

GERTC PRINCIPLES OF SURVEYING, ANALYSIS, AND DESIGN (PSAD) PRACTICE EXAM (SAMPLE) STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

**VISIT US ONLINE FOR
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. Which equipment would be best for establishing a horizontal plane in surveying?**
 - A. GPS Receiver
 - B. Dumpy Level
 - C. Total Station
 - D. Electronic Distance Measuring Device
- 2. What is the role of an optical plummet in surveying?**
 - A. To measure angles
 - B. To establish a vertical reference line
 - C. To calculate distances
 - D. To assess land elevation
- 3. What is the term for the ratio of lateral strain to longitudinal strain in materials?**
 - A. Young's Modulus
 - B. Modulus of Elasticity
 - C. Poisson's Ratio
 - D. Elasticity Coefficient
- 4. Which of the following best describes toughness in material science?**
 - A. Ability to undergo plastic deformation without rupture
 - B. Resistance to indentation
 - C. Ability to return to original shape post-deformation
 - D. Ability to break under low impact
- 5. What is referred to as a condition where the lateral stiffness is less than 70 percent of the stiffness of the story above?**
 - A. Soft Story
 - B. Story Drift
 - C. Toughness
 - D. Elasticity

- 6. Which property best describes an isotropic material?**
- A. Consistent properties in all directions
 - B. Variable properties based on direction
 - C. Only elastic properties
 - D. Materials that do not change shape
- 7. What is the space between two adjacent floors in a building referred to as?**
- A. Loft
 - B. Space
 - C. Storey
 - D. Story
- 8. Which term is used to describe the maximum amount of strain energy a material can absorb before it fractures?**
- A. Elastic Limit
 - B. Ultimate Strength
 - C. Modulus of Toughness
 - D. Yield Point
- 9. What defines a material's ability to deform elastically and return to its original shape when the load is removed?**
- A. Plasticity
 - B. Elasticity
 - C. Ductility
 - D. Brittleness
- 10. What term describes the energy stored in a material due to deformation?**
- A. Strain Energy
 - B. Elastic Energy
 - C. Kinetic Energy
 - D. Potential Energy

Answers

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

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Explanations

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1. Which equipment would be best for establishing a horizontal plane in surveying?

- A. GPS Receiver
- B. Dumpy Level**
- C. Total Station
- D. Electronic Distance Measuring Device

The dumpy level is specifically designed for establishing a horizontal plane in surveying. Its function is to ensure that the line of sight remains level, providing an accurate reference for measuring elevations and making horizontal measurements across a terrain. The dumpy level consists of a telescope mounted on a tripod, which can be adjusted to the desired height and oriented horizontally. Surveyors use it to align the instrument and obtain level readings on stakes or other reference points, thereby ensuring precise and reliable results in various surveying tasks. While other equipment such as a total station and electronic distance measuring devices can assist in gathering data and mapping, their primary functions are more complex and not solely focused on establishing a horizontal plane. The GPS receiver is excellent for determining positions and coordinates over a large area but does not inherently establish a horizontal reference in the manner that a dumpy level does. Thus, the dumpy level stands out as the most suitable tool for the specific purpose of creating a horizontal plane in surveying contexts.

2. What is the role of an optical plummet in surveying?

- A. To measure angles
- B. To establish a vertical reference line**
- C. To calculate distances
- D. To assess land elevation

An optical plummet is a crucial instrument in surveying used primarily to establish a vertical reference line. It is designed to ensure that the surveying equipment, such as a total station or theodolite, is perfectly aligned vertically over a specific point on the ground. The optical plummet utilizes a telescope with a crosshair or reticle, allowing the surveyor to see down to the point directly below the instrument, aiding in precise positioning. This alignment is essential for accurate measurements in vertical applications, such as in construction and setting out plans, where the elevation of various points must be consistent and precise. The ability of the optical plummet to provide a straight vertical reference is pivotal for ensuring that any subsequent measurements taken from the instrument are reliable. While measuring angles and calculating distances are fundamental tasks in surveying, they rely on the initial accurate placement of the instrument, which the optical plummet helps to achieve. Similarly, assessing land elevation may require the instrument to be correctly set up using the optical plummet so that any relevant measurements are accurate and meaningful.

