

DAT BOOTCAMP GENERAL CHEMISTRY PRACTICE TEST (SAMPLE)

STUDY GUIDE



**SAMPLE STUDY GUIDE
WITH LIMITED QUESTIONS**

**VISIT US ONLINE FOR
THE FULL VERSION STUDY GUIDE**

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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

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1. Which statement is true about K_p ?

- A. It is the equilibrium constant expressed in terms of pressure
- B. It is the rate constant
- C. It is the equilibrium constant expressed in terms of concentration
- D. It is independent of temperature

2. What is the expression for pOH?

- A. $\text{pOH} = -\log[\text{OH}^-]$
- B. $\text{pOH} = \log[\text{OH}^-]$
- C. $\text{pOH} = -[\text{OH}^-]$
- D. $\text{pOH} = [\text{OH}^-]$

3. Beta minus decay changes the atomic number Z how?

- A. Z decreases by 1
- B. Z remains unchanged
- C. Z increases by 1
- D. Z increases by 2

4. In a single bond, which type of bond is formed?

- A. covalent
- B. pi
- C. delta
- D. sigma

5. In a reaction coordinate diagram, ΔH is defined as the energy difference between which states?

- A. Activation energy and transition state
- B. Reactants and products
- C. Transition state and products
- D. Reactants and transition state

6. Which sequence is exothermic?

- A. Solid $\rightarrow$ Liquid $\rightarrow$ Gas
- B. Liquid $\rightarrow$ Gas $\rightarrow$ Solid
- C. Gas $\rightarrow$ Solid $\rightarrow$ Liquid
- D. Gas $\rightarrow$ Liquid $\rightarrow$ Solid

7. In redox chemistry, which statement is correct for LEO and GER?

- A. Gain of Electrons is Oxidation; Loss of Electrons is Reduction
- B. Loss of Electrons is Oxidation; Gain of Electrons is Reduction
- C. Oxidation is Gain of Protons; Reduction is Loss of Electrons
- D. Oxidation Numbers Do Not Change During Redox

8. Which of the following is not a strong acid?

- A. H_2CO_3
- B. HCl
- C. HNO_3
- D. H_2SO_4

9. Bond length in a diatomic molecule is best approximated by which relation?

- A. Difference of radii
- B. Product of radii
- C. Sum of radii
- D. Half of sum

10. Which statement best describes solvent in a solution?

- A. It is the substance present in the largest amount.
- B. It is always a liquid.
- C. It is always water.
- D. It is always the solute.

Answers

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

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Explanations

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1. Which statement is true about K_p ?

- A. It is the equilibrium constant expressed in terms of pressure
- B. It is the rate constant
- C. It is the equilibrium constant expressed in terms of concentration
- D. It is independent of temperature

K_p represents the equilibrium constant written in terms of the partial pressures of gases. In gas-phase equilibria, the activities of the species are related to their partial pressures, so the equilibrium expression uses p for products raised to their stoichiometric powers divided by the same for reactants. This is different from K_c , which uses concentrations instead of pressures. The two are connected by $K_p = K_c (RT)^{\Delta n}$, where Δn is the change in the number of moles of gas. Temperature matters because changing temperature shifts the position of equilibrium, altering the value of K_p (and K_c) accordingly. It isn't a rate constant, and it isn't independent of temperature.

2. What is the expression for pOH ?

- A. $pOH = -\log[OH^-]$
- B. $pOH = \log[OH^-]$
- C. $pOH = -[OH^-]$
- D. $pOH = [OH^-]$

pOH is defined as the negative base-10 logarithm of the hydroxide ion concentration. This gives $pOH = -\log_{10}[OH^-]$. The negative sign is essential because $[OH^-]$ in solutions is typically less than 1 M, so $\log_{10}[OH^-]$ would be negative and pOH would become a positive, convenient value that fits with the pH scale ($pH + pOH \approx 14$ at 25°C). Using just $\log[OH^-]$ would miss that conversion to a positive, intuitive measure. Writing $-[OH^-]$ or $[OH^-]$ would not reflect a logarithmic measure at all, so they don't correctly describe pOH .

3. Beta minus decay changes the atomic number Z how?

- A. Z decreases by 1
- B. Z remains unchanged
- C. Z increases by 1
- D. Z increases by 2

In beta minus decay, a neutron inside the nucleus is transformed into a proton, with the emission of an electron (the beta particle) and an antineutrino. This conversion increases the number of protons in the nucleus by one, so the atomic number Z goes up by 1. The total number of nucleons stays the same, so the mass number A doesn't change.

4. In a single bond, which type of bond is formed?

- A. covalent
- B. pi
- C. delta
- D. sigma

In a single covalent bond, the bonding interaction is a sigma bond formed by end-to-end overlap of atomic orbitals along the line between the two nuclei. This head-to-head overlap concentrates electron density directly between the atoms, creating the strongest, simplest bond that holds them together for a single bond. In contrast, pi bonds arise from sideways overlap of p orbitals and occur in double and triple bonds, adding strength beyond the sigma bond but not forming the single bond itself. Delta bonds involve more exotic, typically d-orbital interactions and aren't what constitutes a typical single bond. So, the bond type that forms in a single bond is the sigma bond.

