NORTH CAROLINA SURFACE WATER MATH 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. 300 pounds of lime are applied to treat 4 million gallons of water. What is the dosage in mg/L?

A. 12

B. 4

C. 9

D. 3

2. How is surface water runoff defined?

A. Water storage in underground aquifers

B. Water that evaporates from water bodies

C. Water that flows over the land surface to water bodies

D. Water that seeps through soil layers

3. An operator needs to convert a flow rate of 4,200 gpm to million gallons per day. What is the equivalent flow rate?

A. 0.77

B. 6.04

C. 8.35

D. 2.45

4. How many liters are there in 4.5 gallons?

A. 1.19

B. 0.54

C. 37.53

D. 17.03

5. How many gallons of water are in a storage tank that is 35 feet tall with 20 feet of water and a diameter of 90 feet?

A. 951,232

B. 1,664,655

C. 127,170

D. 3,804,926

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6. How many gallons are there in 14 cubic feet?

A. 104.72

B. 3.69

C. 1.87

D. 52.99

7. Which of the following is an example of a source of point source pollution?

A. A runoff from agricultural fields

B. A septic tank failure

C. A wastewater treatment plant discharge

D. Land erosion from construction sites

8. What are the potential consequences of groundwater over-extraction on surface waters?

A. Increased water levels in rivers

B. Reduced base flow leading to lower water levels

C. Improved water quality in nearby lakes

D. Enhanced aquatic habitats

9. How does agriculture typically impact surface water quality?

A. By providing shade to water bodies

B. By introducing fertilizers and pesticides

C. By reducing water usage in farming

D. By improving irrigation systems

10. What effect can increasing water temperatures due to urban heat islands have on aquatic life?

A. It promotes fish breeding

B. It can harm aquatic organisms

C. It has no significant effect

D. It increases oxygen levels in water

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Answers

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

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Explanations

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1. 300 pounds of lime are applied to treat 4 million gallons of water. What is the dosage in mg/L?

A. 12

B. 4

C. 9

D. 3

*To find the dosage of lime in mg/L, we first need to convert the pounds of lime to milligrams and the volume of water from gallons to liters. 1. **Convert pounds to milligrams**: There are 453,592 milligrams in a pound. Therefore, to convert 300 pounds of lime to milligrams, we perform the following calculation: \[300 \text{ pounds} \times 453,592 \text{ mg/pound} = 136,077,600 \text{ mg} \] 2. **Convert gallons to liters**: One gallon is equal to 3.78541 liters. Thus, 4 million gallons converted to liters is: \[4,000,000 \text{ gallons} \times 3.78541 \text{ L/gallon} = 15,141,640 \text{ L} \] 3. **Calculate the dosage in mg/L**: Now we can calculate the dosage by dividing the total amount of lime in milligrams by the total volume of water in liters: \[\text{Dosage} = \frac{136,077,600*

2. How is surface water runoff defined?

A. Water storage in underground aquifers

B. Water that evaporates from water bodies

C. Water that flows over the land surface to water bodies

D. Water that seeps through soil layers

Surface water runoff is defined as water that flows over the land surface to water bodies, such as rivers, lakes, and oceans. This process occurs when precipitation falls onto the ground and cannot be absorbed by the soil, either due to saturation or because the ground is impervious. Instead of infiltrating the ground, this excess water moves across the land, collecting in various channels and eventually reaching larger bodies of water. Understanding runoff is crucial for various reasons, including managing water resources, preventing erosion, and addressing water quality issues. It also plays a significant role in the hydrological cycle, affecting how ecosystems function and how water is distributed across the landscape. The other choices represent different water-related processes that do not align with the definition of surface water runoff. Water storage in underground aquifers pertains to groundwater, while evaporation refers to the transformation of water from liquid to vapor. Lastly, the process of water seeping through soil layers relates to groundwater recharge and infiltration, further distinct from the concept of surface water runoff.

3. An operator needs to convert a flow rate of 4,200 gpm to million gallons per day. What is the equivalent flow rate?

A. 0.77

B. 6.04

C. 8.35

D. 2.45

To convert a flow rate from gallons per minute (gpm) to million gallons per day (MGD), you can use the conversion factors where 1 million gallons is equal to 1,000,000 gallons and there are 1,440 minutes in a day (24 hours times 60 minutes). Here's the calculation: 1. First, convert the flow rate of 4,200 gpm to gallons per day: \[4,200 \text{ gpm} \times 1,440 \text{ minutes/day} = 6,048,000 \text{ gallons/day} \] 2. Then, convert gallons per day to million gallons per day: \[\frac{6,048,000 \text{ gallons/day}}{1,000,000} = 6.048 \text{ MGD} \] Rounding this value gives approximately 6.04 MGD. Therefore, the correct flow rate is 6.04 million gallons per day. This illustrates the direct application of the conversion factors involving both time and volume to achieve the desired units.

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4. How many liters are there in 4.5 gallons?

A. 1.19

B. 0.54

C. 37.53

D. 17.03

To determine how many liters are in 4.5 gallons, you can use the conversion factor that 1 gallon is approximately equal to 3.78541 liters. By multiplying the number of gallons by this conversion factor, you can convert gallons to liters: 4.5 gallons × 3.78541 liters/gallon = 17.03 liters. This calculation shows that 4.5 gallons is equivalent to 17.03 liters, making this the correct amount. Understanding this conversion is important for accurately translating measurements between these two units, especially when dealing with contexts such as cooking, scientific experiments, or environmental studies where precise water measurements are necessary.

