Acids, Bases, and Salts Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

Sample study guide. For the full version with hundreds of questions, visit: https://acidsbasessalts.examzify.com

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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. In an aqueous solution, which substance yields hydrogen ions as the only positive ion?

A. C2H5OH

B. CH3COOH

C. KH

D. KOH

2. Compared to HCl, the acid CH3COOH is what?

A. HCl is weaker than CH3COOH

B. HCl and CH3COOH are equally strong

C. CH3COOH is weaker than HCl

D. CH3COOH is stronger than HCl

3. What are the products when sulfuric acid reacts with sodium hydroxide in the described stoichiometry?

A. Na2SO4 and 2 H2O

B. Na2SO3 and H2O

C. NaHSO4 and H2O

D. Na2SO4 and H2

4. Which metal will release H2 gas when it reacts with hydrochloric acid?

A. Au

B. Zn

C. Hg

D. Ag

5. Which statement correctly defines an Arrhenius acid?

A. Donates hydroxide ions in aqueous solution.

B. Produces hydrogen ions in aqueous solution.

C. Accepts protons in solution.

D. Decomposes to metal and nonmetal.

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6. Which substance is an Arrhenius base?

A. NaOH

B. HI

C. CH3COOH

D. H2O

7. Which statement about neutralization stoichiometry is true for a reaction between a monoprotic acid and a strong base?

A. The mole ratio is 2:1

B. The mole ratio is 1:1

C. The mole ratio is 1:2

D. The mole ratio is 3:1

8. What color is phenolphthalein in a basic solution?

A. Blue

B. Pink

C. Yellow

D. Colorless

9. In a solution where [H3O+] > [OH-], the solution is

A. Neutral

B. Acidic

C. Basic

D. Amphoteric

10. Acidic solutions are those that contain an excess of which species?

A. H2 molecules

B. H2O molecules

C. H+ ions

D. OH- ions

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Answers

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

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Explanations

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1. In an aqueous solution, which substance yields hydrogen ions as the only positive ion?

A. C_2H_5OH

B. CH_3COOH

C. KH

D. KOH

In water, acids increase the concentration of hydrogen ions by donating a proton to a water molecule, forming hydronium ions (H_3O^+). The positive ions present in solution come from this proton transfer, not from the conjugate base. Acetic acid does this: $CH_3COOH + H_2O \rightleftharpoons H_3O^+ + CH_3COO^-$. The only positive ion produced is hydronium, with acetate as the accompanying anion. Other substances behave differently: ethanol is essentially neutral in water, so it doesn't produce H_3O^+ as a major ion; potassium hydride reacts with water to give K^+ and OH^- (not H_3O^+); potassium hydroxide dissociates to K^+ and OH^- as well. Thus, acetic acid is the one that yields hydrogen ions as the only positive ion.

2. Compared to HCl, the acid CH_3COOH is what?

A. HCl is weaker than CH_3COOH

B. HCl and CH_3COOH are equally strong

C. CH_3COOH is weaker than HCl

D. CH_3COOH is stronger than HCl

Acid strength in water is determined by how completely the acid dissociates. Hydrochloric acid is a strong acid, so it almost completely breaks apart in solution to give H^+ and Cl^-. Acetic acid, on the other hand, is a weak acid; it only partially dissociates, so at the same concentration it produces far fewer H^+. Since the level of H^+ in solution dictates acidity, HCl is stronger and CH_3COOH is weaker. This is reflected in their Ka values as well—acetic acid has a relatively small Ka, while a strong acid like HCl effectively has a much larger tendency to donate a proton in water.

3. What are the products when sulfuric acid reacts with sodium hydroxide in the described stoichiometry?

A. Na_2SO_4 and 2 H_2O

B. Na_2SO_3 and H_2O

C. $NaHSO_4$ and H_2O

D. Na_2SO_4 and H_2

This question tests how a diprotic acid reacts with a strong base in a neutralization to form a salt and water. Sulfuric acid can donate two protons, and sodium hydroxide provides two hydroxide ions per mole. When they react, the two H^+ from the acid pair with two OH^- from the base to make two water molecules, and the sodium ions coat the sulfate to form the salt. The balanced equation is $H_2SO_4 + 2\ NaOH \rightarrow Na_2SO_4 + 2\ H_2O$. That's why the products are sodium sulfate and water. The other options don't fit this neutralization pattern. Forming $NaHSO_4$ would come from only partial neutralization (one proton removed), and producing Na_2SO_3 would require a reduction step not present in a simple acid-base reaction. Generating H_2 would require a reaction that releases hydrogen gas (like a metal reacting with acid), not a base neutralization.

