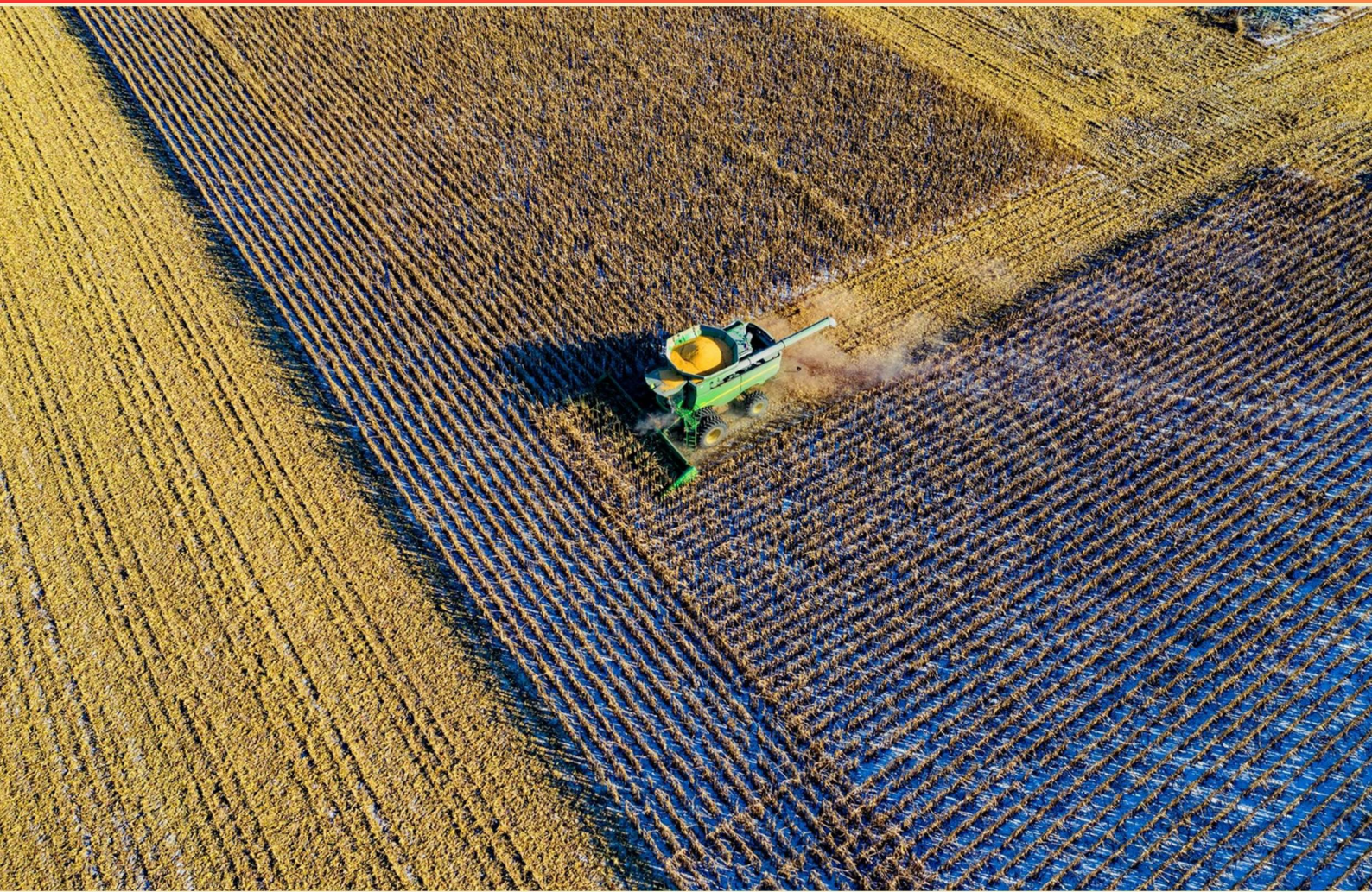


GERTC PRINCIPLES OF SURVEYING, ANALYSIS, AND DESIGN (PSAD) PRACTICE EXAM (SAMPLE)

