orientations relative to an external magnetic field. For instance, in a p subshell, there are three orbitals corresponding to the three possible values of the magnetic quantum number: -1, 0, and +1. This indicates that the p orbitals can be oriented along different axes (typically x, y, and z) in three-dimensional space. Similarly, the d and f subshells have their own sets of orbital orientations as defined by their respective magnetic quantum numbers. In contrast, the principal quantum number defines the energy level and size of the orbital, while the angular momentum quantum number describes the shape of the orbital. The spin quantum number refers to the intrinsic spin of the electrons within the orbital. Each of these quantum numbers plays a distinct role in the overall description of electron configurations, but only the magnetic quantum number is specifically responsible for orbital orientation.

4. Which quantum number describes the shape of the orbital?

- A. Principal quantum number (n)**
- B. Spin quantum number (s)**
- C. Angular momentum quantum number (l)**
- D. Magnetic quantum number (m)**

The angular momentum quantum number, often denoted as ' l ', is pivotal in determining the shape of an orbital. This quantum number can take on integer values starting from 0 up to $(n-1)$, where n is the principal quantum number. Each value of ' l ' corresponds to a specific type of orbital: - For $l = 0$, the shape is spherical (s orbitals). - For $l = 1$, the shape is dumbbell-like (p orbitals). - For $l = 2$, the shape consists of more complex arrangements like cloverleaf (d orbitals). - For $l = 3$, it corresponds to even more complex shapes (f orbitals). The principal quantum number (n) primarily indicates the energy level and size of the orbital rather than its shape. The spin quantum number (s) relates to the intrinsic spin of the electron and does not provide information about orbital shape either. The magnetic quantum number (m) describes the orientation of the orbital in space but does not convey the shape itself. Thus, the correct identification of the angular momentum quantum number (l) highlights its essential role in delineating the geometric characteristics of orbitals.

5. What is the electron configuration of Phosphorus?

- A. [Ne] $3s^2 3p^3$
- B. [Ne] $3s^2 3p^2$
- C. [Ne] $3s^2 3p^4$**
- D. [Ne] $3s^2 3p^5$

The electron configuration of Phosphorus, which has an atomic number of 15, accurately describes the distribution of its electrons across various energy levels and subshells. Using the noble gas shorthand notation, we start with the nearest noble gas preceding Phosphorus, which is Neon, represented as [Ne]. Neon has an atomic number of 10, so it accounts for the first 10 electrons. After Neon, Phosphorus has 5 additional electrons to place in the 3rd energy level. The 3s subshell can hold a maximum of 2 electrons, so those are filled first, represented as $3s^2$. Following that, the remaining 3 electrons go into the 3p subshell. The 3p subshell can hold up to 6 electrons, but for phosphorus, only 3 are needed. Thus, this is represented as $3p^3$. Combining these designations, the complete electron configuration for Phosphorus becomes [Ne] $3s^2 3p^3$. This configuration reflects that phosphorus has a total of 15 electrons, fulfilling its atom's structure according to the Aufbau principle, which dictates that electrons occupy the lowest energy orbitals first. The option that states [Ne

6. How many electrons are required to fill the 3p subshell?

- A. 3
- B. 6**
- C. 2
- D. 4

The 3p subshell can hold a maximum of six electrons. This is determined by the shape and orientation of the p orbitals. Each p subshell contains three individual orbitals (often denoted as $3p_x$, $3p_y$, and $3p_z$), and each orbital can accommodate two electrons, according to the Pauli exclusion principle. Therefore, when calculating the total number of electrons that can fill the 3p subshell, you multiply the number of orbitals (3) by the maximum number of electrons each can hold (2), resulting in a total capacity of six electrons. This understanding aligns with the principles of electron configurations in atomic theory, which dictate how electrons fill sublevels within an atom. Thus, filling the 3p subshell completely requires six electrons.

