AC-HPAT CHEMISTRY PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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.

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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!

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Questions

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1. What is the value of the gas constant R in units of L atm mol−1 K−1 used in the ideal gas law?

A. 0.0821 L atm / (mol K)

B. 8.314 L atm / (mol K)

C. 62.364 L torr / (mol K)

D. 0.082057 L atm / (mol K)

2. In the titration of ammonia with hydrochloric acid, the conjugate acid formed at equivalence is which species?

A. NH3

B. NH4+

C. NH2-

D. NH5+

3. Which activities are reflected in Cash Flow From Investing?

A. Capital expenditures and sales of long-term investments

B. Debt and equity transactions

C. Revenues from customers on an accrual basis

D. Dividends paid to shareholders

4. How many moles are in 2.00 L of a 0.500 M Na2SO4 solution?

A. 0.500 mol

B. 1.00 mol

C. 2.00 mol

D. 0.250 mol

5. Horizontal analysis is defined as what?

A. compares data horizontally, by analyzing values of line items across two or more years; compare historical data

B. looks at the vertical effects that line items have on other parts of the business and the business's proportions; compares items on financial statement in relation to each other

C. uses important ratio metrics to calculate statistical relationships; central part of fundamental equity analysis; compares line-item data

D. reports a company's financial worth in terms of book value

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6. What is the oxidation state of oxygen in most compounds (excluding peroxides or OF2)?

A. +2

B. -1

C. 0

D. -2

7. How is Free Cash Flow defined?

A. net operating cash flow - capital expenditure

B. net income - taxes

C. cash flow from financing - cash flow from investing

D. operating cash flow + capital expenditure

8. What is the molarity of a solution prepared by dissolving 5.844 g of NaCl in 1.000 L of solution?

A. 0.050 M

B. 0.100 M

C. 0.206 M

D. 1.00 M

9. Profitability Ratios express what?

A. How profitably the firm is operating and utilizing its assets

B. The cash flow from operating activities

C. The debt-to-equity ratio

D. The company's current ratio

10. A 5.00 g sample of magnesium reacts with excess hydrochloric acid to produce hydrogen gas and magnesium chloride. How many moles of H2 are produced? (Mg molar mass = 24.305 g/mol)

A. 0.103 mol

B. 0.412 mol

C. 0.206 mol

D. 0.250 mol

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Answers

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

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Explanations

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1. What is the value of the gas constant R in units of L atm mol−1 K−1 used in the ideal gas law?

A. 0.0821 L atm / (mol K)

B. 8.314 L atm / (mol K)

C. 62.364 L torr / (mol K)

D. 0.082057 L atm / (mol K)

R acts as the bridge in PV = nRT, making pressure, volume, amount, and temperature fit together when pressure is in atmospheres and volume in liters. In those units, the constant must have the units L·atm·mol−1·K−1. The precise value is 0.082057 L atm mol−1 K−1, which is why this option is the best choice. A rounded version like 0.0821 is common for quick calculations, but it's just a rounded form of the same constant. Other options use different unit systems or scales: 8.314 is in J·mol−1·K−1, not compatible with atm and L; 62.364 L·torr·mol−1·K−1 is the same constant expressed in torr units (1 atm = 760 torr). The value that exactly matches the requested units is 0.082057 L atm mol−1 K−1.

2. In the titration of ammonia with hydrochloric acid, the conjugate acid formed at equivalence is which species?

A. NH3

B. NH4+

C. NH2-

D. NH5+

At the equivalence point in this titration, all the ammonia (the base) has been protonated by the added acid, forming its conjugate acid. That conjugate acid is ammonium ion (NH4+). In water, NH4+ can donate a proton back to water, making the solution acidic, which is why the equivalence point lies below pH 7. The other species aren't formed here because NH3 is the original base, not its conjugate acid; NH2− would require removing a proton, and NH5+ would require far more protonation than occurs in this titration. So the species present at equivalence is NH4+.

3. Which activities are reflected in Cash Flow From Investing?

A. Capital expenditures and sales of long-term investments

B. Debt and equity transactions

C. Revenues from customers on an accrual basis

D. Dividends paid to shareholders

Cash flows from investing reflect how a company uses and generates cash through long-term assets and investments. It includes cash outflows for capital expenditures—buying property, plant, and equipment—and cash inflows from selling long-term assets or investments. This is distinct from financing activities, which involve borrowing, repaying debt, issuing or repurchasing stock, and paying dividends, and from operating activities, which cover the day-to-day business like revenues from customers. Therefore, capital expenditures and sales of long-term investments are the investing activities.

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4. How many moles are in 2.00 L of a 0.500 M Na2SO4 solution?