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. What is the term for the distance between the center of rigidity and the center of mass?**
 - A. Eccentricity
 - B. Displacement
 - C. Torque
 - D. Extensibility
- 2. Which term refers to the capability of a material to withstand deformation and absorb energy before reaching failure?**
 - A. Toughness
 - B. Elasticity
 - C. Resilience
 - D. Relaxation
- 3. Which principle states that the area of a triangle is equal to half the base multiplied by the height?**
 - A. The area formulation principle
 - B. The Pythagorean theorem
 - C. The distance principle
 - D. The volume calculation principle
- 4. What type of material has the same elastic properties in all directions at any one point?**
 - A. Orthotropic material
 - B. Isotropic material
 - C. Anisotropic material
 - D. Composite material
- 5. What occurs to the mechanical properties of ductile materials as they are subjected to strain?**
 - A. The material becomes more brittle
 - B. They may exhibit strain hardening
 - C. The material gains weight
 - D. The properties remain unchanged

- 6. What term describes the phenomenon where a material supports an increasing load after yielding has ended?**
- A. Ultimate Stress
 - B. Yield Strength
 - C. Strain Hardening
 - D. Ductility
- 7. Which term is used to describe a material that has different properties in different directions?**
- A. Homogeneous material
 - B. Composite material
 - C. Anisotropic material
 - D. Elastic material
- 8. Which property of a material indicates its ability to endure high-impact loads or shock loads?**
- A. Toughness
 - B. Brittleness
 - C. Malleability
 - D. Stiffness
- 9. Which condition defines vertical geometric irregularity in a building?**
- A. The horizontal dimensions of two adjacent storeys are equal
 - B. The horizontal dimension of any storey exceeds 130% of an adjacent storey
 - C. The roof is lighter than the storeys below
 - D. All storeys are uniform in size
- 10. How do you determine the elevation of a point using a level instrument?**
- A. By calculating the distance between two known benchmarks
 - B. By measuring the difference in height from a benchmark
 - C. By averaging the heights of multiple reference points
 - D. By estimating based on surrounding terrain

Answers

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

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Explanations

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1. What is the term for the distance between the center of rigidity and the center of mass?

- A. Eccentricity**
- B. Displacement
- C. Torque
- D. Extensibility

The term for the distance between the center of rigidity and the center of mass is referred to as eccentricity. In the context of structural engineering and dynamics, eccentricity plays a crucial role in understanding how structures respond to lateral forces, such as wind or seismic activity. When the center of mass and the center of rigidity are not aligned, it creates an imbalance that can lead to rotational effects or torque on the structure, potentially leading to instability. Understanding eccentricity is essential for engineers as it helps in the design of stable structures by ensuring that the center of mass and center of rigidity are as close as possible, or by accounting for the effects of any applied forces that could result in dynamic movement. This concept is particularly important in the analysis of buildings and other structures that must withstand various loads and forces throughout their lifespan.

2. Which term refers to the capability of a material to withstand deformation and absorb energy before reaching failure?

- A. Toughness**
- B. Elasticity
- C. Resilience
- D. Relaxation

The correct response is toughness. Toughness is defined as the ability of a material to absorb energy and deform plastically without fracturing. It is a crucial property in materials science because it indicates how well a material can withstand impacts or sudden forces without failing. Tough materials can absorb significant amounts of energy before reaching their failure point, which makes them ideal for applications where resistance to impact and stress is essential. Elasticity refers to a material's ability to return to its original shape and size after being deformed, which is not necessarily related to the energy-absorbing capability before failure. Resilience is more specifically the ability of a material to absorb energy when it is deformed elastically and then return that energy upon unloading, thus it pertains to elastic deformation rather than overall toughness. Relaxation pertains to the reduction of stress in a material over time under constant strain and does not directly relate to the material's ability to absorb energy before failing.

