

AC-HPAT CHEMISTRY PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE

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Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	15

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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. Titration of 25.0 mL of 0.100 M NH_3 ($K_b = 1.8 \times 10^{-5}$) with 0.100 M HCl. What is the pH at the equivalence point?
- A. 7.00
 - B. 3.50
 - C. 4.63
 - D. 9.00
2. Convert 1 atm to torr.
- A. 720 torr
 - B. 745 torr
 - C. 760 torr
 - D. 800 torr
3. In an exothermic reaction at equilibrium, what is the effect of increasing temperature on the position of the equilibrium?
- A. Shifts toward the products (right)
 - B. No change in the position of equilibrium
 - C. The equilibrium constant changes
 - D. Shifts toward the reactants (left)
4. In cash accounting, when are revenues and expenses recorded?
- A. Revenues and expenses are recorded when cash is received and paid
 - B. Revenues recognized when earned and expenses incurred
 - C. All items recognized on accrual basis
 - D. Revenue recognized when cash is received but expenses when incurred
5. Define the limiting reagent in a chemical reaction and give an example.
- A. The reactant consumed first that limits product formation; e.g., in $\text{A} + \text{B} \rightarrow \text{AB}$ with 2 moles A and 1 mole B, B is limiting
 - B. The reactant present in the smallest amount
 - C. The reactant that speeds up the reaction
 - D. The product that forms last

6. Capital budgeting is primarily about choosing projects that add value to the company.

- A. Choosing projects that add value to the company
- B. Managing daily cash flow
- C. Setting interest rates
- D. Auditing financial statements

7. What is the purpose of bank regulation?

- A. To promote safe and sound banking practices.
- B. To maximize bank profits through deregulation.
- C. To set retail pricing targets for consumer products.
- D. To regulate foreign exchange risk only.

8. What does ΔG represent in $\Delta G = \Delta H - T\Delta S$?

- A. Gibbs free energy change
- B. Enthalpy
- C. Entropy
- D. Temperature

9. What does the Balance Sheet report?

- A. report of a company's financial worth in terms of book value
- B. breaks down the revenue that a company earns against the expenses involved in its business to provide net profit or loss
- C. shows the cash inflows and outflows during a period
- D. reports a company's market capitalization

10. Which metric is typically expressed as a percentage?

- A. Internal Rate of Return
- B. Net Present Value
- C. Payback Period
- D. Accounting Profit

Answers

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

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Explanations

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1. Titration of 25.0 mL of 0.100 M NH_3 ($K_b = 1.8 \times 10^{-5}$) with 0.100 M HCl. What is the pH at the equivalence point?

- A. 7.00
- B. 3.50
- C. 4.63**
- D. 9.00

At the equivalence point of titrating a weak base with a strong acid, all the base has been converted to its conjugate acid. Here, ammonia (NH_3) becomes ammonium (NH_4^+). The pH is governed by the hydrolysis of NH_4^+ , not by remaining OH^- or base. First find the conjugate acid's dissociation constant. For NH_3 , $K_b = 1.8 \times 10^{-5}$. Using $K_w = 1.0 \times 10^{-14}$, K_a for NH_4^+ is $K_a = K_w / K_b \approx 1.0 \times 10^{-14} / 1.8 \times 10^{-5} \approx 5.56 \times 10^{-10}$. The pK_a of NH_4^+ is about 9.25, indicating NH_4^+ is a weak acid. At equivalence, the total volume is 25.0 mL of NH_3 plus 25.0 mL of HCl = 50.0 mL, and moles NH_3 initially are $0.0250 \text{ L} \times 0.100 \text{ M} = 2.50 \times 10^{-3} \text{ mol}$. Thus, the NH_4^+ concentration in the solution is $2.50 \times 10^{-3} \text{ mol} / 0.0500 \text{ L} = 0.0500 \text{ M}$. For a weak acid HA with concentration C and K_a , the $[\text{H}^+]$ is approximately $\sqrt{K_a \times C}$. Here, $[\text{H}^+] \approx \sqrt{5.56 \times 10^{-10} \times 0.0500} \approx \sqrt{2.78 \times 10^{-11}} \approx 5.3 \times 10^{-6} \text{ M}$. The pH is then $-\log(5.3 \times 10^{-6}) \approx 5.28$. So, the pH at the equivalence point is about 5.3. This is acidic because the conjugate acid NH_4^+ dominates the solution, unlike a strong acid–base titration where the equivalence point would be neutral.

2. Convert 1 atm to torr.

- A. 720 torr
- B. 745 torr
- C. 760 torr**
- D. 800 torr

Understanding unit relationships: 1 atmosphere is defined as exactly 760 torr. A torr is the same as a millimeter of mercury (mmHg). By definition, the pressure that can support a 760 mm column of mercury at 0°C is one atmosphere. So, converting 1 atm to torr gives 760 torr. The other numbers would represent different pressures and don't match the standard definition of 1 atm.

3. In an exothermic reaction at equilibrium, what is the effect of increasing temperature on the position of the equilibrium?

- A. Shifts toward the products (right)
- B. No change in the position of equilibrium
- C. The equilibrium constant changes
- D. Shifts toward the reactants (left)**

Le Chatelier's principle says a system at equilibrium will adjust to counteract a disturbance. For an exothermic reaction, heat behaves like a product. If you raise the temperature, you're adding heat to the system, so the equilibrium shifts in the direction that absorbs heat—the reverse (endothermic) direction. That means more reactants are formed and fewer products, so the position moves to the left. The equilibrium constant does change with temperature (it usually decreases for an exothermic reaction when temperature rises), which aligns with this shift, but the key point here is the leftward move of the equilibrium position.

