

Association of State Boards of Geology ASBOG 1 Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

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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. Ground-penetrating radar is useful for determining which?**
 - A. Rock type**
 - B. Porosity**
 - C. Location of buried objects**
 - D. Mineral composition**

- 2. A soil with a porosity of 50% would be classified as which USCS symbol?**
 - A. CH**
 - B. ML**
 - C. CL**
 - D. SM**

- 3. What rock makes a poor aggregate for Portland cement?**
 - A. Granite**
 - B. Limestone**
 - C. Basalt**
 - D. Chert**

- 4. Which feature is formed by the coalescing of several alluvial fans into a broader depositional apron?**
 - A. Pediment**
 - B. Bajada**
 - C. Mesa**
 - D. Alluvial fan**

- 5. Which statement best identifies the blueschist facies in terms of mineral assemblage that includes quartz, jadeite, lawsonite, phengite, glaucophane, and chlorite?**
 - A. Quartz, Jadeite, Lawsonite, Phengite, Glaucophane, and Chlorite**
 - B. Quartz, K-feldspar, Muscovite, Biotite**
 - C. Calcite, Dolomite, Gypsum, Anhydrite**
 - D. Olivine, Pyroxene, Calcite, Fluorite**

- 6. Dispersion in groundwater primarily causes what effect on a contaminant plume?**
- A. Spreading of the plume**
 - B. Immediate dissolution**
 - C. Increase in plume concentration without spreading**
 - D. Spread of the contaminant plume**
- 7. A tunnel-like structure created by a burrowing animal and filled with soil material from another horizon is called?**
- A. Krotovina**
 - B. Caliche**
 - C. Mixture cavity**
 - D. Mammillated deposit**
- 8. What describes the amount of soil moisture held after excess water has drained away and the rate of downward movement has decreased?**
- A. Wilting point**
 - B. Porosity**
 - C. Field capacity**
 - D. Saturated hydraulic conductivity**
- 9. In seismic refraction profiles, what signal is most important?**
- A. the first arrival at each geophone**
 - B. the second arrival**
 - C. peak amplitude at surface**
 - D. frequency content of the source**
- 10. The mineral with the chemical formula $K(AlSi_3O_8)$ corresponds to which potassium feldspar species?**
- A. Quartz**
 - B. Orthoclase**
 - C. Microcline**
 - D. Sanidine**

Answers

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

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Explanations

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1. Ground-penetrating radar is useful for determining which?

- A. Rock type
- B. Porosity
- C. Location of buried objects**
- D. Mineral composition

Ground-penetrating radar uses short electromagnetic pulses and listens for echoes from boundaries where the subsurface properties change. Buried objects and distinct interfaces create reflections that stand out in the radar record, so this method is especially good at locating where things are beneath the surface and estimating their depth. It doesn't measure rock type, porosity, or mineral composition directly, because those properties require different techniques—rock type from mineralogy and texture, porosity from pore-space measurements or borehole logs, and mineral composition from mineralogical or chemical analyses. GPR is therefore most useful for mapping where buried objects or features lie, rather than identifying their mineralogical or porosity characteristics.

2. A soil with a porosity of 50% would be classified as which USCS symbol?

- A. CH
- B. ML
- C. CL**
- D. SM

A key idea here is that USCS classification uses grain size (clay vs silt) together with Atterberg limits to describe plasticity, not porosity alone. A porosity around 50% suggests a fine-grained soil, more clay-like than coarse-grained. Among the fine-grained symbols, a clay with relatively low plasticity is designated CL, while CH would indicate high plasticity clay (higher liquid limit and plasticity index). Silts would be labeled ML or SM depending on their texture. So a soil with 50% porosity that behaves like a low-plasticity clay fits best with the symbol CL.

3. What rock makes a poor aggregate for Portland cement?

- A. Granite
- B. Limestone
- C. Basalt
- D. Chert**

The main idea here is alkali-silica reaction. Portland cement contains alkalis that can react with certain forms of silica in aggregates when moisture is present. Chert is a silica-rich rock with silica in microcrystalline forms that are particularly reactive with those alkalis, so it tends to form an expansive gel that swells and cracks the concrete. That makes chert a poor choice for concrete aggregates. In contrast, granite and basalt are hard, stable silicate rocks that are typically durable as aggregates, and limestone is a carbonate rock that doesn't participate in the alkali-silica reaction in this way. So the reactive silica in chert is what makes it unsuitable for Portland cement aggregates.

4. Which feature is formed by the coalescing of several alluvial fans into a broader depositional apron?

- A. Pediment**
- B. Bajada**
- C. Mesa**
- D. Alluvial fan**

When several sediment-filled fans along a mountain front grow and their deposited sediments meet, they merge into one broad, continuous apron at the base of the range. This merging of multiple fans creates a wide, sloping deposit known as a bajada, or fan apron, formed as streams periodically flood from canyons and spread out, losing energy and depositing material along the base with each event. A pediment, by contrast, is a gently sloping bedrock surface carved and worn smooth at the base of mountains, not built up from fan deposits. A mesa is a flat-topped, elevated landform carved by erosion from a surrounding tableland. An alluvial fan is a single fan-shaped deposit at a canyon mouth, not the merged, broad apron that results from multiple fans coalescing.

