

California Specific Exam (CSE) Professional Geologist (PG) 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. How is the difference in energy release between two earthquakes calculated?**
 - A. $\sqrt{1000^{\Delta M}}$**
 - B. $\Delta M * 1000$**
 - C. $1000^{\Delta M}$**
 - D. $\sqrt{\Delta M}$**

- 2. What type of water is defined as being trapped at the time of deposition?**
 - A. Groundwater**
 - B. Connate water**
 - C. Surface water**
 - D. Interstitial water**

- 3. What is the shear wave velocity for Site Class A?**
 - A. Greater than 5000 ft/s**
 - B. 1500-3000 ft/s**
 - C. 2000-4000 ft/s**
 - D. 3000-5000 ft/s**

- 4. What type of landslide movement is characterized by a turning moment about a point above the center of gravity?**
 - A. Translational Slide**
 - B. Rotational Slide or Slump**
 - C. Debris Flow**
 - D. Silt Flow**

- 5. What does liquefaction in soils typically result in during an earthquake?**
 - A. Increase in soil density**
 - B. Formation of mud flows**
 - C. Creation of sand boils and fissures**
 - D. Collapse of geological layers**

- 6. What is one of the primary roles of a Geotechnical Specialist?**
- A. Monitoring construction schedules**
 - B. Conducting hydrological assessments**
 - C. Assessing soil mechanics and stability**
 - D. Designing civil infrastructure projects**
- 7. What does overdraft refer to in a geological context?**
- A. Excessive sediment deposition**
 - B. Water recharge exceeding withdrawal**
 - C. Water withdrawal exceeding recharged amounts**
 - D. Natural spring water accumulation**
- 8. What does CBC Chapter 16, section 1613 specify regarding building safety?**
- A. Design Flood Resistance**
 - B. Design Earthquake Ground Motion**
 - C. Structural Load Capacity**
 - D. Wind Resistance Design**
- 9. Which of the following factors is NOT generally considered when assessing an area for earthquake hazard?**
- A. Soil Type**
 - B. Local Wildlife**
 - C. Fault Lines**
 - D. Historical Activity**
- 10. What site class designation corresponds to rock?**
- A. Site Class B**
 - B. Site Class A**
 - C. Site Class C**
 - D. Site Class D**

Answers

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

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Explanations

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1. How is the difference in energy release between two earthquakes calculated?

- A. $\sqrt{1000^{\Delta M}}$**
- B. $\Delta M * 1000$
- C. $1000^{\Delta M}$
- D. $\sqrt{\Delta M}$

The correct choice involves using a formula that relates the energy released by earthquakes to the difference in magnitude between them. Earthquake magnitudes on the Richter scale or the moment magnitude scale are logarithmic, specifically a base 10 logarithm. This means that for every one unit increase in magnitude, the energy release increases by approximately 31.6 times (which is $10^{(3/2)}$, since the energy scale is typically compared on a logarithmic basis). To calculate the difference in energy release between two earthquakes, we denote the difference in magnitude as ΔM , which is the difference in their magnitudes ($M_2 - M_1$). The relationship can be expressed as: Energy ratio = $E_2/E_1 = 10^{(1.5 * \Delta M)}$. In this context, the energy release is proportional to 1000 raised to the power of ΔM because we are expressing the energy releases in a way that accounts for the logarithmic nature of magnitude. Taking the square root shows up in the context of simplifying this logarithmic energy relationship, where a change in magnitude is squared to arrive at a unit change in energy output. This is why the square root shows up in the subject choice. This understanding unfolds as ΔM relates to energy

2. What type of water is defined as being trapped at the time of deposition?

- A. Groundwater
- B. Connate water**
- C. Surface water
- D. Interstitial water

Connate water refers to the water that is trapped within sedimentary rocks during the process of deposition. This water is generally ancient and has been isolated from the atmosphere for extended periods. The term specifically applies to water that fills the pores in sedimentary rocks, such as sandstone or shale, and represents water that was present at the time the sediments were deposited, essentially being 'fossilized' within the rock matrix. This trapped water often differs in composition from the water found in aquifers and surface bodies. It can be saline, due to the leaching of minerals during sediment compaction and diagenesis. Such water is critical in various geological and petroleum engineering contexts, especially when considering hydrocarbon reservoirs, as it can impact the porosity and permeability of rock formations. Understanding connate water is important for geologists and hydrologists because it helps in determining the history of water movement in geological formations and can influence resource exploration and extraction strategies.

