

PHYSICAL CHEMICAL WASTE WATER GRADE 1 PRACTICE EXAM (SAMPLE)

STUDY GUIDE



**SAMPLE STUDY GUIDE
WITH LIMITED QUESTIONS**

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THE FULL VERSION STUDY GUIDE**

<https://physicalchem1wastewater.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.

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 correctly describes NPDES permit renewal submission timing?**
 - A. 90 days
 - B. 180 days
 - C. 240 days
 - D. 120 days

- 2. Which apparatus is used for the settleable solids test?**
 - A. Imhoff cone
 - B. Beaker
 - C. Hydrometer
 - D. Flask

- 3. Which condition would NOT typically be reviewed in a carbon absorption process?**
 - A. pH levels
 - B. Contact time
 - C. Monitoring ammonia nitrogen
 - D. Breakthrough capacity

- 4. Carbon column reactors are usually lined with epoxy or resin. Which option represents this lining material?**
 - A. Epoxy or Resin
 - B. Concrete
 - C. Steel
 - D. Plastic

- 5. Velocity may be sensed by which combination of methods?**
 - A. electronically, hydraulically, and mechanically
 - B. electronically
 - C. hydraulically
 - D. mechanically

- 6. If water samples are filtered before analysis, how should the results be noted?**
- A. Dissolved
 - B. Total
 - C. Particulate
 - D. Filtered
- 7. What aids in increasing the efficiency of oil/water separators?**
- A. Filtration Membranes
 - B. Coalescing Units
 - C. Heat Exchangers
 - D. Activated Sludge
- 8. Which is a part of a centrifugal pump?**
- A. Valve
 - B. Rod
 - C. Piston
 - D. Impeller
- 9. Total discharge head includes which type of head?**
- A. static discharge head
 - B. velocity head
 - C. suction head
 - D. atmospheric head
- 10. Which option is NOT one of the four routes of entry into the body?**
- A. Inhalation
 - B. Ingestion
 - C. Absorption
 - D. Excretion

Answers

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

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Explanations

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1. Which statement correctly describes NPDES permit renewal submission timing?

- A. 90 days
- B. 180 days**
- C. 240 days
- D. 120 days

The timing tested is the minimum lead time required to renew an NPDES permit. Renewal applications must be submitted at least 180 days before the current permit expires. This gives the permitting authority enough time to review the application, request any additional information, and complete any required steps (like public notice or negotiation) before the existing permit ends. Submitting earlier ensures continuity of coverage and reduces the risk of a lapse in authorization to discharge. Days like 90, 120, or 240 do not reflect the standard minimum interval, with 180 days being the correct guideline.

2. Which apparatus is used for the settleable solids test?

- A. Imhoff cone**
- B. Beaker
- C. Hydrometer
- D. Flask

The settleable solids test measures how much solid material in a wastewater sample settles out by gravity in a defined time, usually about one hour. An Imhoff cone is designed exactly for this purpose. Its conical bottom concentrates the settled solids so they form a distinct layer that can be read clearly against calibrated markings, giving an accurate measure of the volume of settleable solids in the sample. The cone is typically used with a known sample volume (often 1 liter) and the settled solids are read as a volume after the settling period, yielding a value in milliliters per liter. Other vessels like a beaker, a hydrometer, or a flask aren't suited for this measurement. A beaker is a general lab container with no specialized geometry or calibration for reading settled solids. A hydrometer measures liquid density, not sedimentation. A flask is also a generic container without the required conical sedimentation shape or precise graduate markings needed for this specific test.

3. Which condition would NOT typically be reviewed in a carbon absorption process?

- A. pH levels
- B. Contact time
- C. Monitoring ammonia nitrogen**
- D. Breakthrough capacity

In carbon adsorption, how effectively contaminants are removed depends on three practical ideas: how long the water stays in contact with the carbon, how much contaminant the bed can adsorb before it becomes saturated, and how the chemical environment affects adsorption. pH levels matter because changing pH can alter the form of some contaminants and the surface charge of the carbon, which in turn influences how readily substances are drawn into the carbon pores. Contact time, or residence time, is crucial to reach or approach adsorption equilibrium; too little time means not enough contaminants are captured. Breakthrough capacity tracks when the bed starts to lose efficiency, indicating the point at which the effluent concentration rises and the carbon needs regeneration or replacement. Monitoring ammonia nitrogen isn't typically a primary focus in a carbon adsorption process because ammonia in water largely exists as ammonium under normal operating conditions and doesn't adsorb onto activated carbon as readily as many organic compounds. Therefore, ammonia nitrogen monitoring is not a central parameter for assessing adsorption performance.