5. Which statement best identifies the blueschist facies in terms of mineral assemblage that includes quartz, jadeite, lawsonite, phengite, glaucophane, and chlorite?

- A. Quartz, Jadeite, Lawsonite, Phengite, Glaucophane, and Chlorite**
- B. Quartz, K-feldspar, Muscovite, Biotite**
- C. Calcite, Dolomite, Gypsum, Anhydrite**
- D. Olivine, Pyroxene, Calcite, Fluorite**

Forming under high pressure and relatively low temperature typical of subduction zones, blueschist is defined by a distinctive suite of hydrous minerals that survive in these conditions. The minerals quartz, jadeite, lawsonite, phengite, glaucophane, and chlorite together form a classic blueschist assemblage. Glaucophane is a blue amphibole that characterizes the blueschist color and facies, while lawsonite and jadeite indicate high-pressure conditions. Phengite shows high silica in the mica, and chlorite is common in low-temperature, high-pressure environments. Quartz ties the assemblage together as a stable, widespread phase in these rocks. The other options don't reflect blueschist metamorphism. Minerals like K-feldspar, muscovite, and biotite suggest different metamorphic grades or facies, not blueschist. Evaporite minerals such as calcite, dolomite, gypsum, and anhydrite point to sedimentary or diagenetic environments rather than high-pressure, subduction-zone metamorphism. Olivine and pyroxene with calcium-bearing minerals are typical of mantle or high-temperature contexts, not blueschist.

6. Dispersion in groundwater primarily causes what effect on a contaminant plume?

- A. Spreading of the plume**
- B. Immediate dissolution**
- C. Increase in plume concentration without spreading**
- D. Spread of the contaminant plume**

Dispersion in groundwater causes the contaminant plume to spread as it moves. As groundwater flows, different pathlines have slightly different velocities and molecular diffusion acts to mix neighboring water. This combination stretches the plume, widening its spatial extent and diluting concentrations over a larger area. It doesn't trigger immediate dissolution and it isn't about concentration increasing in place without spreading; the defining outcome of dispersion is the spreading and broadening of the plume as it advects through the subsurface.

7. A tunnel-like structure created by a burrowing animal and filled with soil material from another horizon is called?

- A. Krotovina**
- B. Caliche**
- C. Mixture cavity**
- D. Mammillated deposit**

A tunnel-like burrow that is later filled with soil from a different horizon is called a krotovina. This feature records bioturbation by a burrowing organism, with the fill material often differing in texture or color from the surrounding matrix, making the burrow visible as a distinct pocket within the soil profile. Caliche is a cemented calcium carbonate horizon, not a burrow fill. A mixture cavity and mammillated deposit are not standard terms for this type of trace.

8. What describes the amount of soil moisture held after excess water has drained away and the rate of downward movement has decreased?

- A. Wilting point**
- B. Porosity**
- C. Field capacity**
- D. Saturated hydraulic conductivity**

Field capacity is the amount of soil moisture left after excess water has drained away and the downward movement has slowed. When soil is saturated, gravity quickly drains the freely moving water from the larger pores. What remains is water held in the smaller pores by capillary forces and some adsorption to soil particles. This moisture level represents the upper limit of water the soil can hold under gravity-driven drainage and is the baseline for how much water is potentially available to plants (until the wilting point is reached). The other terms refer to different properties: porosity is the total pore space, saturated hydraulic conductivity is how fast water moves through fully saturated soil, and the wilting point is the lower moisture level at which plants can no longer extract water.

9. In seismic refraction profiles, what signal is most important?

- A. the first arrival at each geophone**
- B. the second arrival**
- C. peak amplitude at surface**
- D. frequency content of the source**

In seismic refraction profiles, the most important signal is the first arrival energy at each geophone. This earliest energy comes from waves that travel through the upper, slower layer and then refract into the faster underlying layer, arriving at the surface sooner than any later the energy. Those first-arrival times plotted against distance produce a clear, analyzable pattern: a straight-line trend whose slope is related to the velocity of the top layer, and a break point that helps identify when the refracted path becomes dominant. From this travel-time pattern you can determine the velocities of the layers and the depth to the interface. Amplitude at the surface and the detailed frequency content of the source don't provide the same robust, direct constraints on layer velocities and depths. Amplitude is influenced by coupling, attenuation, source strength, and impedance contrasts, while frequency content affects resolution rather than giving a straightforward velocity-depth model. The second arrival, though it can carry additional information in more complex, multi-layer scenarios, is not the primary signal used to construct the standard refraction velocity model.

10. The mineral with the chemical formula $K(AlSi_3O_8)$ corresponds to which potassium feldspar species?

- A. Quartz**
- B. Orthoclase**
- C. Microcline**
- D. Sanidine**

Potassium feldspars share the composition $KAlSi_3O_8$, but exist as different high- and low-temperature forms that differ in crystal structure and ordering. The high-temperature end-member is sanidine, which forms at elevated temperatures in igneous environments such as rhyolites. Even though orthoclase and microcline have the same ideal formula, they represent lower-temperature forms with varying degrees of structural ordering. Quartz, by contrast, is SiO_2 and not a potassium aluminosilicate. Therefore, the given formula best corresponds to sanidine.

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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