3. What is the shear wave velocity for Site Class A?

- A. Greater than 5000 ft/s**
- B. 1500-3000 ft/s
- C. 2000-4000 ft/s
- D. 3000-5000 ft/s

The shear wave velocity for Site Class A is classified as greater than 5000 feet per second. Site Class A refers to rocks and very stiff soils, which exhibit high shear wave velocities. These materials have the ability to transmit seismic waves more effectively, minimizing the potential for damage during seismic events. Knowing that the velocity exceeds 5000 ft/s indicates a robust geological foundation, which is crucial for seismic design and analysis. In engineering practices, this classification helps in evaluating ground response during earthquakes, aiding in the development of structures that can withstand seismic forces. The other categories mention ranges that are representative of softer soils and sedimentary materials, which have lower shear wave velocities and, therefore, different engineering implications compared to those found in Site Class A.

4. What type of landslide movement is characterized by a turning moment about a point above the center of gravity?

- A. Translational Slide
- B. Rotational Slide or Slump**
- C. Debris Flow
- D. Silt Flow

The type of landslide movement described as having a turning moment about a point above the center of gravity is best characterized as a rotational slide or slump. This type of movement occurs when a mass of soil or rock moves down a slope along a curved surface, leading to a rotation of the material about a pivot point. In a rotational slide, the failure surface is typically curved concavely upward, and as the material slips downwards, it rotates backward about a point located above the center of gravity. This is in contrast to translational slides, which involve movement along a relatively planar surface without rotation. Debris flows and silt flows are characterized by more fluid movement, often involving the mixture of soil and water, but they do not exhibit the rotational aspect that is central to a slump. Therefore, the precise nature of the rotational movement and its distinction from other types of landslide behavior firmly supports the identification of a rotational slide or slump as the correct answer.

5. What does liquefaction in soils typically result in during an earthquake?

- A. Increase in soil density**
- B. Formation of mud flows**
- C. Creation of sand boils and fissures**
- D. Collapse of geological layers**

Liquefaction in soils occurs when saturated, loose, granular soils lose their strength and stiffness due to the application of stress, such as that produced by seismic shaking during an earthquake. This phenomenon typically leads to a condition where the soil behaves more like a liquid than a solid. When this happens, the soils may expel water and fine particles, resulting in the formation of sand boils and fissures on the surface. These surface expressions indicate the upward movement of saturated sand that has been disturbed by the shaking and has transformed into a fluid-like state, which is a direct consequence of liquefaction. Understanding why other scenarios do not apply is essential. For example, while the collapse of geological layers can occur in some seismic events, it is not a direct result of liquefaction. Similarly, mud flows are typically associated with saturated clay soils and not sandy soils, which are more prone to liquefaction. Lastly, liquefaction does not increase soil density; rather, it causes a temporary decrease in density as the soil loses its structural integrity. Therefore, the creation of sand boils and fissures is the most accurate description of the effects of liquefaction during an earthquake.

6. What is one of the primary roles of a Geotechnical Specialist?

- A. Monitoring construction schedules**
- B. Conducting hydrological assessments**
- C. Assessing soil mechanics and stability**
- D. Designing civil infrastructure projects**

The primary role of a Geotechnical Specialist involves assessing soil mechanics and stability. This entails understanding the physical and mechanical properties of soil, as well as how it interacts with structures. This assessment is critical for ensuring safe and stable foundations for buildings, bridges, dams, and other constructions. Geotechnical specialists evaluate factors such as soil strength, compressibility, and permeability, which directly impact the stability and longevity of engineering projects. While monitoring construction schedules, conducting hydrological assessments, and designing civil infrastructure projects are important tasks in the field, they typically fall under the purview of project managers, hydrologists, and civil engineers, respectively. The inclusion of soil mechanics and stability as a core responsibility highlights the specialized knowledge and expertise of geotechnical specialists, making it essential for their role in construction and engineering projects.