5. In a reaction coordinate diagram, ΔH is defined as the energy difference between which states?

- A. Activation energy and transition state
- B. Reactants and products
- C. Transition state and products
- D. Reactants and transition state

Delta H is the overall energy change of the reaction, equal to the difference in energy between products and reactants on a reaction coordinate diagram. On the diagram, reactants sit at one energy level and products at another; $\Delta H = E_{\text{products}} - E_{\text{reactants}}$. If ΔH is negative, the reaction is exothermic (releases heat); if positive, it's endothermic (absorbs heat). This is different from the activation energy, which is the energy needed to climb from the reactants up to the transition state (the energy barrier). The energy difference from the transition state to the products is the reverse activation energy. So, the energy difference between reactants and products is the quantity that represents ΔH .

6. Which sequence is exothermic?

- A. Solid $\rightarrow$ Liquid $\rightarrow$ Gas
- B. Liquid $\rightarrow$ Gas $\rightarrow$ Solid
- C. Gas $\rightarrow$ Solid $\rightarrow$ Liquid
- D. Gas $\rightarrow$ Liquid $\rightarrow$ Solid

Exothermic changes release heat to the surroundings. Gas to liquid is condensation, which releases latent heat as the molecules slow and cling together. Liquid to solid is freezing, which also releases latent heat as the substance forms a rigid structure. Since both steps release heat, the overall path from gas to liquid to solid is exothermic.

7. In redox chemistry, which statement is correct for LEO and GER?

- A. Gain of Electrons is Oxidation; Loss of Electrons is Reduction
- B. Loss of Electrons is Oxidation; Gain of Electrons is Reduction**
- C. Oxidation is Gain of Protons; Reduction is Loss of Electrons
- D. Oxidation Numbers Do Not Change During Redox

Redox chemistry centers on electron transfer. LEO and GER give a simple rule: Loss of Electrons is Oxidation; Gain of Electrons is Reduction. When a species loses electrons, its oxidation state goes up, so it is oxidized. When a species gains electrons, its oxidation state goes down, so it is reduced. The statement that directly captures this relationship is the correct one. The other ideas either mix up what's being transferred (electrons, not protons) or claim oxidation numbers don't change, which isn't true in a redox process.

8. Which of the following is not a strong acid?

- A. H_2CO_3**
- B. HCl
- C. HNO_3
- D. H_2SO_4

Strong acids give up their protons completely in water, so the reaction lies far to the right with essentially all of the acid present as H_3O^+ . A weak acid, on the other hand, only partially ionizes, so there's an equilibrium between the undissociated acid and its ions; a significant amount of the acid remains intact. Carbonic acid is a weak acid because its first dissociation has a small K_a (about 4×10^{-7}), which means only a small fraction of H_2CO_3 converts to H^+ and HCO_3^- at typical concentrations. This partial ionization makes it far from a strong acid. In contrast, hydrochloric acid and nitric acid are strong acids and dissociate completely in water, producing large amounts of H_3O^+ . Sulfuric acid is also considered a strong acid for its first proton donation (the first dissociation is effectively complete), so it behaves as a strong acid in aqueous solution as well. So the not-strong acid among the options is carbonic acid.

9. Bond length in a diatomic molecule is best approximated by which relation?

- A. Difference of radii
- B. Product of radii
- C. Sum of radii
- D. Half of sum**

Bond length is the distance between the two nuclei in a diatomic molecule. In covalent bonding, each atom has a covalent radius that describes how far its electron density extends toward its partner. When the two atoms form a bond, their electron clouds meet, and the nuclei sit apart by roughly the sum of these two radii. So the bond length is well estimated by adding the covalent radii of the two atoms. This simple relation captures why smaller atoms with smaller radii have shorter bonds and larger atoms with bigger radii have longer bonds, and it aligns with typical measurements across many diatomics (for example, $\text{H}-\text{H}$ is about $0.74 \text{ \AA}$, matching $0.37 \text{ \AA} + 0.37 \text{ \AA}$). The idea of taking half of the sum would not correspond to the actual nucleus-to-nucleus distance, which is why the sum is the standard estimate.

10. Which statement best describes solvent in a solution?

A. It is the substance present in the largest amount.

B. It is always a liquid.

C. It is always water.

D. It is always the solute.

The solvent is the component present in the greatest amount, serving as the medium in which other substances (solutes) are dissolved. Its identity largely dictates the solution's properties and phase. It's not required to be a liquid—solvents can be gases or solids in some contexts (such as air or metal alloys), and water is simply a very common solvent, not universal. It's also not always the solute, which is the substance that is dissolved. So the best description is that the solvent is the substance present in the largest amount.

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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://datbootcampgenchem.examzify.com>

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

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