

PRINCIPLES AND PRACTICE OF ENGINEERING (PE) CIVIL: BREADTH PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. What is the spacing typically used for bar racks in water reclamation?**
 - A. 1-3 inches apart
 - B. 0.5 to 1.5 cm apart
 - C. 4-6 inches apart
 - D. 10-12 cm apart
- 2. What is the main type of wastewater treated in facilities for both residential and commercial use?**
 - A. Stormwater
 - B. Sanitary / wastewater
 - C. Industrial discharge
 - D. Ballast water
- 3. What is the oldest type of grit chamber used in wastewater treatment?**
 - A. Vertical flow grit chamber
 - B. Channel type, horizontal flow grit chamber
 - C. Rectangular grit chamber
 - D. Inclined grit chamber
- 4. Which compounds are referred to as THM in the context of wastewater?**
 - A. Tri halogen methanes
 - B. Tetra halogen methanes
 - C. Trisulfide methanes
 - D. Trimethylamines
- 5. Which equipment is responsible for shredding material that is sometimes returned to wastewater?**
 - A. Grating screen
 - B. Comminutor
 - C. Disk screen
 - D. Vortex grit chamber

- 6. How many conflict points are typically present in a four-leg intersection?**
- A. 24 conflict points
 - B. 32 conflict points
 - C. 28 conflict points
 - D. 36 conflict points
- 7. Which metric is primarily concerned with the flow of traffic on a roadway?**
- A. Density
 - B. Headway
 - C. Peak hour factor
 - D. Flow Rate
- 8. How is density defined in transportation terms?**
- A. The number of lanes on a roadway
 - B. The number of vehicles per mile on a roadway
 - C. The average speed of vehicles
 - D. The total flow volume of vehicles
- 9. What does the water-cement ratio primarily influence in concrete?**
- A. Color of the concrete
 - B. Compressive Strength
 - C. Setting Time
 - D. Aesthetic Appeal
- 10. What is the definition of chemical precipitation in wastewater treatment?**
- A. Use of biological processes to oxidize organics
 - B. Accumulation of solids through microbial action
 - C. Production of a precipitate that will settle
 - D. Adsorption of pollutants through solid surfaces

Answers

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

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Explanations

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1. What is the spacing typically used for bar racks in water reclamation?

- A. 1-3 inches apart
- B. 0.5 to 1.5 cm apart**
- C. 4-6 inches apart
- D. 10-12 cm apart

The correct spacing for bar racks in water reclamation typically falls within the range of 0.5 to 1.5 cm apart. This spacing is effective in capturing solid materials and debris while allowing for sufficient water flow. The narrower gaps help ensure that smaller particles are trapped, preventing them from entering and potentially damaging subsequent treatment processes and equipment. Additionally, the chosen spacing supports efficient maintenance and cleaning practices since it provides a balance between structural integrity and operational efficiency. Other spacing options might not provide the optimal performance needed for effectively managing the inflow of water while ensuring the removal of unwanted materials. Too wide a spacing could allow larger debris to pass through and negatively impact the treatment processes downstream. Therefore, the specified range of 0.5 to 1.5 cm is well-suited for the intended function of bar racks in water reclamation systems.

2. What is the main type of wastewater treated in facilities for both residential and commercial use?

- A. Stormwater
- B. Sanitary / wastewater**
- C. Industrial discharge
- D. Ballast water

The primary type of wastewater treated in facilities serving both residential and commercial needs is sanitary or wastewater. This category encompasses the used water generated from activities such as flushing toilets, showering, laundry, and food preparation, making it a critical aspect of public health and environmental protection. Sanitary wastewater includes a mix of human waste, household chemicals, and food particles, and it requires specialized treatment processes to remove pollutants and pathogens before the water can be safely released into the environment or reused. Treatment facilities are designed specifically to handle these wastes, ensuring they meet regulatory standards for safe discharge. Stormwater, while important in the context of urban planning and environmental management, consists of rainfall or melted snow flowing over surfaces and typically has different treatment standards and methods focused on managing runoff rather than treating sanitary waste. Industrial discharge refers to wastewater produced from industrial processes, which often contains specific pollutants and is treated in separate industrial facilities tailored to handle those contaminants. Ballast water is primarily associated with ships and marine operations, involving water used to maintain stability and balance in vessels, and is regulated under maritime environmental laws rather than being part of standard wastewater treatment in municipal facilities. Overall, the focus on sanitary or wastewater treatment reflects the need to effectively manage the public health risks associated with human waste and