7. What does overdraft refer to in a geological context?

- A. Excessive sediment deposition
- B. Water recharge exceeding withdrawal
- C. Water withdrawal exceeding recharged amounts**
- D. Natural spring water accumulation

In a geological context, overdraft specifically refers to the situation where the withdrawal of groundwater from an aquifer exceeds the rate at which the aquifer is replenished or recharged. This condition can lead to several negative consequences, such as lowering the water table, diminishing water availability for wells and surface water bodies, and potentially causing land subsidence. Overdraft is a key concern in water resource management, particularly in regions where groundwater is a primary source of water supply. When water is extracted faster than it can naturally be replenished, it can lead to long-term sustainability issues for those water resources. The other options presented do not accurately capture the meaning of overdraft. For instance, excessive sediment deposition refers to geological processes involving physical materials rather than water balance. Water recharge exceeding withdrawal describes a sustainable scenario where the aquifer is being adequately replenished, thus not aligning with the concept of overdraft. Lastly, natural spring water accumulation does not pertain to the imbalance of usage and replenishment of groundwater resources, which is the essence of overdraft.

8. What does CBC Chapter 16, section 1613 specify regarding building safety?

- A. Design Flood Resistance
- B. Design Earthquake Ground Motion**
- C. Structural Load Capacity
- D. Wind Resistance Design

The correct choice pertains to the design requirements for buildings to withstand seismic forces, which are a significant concern in California due to its earthquake-prone environment. Chapter 16 of the California Building Code (CBC) specifically addresses the design for earthquake ground motions. This includes guidelines that ensure buildings are appropriately designed and constructed to survive the forces generated by earthquakes, thereby minimizing risk to human life and property. The CBC requires structural engineers to take into account factors such as the seismic design category of the building, site conditions, the importance of the structure, and the potential ground motion levels based on historical data and geological assessments. This chapter serves as a critical reference for ensuring that buildings not only comply with safety regulations but also are resilient against seismic events, which is especially vital in California's geographical context. The other options, while related to building safety and design, focus on different aspects of structural integrity. Flood resistance, structural load capacity, and wind resistance design are also important but do not fall under the specific seismic design requirements outlined in CBC Chapter 16, section 1613. Therefore, the emphasis on earthquake ground motion design is essential for ensuring the safety and reliability of buildings in seismic zones.

9. Which of the following factors is NOT generally considered when assessing an area for earthquake hazard?

- A. Soil Type**
- B. Local Wildlife**
- C. Fault Lines**
- D. Historical Activity**

When assessing an area for earthquake hazard, local wildlife is not generally a factor taken into consideration. The focus is primarily on geological and structural aspects that directly relate to seismic activity and its potential impacts. Soil type plays a crucial role in how seismic waves are transmitted through the ground, affecting the level of ground shaking experienced during an earthquake. Different soil types can amplify or dampen seismic waves, influencing construction practices and infrastructure resilience. Fault lines are critical to earthquake hazard assessments as they represent the locations where earthquakes are likely to occur. Understanding the proximity and activity of these fault lines helps in evaluating the likelihood of seismic events in the area. Historical activity provides vital insights into the earthquake history of a region, including past events' magnitude, frequency, and effects. This information is essential for predicting future earthquake risks and planning for mitigation strategies. In contrast, local wildlife does not provide relevant information related to the geological risks posed by earthquakes and thus is not a consideration in assessments aimed at understanding seismic hazards.

10. What site class designation corresponds to rock?

- A. Site Class B**
- B. Site Class A**
- C. Site Class C**
- D. Site Class D**

The correct designation for rock is Site Class B. Site Class B is typically assigned to sites that consist of competent and stable bedrock, which has a high shear wave velocity, generally greater than 1,200 meters per second. This classification is essential for seismic design as it indicates lower vulnerability to earthquake shaking compared to softer or unconsolidated materials. Understanding site class designations is crucial for professionals involved in geotechnical engineering and seismic assessments because they influence design criteria for structures in earthquake-prone areas. Site Class A, on the other hand, corresponds to sites with very hard rock, while Site Class C refers to dense soil and soft rock. Site Class D includes softer soils that can amplify seismic waves, making it less suitable for structures in seismic zones.

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://csepg.examzify.com>

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

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