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4. Which metal will release H2 gas when it reacts with hydrochloric acid?

A. Au

B. Zn

C. Hg

D. Ag

Metals that are more reactive than hydrogen will push hydrogen out of acids, producing hydrogen gas. In hydrochloric acid, zinc can donate electrons to reduce H+ to H2, so it undergoes oxidation to Zn2+ while the hydrogen gas is released. The overall reaction is Zn + 2HCl → ZnCl2 + H2. Gold and silver are much less reactive than hydrogen, so they don't displace hydrogen from HCl and no H2 is produced under normal conditions. Mercury doesn't react with dilute hydrochloric acid to liberate hydrogen gas either, though it can react with stronger oxidizing acids. So zinc is the metal that releases hydrogen gas with hydrochloric acid.

5. Which statement correctly defines an Arrhenius acid?

A. Donates hydroxide ions in aqueous solution.

B. Produces hydrogen ions in aqueous solution.

C. Accepts protons in solution.

D. Decomposes to metal and nonmetal.

Arrhenius acids are substances that increase the concentration of hydrogen ions in aqueous solution. In water, those H+ ions are present as hydronium (H3O+), so acids release H+ when dissolved. That's why the statement about producing hydrogen ions in aqueous solution is correct. Releasing hydroxide ions would define an Arrhenius base, accepting protons fits Bronsted-Lowry base behavior, and decomposing into metal and nonmetal isn't related to acid-base definitions.

6. Which substance is an Arrhenius base?

A. NaOH

B. HI

C. CH3COOH

D. H2O

An Arrhenius base is a substance that increases the concentration of hydroxide ions (OH−) when dissolved in water. Sodium hydroxide does exactly that: it dissociates in water to yield Na+ and OH−, raising the OH− concentration and making the solution basic. The other substances do not increase OH− in solution—hydroiodic acid and acetic acid donate protons (H+), while water is neutral (though it can act amphoterically, it isn't considered an Arrhenius base in this context).

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7. Which statement about neutralization stoichiometry is true for a reaction between a monoprotic acid and a strong base?

A. The mole ratio is 2:1

B. The mole ratio is 1:1

C. The mole ratio is 1:2

D. The mole ratio is 3:1

The main idea is that neutralization between a monoprotic acid and a strong base uses one proton from the acid for each hydroxide ion from the base. The reaction HA + OH− → A− + H2O shows a one-to-one relationship: one mole of acid reacts with one mole of base. Therefore, the mole ratio is 1:1. Ratios like 2:1, 1:2, or 3:1 would imply more than one proton (or hydroxide) per acid molecule, which doesn't apply to a monoprotic acid.

8. What color is phenolphthalein in a basic solution?

A. Blue

B. Pink

C. Yellow

D. Colorless

Phenolphthalein is a pH indicator whose color depends on its protonation state. In acidic solutions it stays colorless because the molecule is in its protonated form. As the solution becomes basic, phenolphthalein loses protons and shifts to a deprotonated form that absorbs light differently, giving a pink color. This pink appearance typically starts once the pH rises above about 8.2 and can deepen toward a fuchsia at higher pH. So in a basic solution you would observe pink. The other color options don't match phenolphthalein's behavior under normal aqueous pH ranges.

9. In a solution where [H3O+] > [OH-], the solution is

A. Neutral

B. Acidic

C. Basic

D. Amphoteric

When the hydronium concentration exceeds the hydroxide concentration, the solution has extra protons, so the pH is below 7. At room temperature, neutral water has [H3O+] = [OH−] ≈ 1×10−7 M; any excess of H3O+ lowers the pH, which defines an acidic solution. The product [H3O+][OH−] equals Kw (about 1×10−14 at 25°C), so a higher [H3O+] shifts the balance toward acidity. This matches an acidic description. It wouldn't be neutral, and it wouldn't be basic (which would have [OH−] > [H3O+]); amphoteric refers to a substance that can act as either acid or base, not the state of the solution itself.

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10. Acidic solutions are those that contain an excess of which species?

A. H2 molecules

B. H2O molecules

C. H+ ions

D. OH- ions

Acidic solutions are defined by having more hydrogen ions than other species in the solution. In water, those hydrogen ions are present as hydronium (H3O+) ions. Acids donate protons to the solution, increasing the concentration of H+ (or H3O+). The higher the H+ concentration, the more acidic the solution and the lower its pH. The other possibilities don't explain acidity: H2 is just diatomic hydrogen and doesn't define acidity in solution; H2O is the solvent, not a measure of acidity; OH− ions are characteristic of basic solutions, not acidic ones.

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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://acidsbasessalts.examzify.com

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

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