3. What is the term for the ratio of lateral strain to longitudinal strain in materials?

- A. Young's Modulus
- B. Modulus of Elasticity
- C. Poisson's Ratio**
- D. Elasticity Coefficient

The term that describes the ratio of lateral strain to longitudinal strain in materials is Poisson's Ratio. This ratio is an important material property that indicates how a material deforms in directions perpendicular to the applied force. Specifically, when a material is stretched or compressed along one axis, it tends to expand or contract in the perpendicular direction; Poisson's Ratio quantifies this behavior. For example, in a tensile test where a rod is pulled, it elongates in the direction of the applied force (longitudinal strain), while simultaneously exhibiting a reduction in diameter (lateral strain). The value of Poisson's Ratio helps engineers predict how a material will behave under various loading conditions, which is critical for structural analysis and design. Other choices like Young's Modulus and Modulus of Elasticity relate to the material's stiffness, describing the relationship between stress and strain in the linear elastic region. Elasticity Coefficient is not a standard term used in material science, making it less relevant to the question. Understanding Poisson's Ratio is essential in fields such as civil engineering, materials science, and mechanical engineering, as it influences design decisions to ensure safety and performance of structures.

4. Which of the following best describes toughness in material science?

- A. Ability to undergo plastic deformation without rupture**
- B. Resistance to indentation
- C. Ability to return to original shape post-deformation
- D. Ability to break under low impact

Toughness in material science is best described as the ability of a material to absorb energy and undergo plastic deformation without experiencing rupture. This characteristic indicates that a tough material can withstand significant stress and strain, making it highly desirable in applications where materials are subject to impact and dynamic loading. Toughness relates to not just the strength of a material under tension but also its ability to deform without failing. It plays a crucial role in assessing how materials will behave under real-world conditions, such as in construction, automotive, and aerospace industries, where materials must endure varying loads. The other options reflect different properties of materials, such as hardness (resistance to indentation) and elasticity (ability to return to original shape post-deformation), but they do not encompass the complete scope of toughness as it pertains to energy absorption and plasticity before rupture. The concept of breaking under low impact suggests a brittle characteristic, which is the opposite of toughness, highlighting why the first option is the most accurate description.

5. What is referred to as a condition where the lateral stiffness is less than 70 percent of the stiffness of the story above?

- A. Soft Story**
- B. Story Drift
- C. Toughness
- D. Elasticity

A condition where the lateral stiffness is less than 70 percent of the stiffness of the story above is known as a soft story. In structural engineering, a soft story is characterized by a significant reduction in lateral load resistance when compared to the floors above it. This can lead to poor performance during seismic events, as the building may experience excessive movement or even failure due to the insufficient lateral stiffness. Identifying a soft story is crucial for earthquake-resistant design because the reduced stiffness can make a building vulnerable to overturning or collapse under lateral loads, such as those caused by winds or seismic activity. In contrast, the other terms like story drift, toughness, and elasticity refer to different structural characteristics and behaviors that do not specifically describe the condition of lateral stiffness relative to the structure above. Story drift pertains to the lateral displacement of a building's stories, toughness refers to the ability of a material to absorb energy, and elasticity relates to the ability of a material to return to its original shape after being deformed.

6. Which property best describes an isotropic material?

- A. Consistent properties in all directions**
- B. Variable properties based on direction
- C. Only elastic properties
- D. Materials that do not change shape

An isotropic material is best characterized by having consistent properties in all directions. This means that regardless of the orientation in which the material is measured, its mechanical and thermal properties remain the same. For instance, the Young's modulus, thermal conductivity, and strength of an isotropic material do not vary with directional changes. This uniformity is crucial in many engineering applications where predictable material behavior is essential. In contrast, materials that exhibit variable properties based on direction are classified as anisotropic, and they can behave differently depending on the direction of load or force applied. The other options, such as having only elastic properties or not changing shape, do not adequately capture the essence of isotropy in materials. Isotropic materials can be elastic, plastic, or exhibit different deformation characteristics, but it is their directional uniformity in properties that truly defines them.