A. 0.500 mol

B. 1.00 mol

C. 2.00 mol

D. 0.250 mol

In a solution, molarity tells you how many moles are present per liter, so you find moles by multiplying the molarity by the volume in liters. The amount of Na2SO4 is 0.500 mol/L × 2.00 L = 1.00 mol. Since the question asks for moles of the dissolved compound itself, not the ions it forms, there's no further multiplication. The three significant figures are preserved, so the result is 1.00 moles.

5. Horizontal analysis is defined as what?

A. compares data horizontally, by analyzing values of line items across two or more years; compare historical data

B. looks at the vertical effects that line items have on other parts of the business and the business's proportions; compares items on financial statement in relation to each other

C. uses important ratio metrics to calculate statistical relationships; central part of fundamental equity analysis; compares line-item data

D. reports a company's financial worth in terms of book value

Horizontal analysis looks at financial data over multiple periods to spot trends in line items. It focuses on how each item changes from year to year, using both dollar changes and percentage changes to quantify growth or decline. This method helps you see patterns like revenue increasing consistently, costs rising faster than sales, or profits shrinking over time. For example, you'd compare the same item across two or more years to determine what happened from one period to the next. This is why it's described as analyzing data across time and historical periods. By contrast, vertical analysis examines proportions within a single period, ratio analysis compares relationships between items, and reporting book value is about the stated worth of assets rather than changes over time.

6. What is the oxidation state of oxygen in most compounds (excluding peroxides or OF2)?

A. +2

B. -1

C. 0

D. -2

Oxygen almost always has an oxidation state of -2 in compounds because it tends to form oxide ions and fill its valence shell. In neutral compounds, the sum of oxidation states is zero, so with typical partners, oxygen takes -2 (as in water or metal oxides). The main exception is when oxygen is bonded to a more electronegative element like fluorine, as in OF2, where oxygen ends up with a positive oxidation state (+2). Peroxides are another special case, where the O–O bond assigns an average oxidation state of -1 to each oxygen. So, for most compounds, the oxidation state of oxygen is -2.

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7. How is Free Cash Flow defined?

A. net operating cash flow - capital expenditure

B. net income - taxes

C. cash flow from financing - cash flow from investing

D. operating cash flow + capital expenditure

Free cash flow is the cash a company has left after paying the costs needed to maintain or grow its asset base. In practical terms, it's operating cash flow minus capital expenditures. This shows the cash generated by the core business that is available to distribute to investors, pay down debt, or reinvest. The given definition matches this idea: subtract capital expenditures from cash generated by operations to reflect the cash truly available after maintaining the assets. Other options mix inearnings metrics or add CapEx instead of subtracting it, which doesn't represent the cash that remains after sustaining the asset base.

8. What is the molarity of a solution prepared by dissolving 5.844 g of NaCl in 1.000 L of solution?

A. 0.050 M

B. 0.100 M

C. 0.206 M

D. 1.00 M

Molarity is moles of solute per liter of solution. First determine the amount of NaCl in moles: NaCl has a molar mass of 58.44 g/mol, so n = 5.844 g ÷ 58.44 g/mol = 0.100 mol. The volume is 1.000 L, so M = n/V = 0.100 mol ÷ 1.000 L = 0.100 M. This equals one-tenth of a mole per liter, since the given mass corresponds to exactly 0.1 mol in one liter. The other possibilities would require more or less NaCl per liter than what was provided.

9. Profitability Ratios express what?

A. How profitably the firm is operating and utilizing its assets

B. The cash flow from operating activities

C. The debt-to-equity ratio

D. The company's current ratio

Profitability ratios show how effectively a company turns sales into profit and how efficiently it uses its assets to generate earnings. They focus on margins (like gross, operating, and net margins) and returns (such as return on assets and return on equity), which capture how much profit the firm makes relative to sales, assets, or equity. That's why the correct way to express profitability is to describe how profitably the firm is operating and utilizing its assets. Cash flow from operating activities measures the cash generated by core operations, not necessarily how profitable those operations are. The debt-to-equity ratio reflects leverage, not profitability. The current ratio assesses liquidity, not profitability.

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10. A 5.00 g sample of magnesium reacts with excess hydrochloric acid to produce hydrogen gas and magnesium chloride. How many moles of H2 are produced? (Mg molar mass = 24.305 g/mol)

A. 0.103 mol

B. 0.412 mol

C. 0.206 mol

D. 0.250 mol

In this reaction, magnesium reacts with excess hydrochloric acid to produce hydrogen gas, and the balanced equation shows a 1:1 relationship between magnesium and hydrogen gas. That means the number of moles of hydrogen produced equals the number of moles of magnesium that react. First find how many moles of magnesium you have: 5.00 g ÷ 24.305 g/mol ≈ 0.206 mol. Since the acid is in excess, magnesium is the limiting reagent, so all of it is converted to hydrogen gas. Therefore, about 0.206 moles of hydrogen gas are produced.

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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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