4. In cash accounting, when are revenues and expenses recorded?

- A. Revenues and expenses are recorded when cash is received and paid
- B. Revenues recognized when earned and expenses incurred
- C. All items recognized on accrual basis
- D. Revenue recognized when cash is received but expenses when incurred

Cash accounting records revenues when cash is actually received and expenses when cash is actually paid. This means revenue is recognized only after payment is received, and an expense is recorded only when the cash is paid out. So, if you perform a service in December but aren't paid until January, the revenue is recorded in January. If you incur an expense in December but pay in January, the expense is recorded in January. The other statements describe accrual accounting or mixed methods, which don't fit cash accounting.

5. Define the limiting reagent in a chemical reaction and give an example.

- A. The reactant consumed first that limits product formation; e.g., in $A + B \rightarrow AB$ with 2 moles A and 1 mole B, B is limiting
- B. The reactant present in the smallest amount
- C. The reactant that speeds up the reaction
- D. The product that forms last

Limiting reagent is the reactant that is consumed first, which sets the maximum amount of product that can be formed given the amounts and the ratios in the balanced equation. Once this reactant is used up, the reaction stops even if other reactants are still present in excess. For example, in the reaction $A + B \rightarrow AB$, with 2 moles of A and 1 mole of B, you need a 1:1 ratio of A to B to make AB. Since there is only 1 mole of B, only 1 mole of AB can be produced, using 1 mole of A and leaving 1 mole of A unreacted. Thus the reactant present in the smaller proportion relative to its required amount becomes the limiting reagent. It's not simply about which reactant starts with the smaller amount, because the limiting reagent depends on the amounts and the stoichiometric coefficients, not just the initial quantities.

6. Capital budgeting is primarily about choosing projects that add value to the company.

- A. Choosing projects that add value to the company
- B. Managing daily cash flow
- C. Setting interest rates
- D. Auditing financial statements

Selecting long-term investments that increase the firm's value. Capital budgeting focuses on evaluating and choosing projects whose expected cash flows, when discounted at the cost of capital, add value to the company. The aim is to maximize shareholder value by undertaking projects that yield a positive net present value or otherwise enhance future profitability. Daily cash flow management deals with short-term liquidity, setting interest rates is a macro decision outside the firm, and auditing financial statements is about verifying accuracy—none of these drive the long-run value creation that capital budgeting targets.

7. What is the purpose of bank regulation?

- A. To promote safe and sound banking practices.
- B. To maximize bank profits through deregulation.
- C. To set retail pricing targets for consumer products.
- D. To regulate foreign exchange risk only.

Bank regulation exists to keep banks safe and trustworthy so they can meet their obligations to customers and support the broader economy. Regulators require banks to hold enough capital to absorb losses, maintain liquidity to cover withdrawals, and have effective risk management, governance, and internal controls. They also conduct ongoing supervision and regular stress testing to spot problems early and enforce corrective actions. All of this reduces the chance of bank failures, protects depositors, and helps maintain confidence in the financial system, which is crucial for stable economic activity. Options that focus on maximizing profits through deregulation miss the protection and stability purpose of regulation. Setting retail pricing targets for consumer products is not the regulator's role and would distort markets. Regulating foreign exchange risk alone is too narrow; regulation covers a wide range of risks and activities beyond just FX to ensure overall safety and soundness.

8. What does ΔG represent in $\Delta G = \Delta H - T\Delta S$?

- A. Gibbs free energy change
- B. Enthalpy
- C. Entropy
- D. Temperature

ΔG represents the change in Gibbs free energy, the amount of energy available to do useful work when pressure and temperature are held constant. The equation $\Delta G = \Delta H - T\Delta S$ shows how heat exchange (ΔH) and the system's tendency to become more or less disordered (ΔS) compete: the temperature multiplies the entropy change to give how much energy is tied up in increasing disorder. When ΔG is negative, the process can proceed spontaneously under those conditions; when positive, it tends not to occur unless driven by external input; at equilibrium, ΔG is zero. A helpful way to see this is the melting example: melting ice requires energy input (ΔH is positive) but increases randomness (ΔS is positive); at higher temperature, the $T\Delta S$ term can overcome ΔH , making ΔG negative and melting favorable. So the quantity described is the Gibbs free energy change. The other terms aren't what ΔG alone represents: ΔH is the enthalpy change, ΔS is the entropy change, and T is the temperature.

9. What does the Balance Sheet report?

- A. report of a company's financial worth in terms of book value
- B. breaks down the revenue that a company earns against the expenses involved in its business to provide net profit or loss
- C. shows the cash inflows and outflows during a period
- D. reports a company's market capitalization

The balance sheet is a snapshot of a company's financial position at a specific date, listing what it owns (assets) and what it owes (liabilities), with the owners' claim (equity) on the remaining assets. This arrangement shows the book value of the company, since assets minus liabilities equal equity. It's the clear way to express the company's financial worth in accounting terms. It isn't about profits or losses (that's shown on the income statement), nor about cash movements over a period (that's the cash flow statement), and it doesn't reflect market value or market capitalization.

10. Which metric is typically expressed as a percentage?

A. Internal Rate of Return

B. Net Present Value

C. Payback Period

D. Accounting Profit

When evaluating investments, some metrics express value in currency while others express a rate of return. Internal Rate of Return is a rate of return—the annualized discount rate that makes the net present value of cash flows zero. Because it's a rate, it's naturally shown as a percentage per year. That's why this metric is typically expressed as a percentage. Net Present Value, in contrast, is a dollar amount—the present value of inflows minus outflows. The Payback Period is measured in years, indicating how long it takes to recover the initial investment. Accounting Profit is also expressed in currency terms, not as a rate. So the one that is commonly shown as a percentage is the Internal Rate of Return.

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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://achpatchem.examzify.com>

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

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