5. How many gallons of water are in a storage tank that is 35 feet tall with 20 feet of water and a diameter of 90 feet?

A. 951,232

B. 1,664,655

C. 127,170

D. 3,804,926

To determine the number of gallons of water in the storage tank, we first need to calculate the volume of the water in the tank, which has a cylindrical shape. The formula for the volume of a cylinder is: $$ V = \pi r^2 h $$ where $$ r $$ is the radius of the cylinder and $$ h $$ is its height. In this scenario, the height of the water is 20 feet. The diameter of the tank is given as 90 feet, so we can find the radius by dividing the diameter by 2: $$ r = \frac{90 \text{ ft}}{2} = 45 \text{ ft} $$. Now, we can plug the radius and height into the volume formula: $$ V = \pi (45 \, \text{ft})^2 (20 \, \text{ft}) $$ $$ V \approx 3.14159 \times 2025 \times 20 $$ $$ V \approx 3.14159 \times 40500 $$ $$ V \approx 127,170 \, \text{cubic feet} $$ To convert cubic feet to gallons, we use the conversion factor that 1

6. How many gallons are there in 14 cubic feet?

A. 104.72

B. 3.69

C. 1.87

D. 52.99

To determine the number of gallons in 14 cubic feet, one must use the conversion factor that 1 cubic foot is equal to approximately 7.48 gallons. First, multiply the volume in cubic feet by the conversion factor: $$ 14 \text{ cubic feet} \times 7.48 \text{ gallons/cubic foot} $$ Calculating this gives: $$ 14 \times 7.48 = 104.72 \text{ gallons} $$ This calculation shows that there are indeed 104.72 gallons in 14 cubic feet, making this choice accurate. Understanding this conversion is crucial, especially in water management and environmental studies, as units often need to be converted from cubic measurements to fluid measurements for practical applications, like knowing how much water a certain volume can hold. The other choices do not suffice because they reflect either a misunderstanding of the conversion rate or inaccurate calculations relative to the volume specified.

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7. Which of the following is an example of a source of point source pollution?

A. A runoff from agricultural fields

B. A septic tank failure

C. A wastewater treatment plant discharge

D. Land erosion from construction sites

Point source pollution refers to contaminants that enter a waterway from a single, identifiable source. These sources are usually distinct and can be easily pinpointed, making them easier to regulate and manage. A wastewater treatment plant discharge is a prime example of point source pollution. This discharge is a controlled outflow from a specific facility designed to treat municipal or industrial wastewater before it is released into the environment. Because the source of the pollution can be identified as the discharge point of the treatment plant, it fits the definition of point source pollution perfectly. In contrast, runoff from agricultural fields, septic tank failures, and land erosion from construction sites represent non-point source pollution. These forms of pollution originate from multiple and diffuse sources rather than a single identifiable outlet, making their management more complex and challenging. For instance, agricultural runoff can be from various locations depending on rain events, while septic tank failures can occur at various properties scattered across a landscape, and erosion from construction sites can vary widely across different sites.

8. What are the potential consequences of groundwater over-extraction on surface waters?

A. Increased water levels in rivers

B. Reduced base flow leading to lower water levels

C. Improved water quality in nearby lakes

D. Enhanced aquatic habitats

Groundwater over-extraction can have significant effects on surface waters, particularly in relation to the base flow of rivers and streams. Base flow refers to the portion of river flow that is sustained by groundwater discharge, often during periods of little to no precipitation. When groundwater is excessively withdrawn, the overall water table can decline, which, in turn, reduces the amount of water that naturally seeps into rivers and streams. This reduction in base flow can lead to lower water levels in these surface water bodies, impacting aquatic ecosystems, water availability for other uses, and potentially leading to negative effects on water quality. The interplay between groundwater and surface water is crucial; when groundwater levels drop, there may be less water available to maintain the flow of rivers, especially during dry spells. This phenomenon highlights the relationship between groundwater resources and surface water levels, making the option of reduced base flow leading to lower water levels the most accurate consequence of over-extraction.

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9. How does agriculture typically impact surface water quality?

A. By providing shade to water bodies

B. By introducing fertilizers and pesticides

C. By reducing water usage in farming

D. By improving irrigation systems

Agriculture typically impacts surface water quality primarily through the introduction of fertilizers and pesticides into the environment. These substances, while beneficial for crop production, can run off into nearby water bodies during rainfall or irrigation events. This runoff can lead to nutrient pollution, primarily from nitrogen and phosphorus found in fertilizers. An excess of these nutrients in surface waters can cause eutrophication, which leads to harmful algal blooms, oxygen depletion, and overall degradation of aquatic ecosystems. Pesticides can also contaminate water sources and harm aquatic life, further compromising water quality. The other options do not adequately address the primary mechanisms through which agricultural practices can affect surface water quality. Providing shade to water bodies, reducing water usage in farming, or improving irrigation systems might have localized benefits or contribute to water conservation but do not have direct, widespread negative impacts like the use of fertilizers and pesticides.

10. What effect can increasing water temperatures due to urban heat islands have on aquatic life?

A. It promotes fish breeding

B. It can harm aquatic organisms

C. It has no significant effect

D. It increases oxygen levels in water

Increasing water temperatures due to urban heat islands can have a harmful effect on aquatic organisms. Elevated temperatures can decrease the solubility of oxygen in water, which is critical for the survival of many aquatic species. Warmer water can also lead to stress for fish and other organisms, as they may become less efficient at oxygen uptake and may struggle to survive in warmer conditions. Furthermore, higher temperatures can disrupt the delicate balance of aquatic ecosystems, resulting in harmful algal blooms that can produce toxins and deplete oxygen levels as they decompose. These changes can lead to decreased biodiversity, as more sensitive species may be unable to thrive in the altered conditions, ultimately impacting the health of the entire aquatic environment. Thus, the choice that highlights the potential harm to aquatic organisms accurately reflects the consequences of rising water temperatures in urban areas.

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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://ncsurfacewatermath.examzify.com

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

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