3. What is the oldest type of grit chamber used in wastewater treatment?

- A. Vertical flow grit chamber
- B. Channel type, horizontal flow grit chamber**
- C. Rectangular grit chamber
- D. Inclined grit chamber

The channel type, horizontal flow grit chamber is considered the oldest type of grit chamber used in wastewater treatment. This design utilizes a simple and effective method in which wastewater flows horizontally through a channel. The flow velocity is controlled to allow heavier particles, such as sand and grit, to settle to the bottom of the chamber while lighter organic materials continue to flow toward downstream treatment processes. Historically, the horizontal flow design has been widely adopted due to its straightforward construction and operational principles. It is effective in removing gritty materials from wastewater prior to further treatment stages, thereby reducing wear and tear on mechanical equipment and improving overall system efficiency. Other types of grit chambers, such as vertical flow, rectangular, and inclined designs, may have specific benefits or applications in certain scenarios, but they were developed later and are not representative of the earliest approaches in grit removal technology. This historical context underlines why the channel type, horizontal flow grit chamber is recognized as the oldest type used in the field.

4. Which compounds are referred to as THM in the context of wastewater?

- A. Tri halogen methanes**
- B. Tetra halogen methanes
- C. Trisulfide methanes
- D. Trimethylamines

The correct response identifies THMs as trihalomethanes. These are a group of chemical compounds that consist of one carbon atom bonded to three halogen atoms. Specifically, trihalomethanes are typically formed when chlorine or other halogens react with organic material in the water during the disinfection process, commonly found in wastewater treatment. Understanding the significance of trihalomethanes is crucial, as they are regulated by environmental agencies due to their potential health risks, including being suspected carcinogens. While the other terms mention different groups of compounds, they do not pertain directly to wastewater in the context of disinfection byproducts. Tetrahalogen methanes do exist but are not widely recognized as a category like trihalomethanes. Similarly, trisulfide methanes and trimethylamines describe completely different classes of chemical compounds that do not have the same relevance in wastewater treatment processes or regulations concerning disinfection byproducts.

5. Which equipment is responsible for shredding material that is sometimes returned to wastewater?

- A. Grating screen
- B. Comminutor**
- C. Disk screen
- D. Vortex grit chamber

The equipment that is responsible for shredding material that is sometimes returned to wastewater is indeed the comminutor. Comminutors are specifically designed to break down solid waste materials into smaller particles, making them easier to manage during the wastewater treatment process. By reducing the size of organic and inorganic materials present in wastewater, comminutors help prevent clogging and damage in downstream treatment processes. This equipment greatly enhances the efficiency of the wastewater treatment facility by ensuring that larger solids do not interfere with pumps and other components essential for effective treatment. Other equipment mentioned, such as grating screens, are used primarily for the purpose of filtering out larger objects from the wastewater stream. Disk screens are effective for separating materials based on size but do not shred or reduce the size of solids. Vortex grit chambers are designed to settle out heavier materials like sand and grit from wastewater but do not address the shredding or breakdown of solids. Thus, the comminutor uniquely fulfills the shredding function required in wastewater treatment.

6. How many conflict points are typically present in a four-leg intersection?

- A. 24 conflict points
- B. 32 conflict points**
- C. 28 conflict points
- D. 36 conflict points

*In a typical four-leg intersection, the number of conflict points can be understood by analyzing how vehicles can potentially interact at various points. In general, there are several types of conflict points that must be considered: 1. Turning movements from each leg to the opposing leg. 2. Conflicts between vehicles making left turns and those traveling straight through the intersection. 3. Conflicts between vehicles making right turns and both through and left-turning vehicles. For a four-leg intersection, each leg presents significant interactions: - **Through movements**: Vehicles traveling straight through the intersection can conflict with those making turns. - **Left turns**: Each left-turning vehicle creates conflict points with oncoming traffic and can also conflict with straight-through vehicles. - **Right turns**: These vehicles must also account for conflicts with both straight-through and left-turning traffic. Each leg of the intersection typically contributes a series of conflict points stemming from all the turning movements and direct travel. After considering these interactions carefully in typical engineering practices, it has been established that a four-leg intersection usually presents 32 conflict points. These are calculated based on the combination of all vehicle interaction scenarios at the intersection considering different turning movements and directions. Hence, the identification of 32 conflict points helps transportation*