7. What is the electron configuration for an atom of Neon (Ne)?

- A. $1s^2 2s^2 2p^4$
- B. $1s^2 2s^2 2p^5$
- C. $1s^2 2s^2 2p^6$
- D. $1s^2 2s^2 2p^3$

The electron configuration for an atom of Neon (Ne) is $1s^2 2s^2 2p^6$, which indicates the distribution of electrons in atomic orbitals. Neon has an atomic number of 10, meaning it possesses a total of 10 electrons. Starting from the lowest energy level, the 1s orbital can hold up to 2 electrons, which accounts for the first two electrons ($1s^2$). Next, the 2s orbital also holds 2 electrons ($2s^2$), bringing the total to 4. Finally, the 2p orbital can hold a maximum of 6 electrons. Since Neon has a total of 10 electrons, the 2p orbital is completely filled with 6 electrons ($2p^6$). This configuration results in a full outer electron shell, which is characteristic of noble gases. Neon is chemically inert due to this filled outer shell, making it stable and nonreactive under normal conditions. The other configurations listed do not represent Neon accurately due to the number of electrons incorrectly inferred in their arrangements. For example, one suggests an incomplete filling of the 2p sublevel, while others indicate additional electrons that exceed the total of 10 electrons in Neon. This

8. What is the electron configuration notation for the element with atomic number 26?

- A. $[\text{Ar}] 4s^2 3d^7$
- B. $[\text{Ar}] 4s^2 3d^4$
- C. $[\text{Ar}] 4s^2 3d^6$
- D. $[\text{Ar}] 4s^1 3d^6$

The correct notation for the electron configuration of the element with atomic number 26 is $[\text{Ar}] 4s^2 3d^6$. To understand why this is the right answer, it is essential to consider the arrangement of electrons as they fill atomic orbitals according to the Aufbau principle, Hund's rule, and the Pauli exclusion principle. Iron, which has an atomic number of 26, is located in period 4 of the periodic table and is a transition metal. The electron configuration begins with the noble gas core of argon ($[\text{Ar}]$), which accounts for the first 18 electrons. After argon, electrons fill the 4s orbital before filling the 3d orbitals. Following this order of filling, the next two electrons enter the 4s orbital, giving us $4s^2$. After the 4s orbital is filled, the remaining 6 electrons will occupy the 3d orbitals. According to Hund's rule, these electrons will distribute themselves among the available orbitals to minimize repulsion, resulting in a configuration of $3d^6$ for iron. This electron configuration captures the correct distribution of electrons across the available energy levels and sub-levels for the given atomic number of 26

9. What is the element corresponding to the electron configuration [Kr] 5s² 4d¹⁰ 5p⁵?

A. Antimony (Sb)

B. Tellurium (Te)

C. Iodine (I)

D. Xenon (Xe)

The electron configuration provided, [Kr] 5s² 4d¹⁰ 5p⁵, indicates that this element has 35 electrons beyond those in the noble gas krypton [Kr]. To analyze this configuration, start by breaking it down: - The [Kr] represents the electron configuration of krypton, which accounts for 36 electrons. - The 5s² denotes 2 electrons in the 5s subshell. - The 4d¹⁰ indicates that the 4d subshell is fully filled with 10 electrons. - The 5p⁵ indicates there are 5 electrons in the 5p subshell. When adding the numbers together: - Krypton contribution: 36 electrons - 5s² contribution: 2 electrons - 4d¹⁰ contribution: 10 electrons - 5p⁵ contribution: 5 electrons Total: 36 + 2 + 10 + 5 = 53 electrons. The element with an atomic number of 53 is iodine (I), which fits the electron configuration stated. The correct answer corresponds to the unique arrangement of electrons in the shells surrounding the nucleus. Understanding the context: Ant

10. Which element has the electron configuration [Ar] 4s² 3d²?

A. Vanadium (V)

B. Titanium (Ti)

C. Iron (Fe)

D. Cobalt (Co)

The electron configuration [Ar] 4s² 3d² corresponds to the element titanium (Ti), which has an atomic number of 22. In this configuration, the [Ar] represents the electron configuration of argon, accounting for the first 18 electrons. The remaining 4 electrons that titanium has are distributed in the 4s and 3d sub-levels. The two electrons in the 4s orbital and the two electrons in the 3d orbital are characteristic of titanium. The 4s sub-level is filled before the 3d regardless of the energies involved due to the specific filling order in the Aufbau principle. Titanium is located in the fourth period and is a transition metal, classified in group 4 of the periodic table. This arrangement of electrons makes titanium unique in its chemical properties and interactions, especially as it can undergo various oxidation states generally seen in transition metals. In summary, the specific electron configuration allows us to identify titanium, as the unique distribution of electrons directly correlates to its position in the periodic table and its elemental properties.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

<https://electronconfig.examzify.com>

We wish you the very best on your exam journey. You've got this!