7. What is the space between two adjacent floors in a building referred to as?

- A. Loft
- B. Space
- C. Storey
- D. Story**

The term used to describe the space between two adjacent floors in a building is "story." In architectural terminology, a story refers to a continuous level or floor of the building, which is separated by ceilings and floors from the levels above and below. This concept is essential for understanding the vertical organization of a building, as it indicates how many levels are present and is commonly used when discussing building height and design. While "loft" typically refers to an open space or area under the roof of a building that has been converted for use, and "space" is a more general term that does not specifically denote a level in a structure, "story" specifically captures the idea of constructed levels stacked within the overall architecture of a building. The confusion between "story" and "storey" often arises, but both terms essentially convey the same idea in different English dialects, with "story" being more common in American English and "storey" more commonly used in British English. In the context of this question, the focus is on the term that accurately defines the architectural element representing the space between floors, making "story" the correct choice.

8. Which term is used to describe the maximum amount of strain energy a material can absorb before it fractures?

- A. Elastic Limit
- B. Ultimate Strength
- C. Modulus of Toughness**
- D. Yield Point

The term that describes the maximum amount of strain energy a material can absorb before it fractures is the modulus of toughness. This property quantifies a material's ability to withstand deformation and absorb energy up to the point of fracture. The modulus of toughness is particularly important in applications where materials are subjected to high stress and strain, as it reflects how much energy a material can absorb without failing. In contrast, the elastic limit refers to the maximum stress a material can withstand while still returning to its original shape upon unloading, so it does not account for energy absorption leading to fracture. Ultimate strength is the maximum stress a material can withstand before failure but does not provide insight into the energy aspect. Yield point refers to the stress at which a material begins to deform plastically, meaning it will not return to its original shape, and again, like the elastic limit, it does not address the total energy absorption capabilities of the material. Thus, modulus of toughness is the most comprehensive measure of energy absorption before failure occurs, making it the correct choice.

9. What defines a material's ability to deform elastically and return to its original shape when the load is removed?

- A. Plasticity
- B. Elasticity**
- C. Ductility
- D. Brittleness

The ability of a material to deform elastically and return to its original shape upon the removal of a load is referred to as elasticity. This property is fundamental in many engineering applications where materials are subject to forces. Elastic materials absorb energy when deformed and can completely recover their shape, which is characterized by their elastic limit—the maximum stress that can be applied without causing permanent deformation. In contrast to elasticity, plasticity refers to a material's capacity to undergo permanent deformation. Once a plastic material has been deformed beyond its yield point, it does not return to its original shape. Ductility describes a material's ability to deform under tensile stress, often characterized by the material's ability to be stretched into a wire, but this concept mainly revolves around the extent of plastic deformation rather than elastic behavior. Brittleness indicates a material's tendency to fracture or break under stress without significant deformation, contrary to the ability to return to an original shape. Thus, elasticity is the defining characteristic of materials capable of returning to their original form after the load is removed, making it the correct choice for this question.

10. What term describes the energy stored in a material due to deformation?

- A. Strain Energy**
- B. Elastic Energy
- C. Kinetic Energy
- D. Potential Energy

The term that describes the energy stored in a material due to deformation is strain energy. This energy is a result of the work done on a material when it is deformed, such as when it is stretched, compressed, or bent. When a material is subjected to stress, it deforms, and the energy associated with this deformation becomes stored within the material. If the load is removed and the material returns to its original shape, this energy can be released, often used in applications like springs or rubber bands, which showcase the material's ability to return to its initial state. While elastic energy refers specifically to the energy stored in a material when it is deformed elastically (and it can be considered synonymous with strain energy for elastic deformations), the more encompassing term in a broader context that fits the question is strain energy. Kinetic energy relates to the energy of motion, and potential energy generally refers to energy stored due to an object's position in a field, such as gravitational potential energy, which is different from energy stored due to deformation.

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://gertcpsad.examzify.com>

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

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