

ASSOCIATION OF STATE BOARDS OF GEOLOGY ASBOG 1 PRACTICE EXAM (SAMPLE) STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE**

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Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	15

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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. The direct shear test is used to measure which property?**
 - A. Measure density
 - B. Measure the shear strength properties of soil or rock material, or of discontinuities in soil or rock masses.
 - C. Measure permeability
 - D. Measure thermal conductivity
- 2. Ground-penetrating radar is commonly used in environmental site investigations to?**
 - A. Locate buried drums.
 - B. Determine soil pH.
 - C. Measure groundwater salinity.
 - D. Assess rock strength.
- 3. Consolidation test evaluates which soil property?**
 - A. Permeability
 - B. Settlement potential
 - C. Shear strength
 - D. Compaction behavior
- 4. Which type of water has never circulated in the hydrologic cycle?**
 - A. Juvenile
 - B. Meteoric
 - C. Connate
 - D. Atmospheric
- 5. Which seismic wave travels through both solids and liquids?**
 - A. P-waves
 - B. S-waves
 - C. Surface waves
 - D. Love waves

- 6. Regolith comprises which horizons of the soil profile?**
- A. O, A, B, and C
 - B. O and A horizons only
 - C. B and C horizons only
 - D. A, B, and E horizons
- 7. Which of the following is a test used to establish aggregate stability?**
- A. Bulk specific gravity, LA abrasion, sulfate, crushing, freeze-thaw, and mineral hardness
 - B. LA abrasion only
 - C. Sieve analysis
 - D. Permeability test
- 8. A braided stream typically indicates which condition of sediment transport?**
- A. Greater channel capacity than load
 - B. Low sediment load
 - C. Greater load than capacity
 - D. Steady, slow flow with little sediment
- 9. Which transducer is used to create an electrical signal whose magnitude is directly proportional to the force being measured?**
- A. The load cell
 - B. A strain gauge
 - C. A capacitive sensor
 - D. A thermocouple
- 10. Removal of lateral support can lead to which?**
- A. Groundwater contamination
 - B. Seismic hazard
 - C. Landslide
 - D. Slope instability

Answers

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

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Explanations

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1. The direct shear test is used to measure which property?

- A. Measure density
- B. Measure the shear strength properties of soil or rock material, or of discontinuities in soil or rock masses.**
- C. Measure permeability
- D. Measure thermal conductivity

The direct shear test evaluates how much shear resistance a soil, rock material, or a planar discontinuity can provide along a defined sliding plane. In the test, a normal load is applied while a shear load is gradually increased until the plane fails, giving the shear strength at that normal stress. By doing tests at several normal stresses, you can determine the parameters that describe shear strength, typically cohesion and the internal friction angle, through the Mohr-Coulomb relationship. This focus on resistance to sliding on a plane is why the test is used to characterize shear strength properties, rather than density, permeability, or thermal conductivity, which require different tests.

2. Ground-penetrating radar is commonly used in environmental site investigations to?

- A. Locate buried drums.**
- B. Determine soil pH.
- C. Measure groundwater salinity.
- D. Assess rock strength.

Ground-penetrating radar relies on sending high-frequency radio waves into the ground and recording reflections from subsurface interfaces with different dielectric properties. Buried drums create a strong contrast with surrounding soil, producing a noticeable reflection that can be detected and mapped at shallow depths. In environmental site investigations, this makes GPR a quick, non-destructive way to locate potential sources of contamination like buried drums before intrusive digging or sampling. It's not used to measure soil pH or groundwater salinity, which require chemical analyses, nor to assess rock strength, which needs mechanical testing; those tasks rely on different methods. So locating buried drums is the best fit for GPR in this context.

3. Consolidation test evaluates which soil property?

- A. Permeability
- B. Settlement potential**
- C. Shear strength
- D. Compaction behavior

Consolidation tests focus on how a soil decreases in volume over time when a sustained load is applied, as water is squeezed out of the pore spaces. This process directly governs how much a foundation or soil fill will settle in the long term. By measuring vertical settlement under controlled drainage, you obtain the soil's compressibility and rate of consolidation, which are used to predict settlement potential for design. This is different from permeability (which looks at fluid flow through soil), shear strength (which concerns resistance to sliding under shear), or compaction behavior (which is about densification under energy input). So the test is best for evaluating settlement potential.

4. Which type of water has never circulated in the hydrologic cycle?

- A. Juvenile**
- B. Meteoric
- C. Connate
- D. Atmospheric

The main idea here is distinguishing water sources by where they originate and whether they have been part of the hydrologic cycle. Water from the atmosphere and precipitation has clearly circulated through evaporation, condensation, and precipitation. Atmospheric water vapor is continually cycling in the air, and meteoric water describes water derived from precipitation that enters the cycle. Water trapped in rocks as they form (connate) represents ancient water that was incorporated at deposition and has not been part of surface-atmosphere cycling since, so it's not part of ongoing cycling in the same way. Juvenile water comes from deep within Earth's mantle and is released by magmatic processes; it has not passed through the surface/atmosphere hydrologic cycle, so it's the water type that has never circulated in that cycle.