7. Which metric is primarily concerned with the flow of traffic on a roadway?

- A. Density
- B. Headway
- C. Peak hour factor
- D. Flow Rate**

The metric that is primarily concerned with the flow of traffic on a roadway is flow rate. Flow rate measures the number of vehicles that pass a point on the roadway over a specific period of time, typically expressed in vehicles per hour. This metric provides critical insight into the effectiveness and capacity of the roadway. It helps transportation engineers assess the current levels of traffic and identify potential congestion issues, as well as make decisions regarding design modifications or improvements to traffic control measures. Understanding flow rate is essential for effective traffic management, as it directly relates to the performance of a road segment. High flow rates may indicate efficient movement, while low flow rates may suggest congestion or operational issues. In contrast, density refers to the number of vehicles occupying a given length of roadway at a specific time, while headway denotes the time interval between successive vehicles passing a point. The peak hour factor adjusts hourly traffic volumes to account for variations in traffic flow throughout the day. Although these metrics are related to traffic conditions, they do not focus explicitly on the rate at which traffic flows on a roadway, which is why flow rate is the most relevant in this context.

8. How is density defined in transportation terms?

- A. The number of lanes on a roadway
- B. The number of vehicles per mile on a roadway**
- C. The average speed of vehicles
- D. The total flow volume of vehicles

In transportation terms, density is defined as the number of vehicles per mile on a roadway. This measurement is critical for understanding traffic conditions and is used to analyze roadway capacity, congestion levels, and the overall efficiency of traffic flow. It provides insight into how closely vehicles are spaced on the road, which can inform decisions about lane usage, traffic signal timing, and other aspects of transportation engineering. High density often correlates with increased congestion, as more vehicles are occupying the same space, potentially leading to slower travel times. Conversely, lower density might indicate smoother traffic flow and higher travel speeds. Understanding density helps transport engineers design effective traffic management strategies and assess the need for infrastructure improvements.

9. What does the water-cement ratio primarily influence in concrete?

- A. Color of the concrete
- B. Compressive Strength**
- C. Setting Time
- D. Aesthetic Appeal

The water-cement ratio is a critical factor that significantly influences the compressive strength of concrete. This ratio refers to the amount of water relative to the amount of cement used in a concrete mix. A lower water-cement ratio results in a denser and stronger concrete, as it allows for better bonding between cement particles and ensures reduced voids within the mixture, leading to increased durability and compressive strength. Conversely, a higher water content can result in a weaker concrete mix, as it makes the concrete less dense and can create more internal air voids. Therefore, controlling the water-cement ratio is essential in concrete design to achieve the desired strength and performance characteristics, making this option the primary influence in concrete's properties. Other factors, such as color, setting time, and aesthetic appeal, are affected to a lesser extent and are not as directly linked to structural performance as the compressive strength is.

10. What is the definition of chemical precipitation in wastewater treatment?

- A. Use of biological processes to oxidize organics
- B. Accumulation of solids through microbial action
- C. Production of a precipitate that will settle**
- D. Adsorption of pollutants through solid surfaces

Chemical precipitation in wastewater treatment refers to the process where dissolved substances are converted into a solid form, allowing them to settle out of the liquid. This occurs through a series of chemical reactions, often involving the addition of chemicals known as precipitants. The result is the formation of a solid phase, or precipitate, which can then be removed from the treated water. In this context, the correct choice emphasizes the production of a precipitate that will ultimately settle, which is crucial for the effective removal of contaminants from wastewater. This technique is particularly useful for removing heavy metals and other soluble pollutants from water. The resulting solids can then be separated through sedimentation processes, thereby cleaning the water. The other choices focus on different processes involved in wastewater treatment. For example, the use of biological processes to oxidize organics represents biological treatment methods rather than chemical. Accumulation of solids through microbial action pertains to biological sedimentation, and adsorption involves the attachment of pollutants to solid surfaces, which is a distinct physical or chemical process. These options illustrate essential aspects of wastewater treatment but do not accurately describe the chemical precipitation process.

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://pe-civilbreadth.examzify.com>

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

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