4. Carbon column reactors are usually lined with epoxy or resin. Which option represents this lining material?

A. Epoxy or Resin

B. Concrete

C. Steel

D. Plastic

Lining a carbon column reactor needs a barrier that resists chemical attack, prevents leaks, and stays durable in a harsh wastewater environment. Epoxy or resin coatings fit this role because they cure into a tough, non-porous film that bonds well to common substrates and provides a smooth interior surface that's easy to clean. This protective coating stalls corrosion and wear from aggressive components in the water and helps prevent fouling. Concrete is porous and can deteriorate under chemical exposure, steel can corrode without perfect protection, and while plastic linings exist, epoxy or resin coatings are the standard choice for their strong chemical resistance, durability, and reliable adhesion. So the lining material represented is epoxy or resin.

5. Velocity may be sensed by which combination of methods?

A. electronically, hydraulically, and mechanically

B. electronically

C. hydraulically

D. mechanically

Velocity is the speed of fluid at a point, and it can be sensed using three distinct approaches—electronic, hydraulic, or mechanical—often in combination for robust measurement. Electronic sensing converts the fluid's motion into an electrical signal, with methods like ultrasonic or electromagnetic flow meters providing a direct electrical readout of velocity. Hydraulic sensing uses pressure differences, such as with a Pitot tube or differential pressure element, to infer velocity through Bernoulli-type relations. Mechanical sensing relies on a moving part, like a turbine, paddlewheel, or vane, whose rotation or deflection is proportional to flow speed. In wastewater environments, debris, fouling, and varying conditions affect each method differently, so using more than one sensing principle improves accuracy, reliability, and operational range.

6. If water samples are filtered before analysis, how should the results be noted?

A. Dissolved

B. Total

C. Particulate

D. Filtered

Filtration separates solids from the liquid, so the portion that passes through the filter consists of dissolved substances. When you filter a water sample before analysis, the measurement reflects the dissolved constituents, not the suspended or particulate matter. That's why the correct note is "dissolved." If you were to report "total," it would imply measuring both dissolved and particulate forms, which isn't the case after filtration. Reporting "particulate" would refer to what the filter retains, not what passes through. "Filtered" is an operational description rather than a fraction of the sample to report. In standard water analysis, filtered samples are described as measuring the dissolved fraction, typically defined as what passes through the chosen filter size (e.g., 0.45 μm).

7. What aids in increasing the efficiency of oil/water separators?

- A. Filtration Membranes
- B. Coalescing Units**
- C. Heat Exchangers
- D. Activated Sludge

Promoting coalescence of dispersed oil droplets is the main idea behind increasing efficiency in oil/water separation. When oil is finely dispersed in water, many tiny droplets resist quick separation because their interfacial films and surfactants keep them from merging. Coalescing units provide surfaces and flow conditions that encourage droplets to collide and merge into larger droplets. As droplets grow, their buoyancy increases and they rise to the surface faster, allowing easier skimming and removal of the oil. This makes the separation process quicker and more complete, especially for free or lightly emulsified oil. Filtration membranes mainly target solid particulates and can foul when faced with oil emulsions, so they're not the best fit for enhancing the separation of free oil from water. Heat exchangers move heat between streams and don't fundamentally improve oil droplet separation. Activated sludge is a biological treatment process that degrades organic matter, not a mechanism for separating oil from water.

8. Which is a part of a centrifugal pump?

- A. Valve
- B. Rod
- C. Piston
- D. Impeller**

In centrifugal pumps, the key element that does the work is the impeller. As it spins, the blades fling fluid outward, turning rotational energy into kinetic energy and then into pressure energy as the flow is directed by the pump housing. This energy transfer from the rotating impeller to the fluid creates the flow and pressure the pump delivers. Without the impeller, there's no mechanism to impart energy to the fluid, so pumping wouldn't occur. A valve controls flow, a rod isn't the energy-transfer component, and a piston is used in different pump types (positive-displacement) rather than in centrifugal pumps.

9. Total discharge head includes which type of head?

- A. static discharge head**
- B. velocity head
- C. suction head
- D. atmospheric head

Total discharge head represents the energy needed to raise the water to the discharge point, which is captured by the static discharge head. This is the elevation component of the head on the discharge side—the height the water must be lifted. The velocity of the water contributes a separate energy term (velocity head) used for calculating exit speed and flow rate, not part of the discharge head itself. Suction head relates to the suction side conditions, and atmospheric head is the ambient pressure, which is typically accounted for differently in gauge-head calculations. So, the discharge head is governed by the static discharge head.

10. Which option is NOT one of the four routes of entry into the body?

- A. Inhalation
- B. Ingestion
- C. Absorption
- D. Excretion**

Excretion is the process by which the body removes substances it has already taken in, through means like urine, feces, sweat, or breath. The ways a substance can enter the body are inhalation (through the lungs), ingestion (through the mouth and digestive tract), absorption (through the skin or mucous membranes), and injection (entry via a puncture or needle). Since excretion involves elimination after exposure, it does not describe a route for something to enter the body. That's why excretion is not a route of entry.

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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://physicalchem1wastewater.examzify.com>

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

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