5. Which seismic wave travels through both solids and liquids?

- A. P-waves**
- B. S-waves
- C. Surface waves
- D. Love waves

Seismic wave propagation depends on whether the medium supports shear. The wave that travels through both solids and liquids is the compressional (P) wave. P-waves move by compressing and expanding the material in the direction of travel, and this mechanism works in substances that have bulk rigidity, including liquids. Liquids lack shear strength, but they do have bulk modulus, so they can carry these compressional waves. In contrast, shear (S) waves rely on the medium's ability to support shear motion and cannot propagate through liquids, so they stay within solids. Surface waves travel along interfaces and are not the wave type responsible for moving through liquids. So the wave that traverses both solids and liquids is the compressional P-wave.

6. Regolith comprises which horizons of the soil profile?

- A. O, A, B, and C**
- B. O and A horizons only
- C. B and C horizons only
- D. A, B, and E horizons

Regolith is all loose material that sits on top of solid bedrock. This includes the organic surface layer and the mineral horizons that have formed or been weathered above the bedrock. So the horizons involved are the organic surface layer (O), the mineral topsoil (A), the subsoil (B), and the weathered portion of the parent material (C). The bedrock horizon (R) lies below and is not part of regolith. The option listing O, A, B, and C aligns with this definition.

7. Which of the following is a test used to establish aggregate stability?

- A. Bulk specific gravity, LA abrasion, sulfate, crushing, freeze-thaw, and mineral hardness**
- B. LA abrasion only
- C. Sieve analysis
- D. Permeability test

Aggregate stability is about how well an aggregate resists disintegration under the combined effects of vehicle traffic, weathering, and chemical exposure. To gauge this, a suite of tests looks at different ways the material can break down. The LA abrasion test simulates the grinding action and surface wear that aggregates endure in a road surface, giving a direct measure of abrasion resistance. The sulfate test assesses chemical durability against sulfate attack, which can cause expansion and cracking in susceptible aggregates. The crushing test evaluates resistance to crushing under load, a key factor in how the material will perform under traffic stresses. The freeze-thaw test subjects aggregates to cycles of freezing and thawing, which induce internal stresses and can lead to cracking and disintegration in climates where such cycles occur. Mineral hardness indicates how resistant the material is to abrasion and wear at the mineral level, influencing overall durability. Bulk specific gravity is included as part of evaluating aggregate properties and helps interpret performance-related characteristics, even though it isn't a direct stability test on its own. Taken together, these tests cover the major modes of deterioration, so this combination best establishes aggregate stability.

8. A braided stream typically indicates which condition of sediment transport?

- A. Greater channel capacity than load
- B. Low sediment load
- C. Greater load than capacity**
- D. Steady, slow flow with little sediment

Braided streams form when there is more sediment coming in than the river can move downstream with the available flow. When the load exceeds the channel's transport capacity, sediment is deposited in the bed, creating mid-channel bars around which the flow splits into multiple, shifting channels. This continual redistribution of sediment and changing discharge causes the braided pattern to persist, especially where sediment supply is high or flow is highly variable. If the channel had more capacity than load, or if the flow were steady with little sediment, you'd expect a single, stable channel rather than a braided network. A steady, slow flow with little sediment wouldn't generate the characteristic braided pattern.

9. Which transducer is used to create an electrical signal whose magnitude is directly proportional to the force being measured?

- A. The load cell**
- B. A strain gauge
- C. A capacitive sensor
- D. A thermocouple

A force-to-electrical signal transducer is needed when you want the output magnitude to track the applied force. A load cell fits this role because it's a complete force transducer that converts mechanical load into an electrical signal, with the signal magnitude proportional to the force within the material's elastic range. In typical load cells, strain gauges are arranged in a Wheatstone bridge; as force deforms the sensing element, the strain changes the resistance of the gauges, and the bridge produces a voltage proportional to that deformation, which corresponds to the applied force when properly calibrated. A strain gauge is a sensing element that detects deformation, but on its own it doesn't deliver a directly proportional electrical signal without being wired into a bridge and accompanied by electronics. A capacitive sensor detects changes in capacitance due to displacement, not directly force, and a thermocouple measures temperature differences, not mechanical load.

10. Removal of lateral support can lead to which?

- A. Groundwater contamination
- B. Seismic hazard
- C. Landslide
- D. Slope instability**

Removing lateral support takes away constraints that keep a slope from deforming under its own weight. Slope stability is a balance: gravity drives movement downslope, while shear strength and confinement resist that movement. Lateral support helps maintain that resistance and distributes stresses within the mass; when it's removed, the factor of safety against failure drops and the slope becomes prone to movement. The immediate result is slope instability, which can manifest as various forms of mass movement, such as a landslide. Groundwater contamination is not a direct consequence of losing lateral support, and seismic hazard describes earthquake-related risk rather than the mechanical instability of a slope—though earthquakes can trigger instability in an already unstable slope.

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://asbog1.examzify.com>

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

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