3. Which principle states that the area of a triangle is equal to half the base multiplied by the height?

- A. The area formulation principle**
- B. The Pythagorean theorem
- C. The distance principle
- D. The volume calculation principle

The principle that states the area of a triangle is equal to half the base multiplied by the height is indeed linked to the area formulation. This principle provides a straightforward method for calculating the area of a triangle, which is fundamental in various applications within surveying, engineering, and design. The formula itself, $\text{Area} = 0.5 \times \text{base} \times \text{height}$, relies on the relationship between the dimensions of the triangle and is critical for determining areas in many contexts, such as land surveying or architectural design. Understanding this principle allows professionals to assess land areas accurately, which is vital for planning and development. Other options do not pertain specifically to the calculation of area for triangles. The Pythagorean theorem relates to the sides of right triangles, the distance principle typically concerns linear measurements, and the volume calculation principle pertains to three-dimensional spaces rather than two-dimensional areas. Thus, recognizing the significance of the area formulation principle is essential for anyone involved in the principles of surveying and design.

4. What type of material has the same elastic properties in all directions at any one point?

- A. Orthotropic material
- B. Isotropic material**
- C. Anisotropic material
- D. Composite material

The chosen answer, which is isotropic material, is correct because isotropic materials possess uniform properties in all directions. This means that regardless of the direction in which stress is applied, the material will respond identically if it is subjected to factors like strain or deformation. Isotropic materials have the same elastic modulus and other mechanical properties, ensuring that they maintain consistent behavior, making them predictable and easier to model in engineering applications. Common examples include metals like steel and aluminum, which exhibit this uniformity. In contrast, orthotropic materials have different elastic properties along three mutually perpendicular axes but can also exhibit isotropic behavior in the plane perpendicular to the third axis. Anisotropic materials display varied mechanical properties in different directions, leading to complex behavior under applied forces. Composite materials generally combine different materials to achieve desired properties, which can result in either isotropic or anisotropic behavior depending on their configuration and composition.

5. What occurs to the mechanical properties of ductile materials as they are subjected to strain?

- A. The material becomes more brittle
- B. They may exhibit strain hardening**
- C. The material gains weight
- D. The properties remain unchanged

When ductile materials are subjected to strain, they may exhibit strain hardening, which is a phenomenon where the material becomes stronger and harder as it is deformed. This occurs due to the dislocation movement within the material's crystal structure. As the material is stretched or compressed, dislocations interact with each other, becoming entangled and creating an internal resistance to further deformation. This increased resistance leads to an increase in yield strength and tensile strength, making the material harder and less ductile as it undergoes plastic deformation. The process of strain hardening is significant in various engineering applications, as it enhances the performance characteristics of materials under load, allowing for better stability and durability in structures. Ductile materials typically return to their original shape as long as they have not exceeded their elastic limit. However, once they do yield and start to be deformed beyond this point, the strain hardening effect becomes evident, making option B the most accurate response.

6. What term describes the phenomenon where a material supports an increasing load after yielding has ended?

- A. Ultimate Stress
- B. Yield Strength
- C. Strain Hardening**
- D. Ductility

The phenomenon where a material supports an increasing load after yielding has ended is referred to as strain hardening. When a material is subjected to stress beyond its yield point, it undergoes plastic deformation. In this state, if the material is further deformed, it can actually increase in strength, allowing it to support higher loads than it could immediately after yielding. This behavior is primarily observed in ductile materials, where the dislocation density increases as the material is deformed, leading to enhanced strength. The other terms are relevant in the study of material behavior, but they do not describe this specific phenomenon. Ultimate stress refers to the maximum stress a material can withstand before failure. Yield strength refers to the stress at which a material begins to undergo permanent deformation. Ductility describes a material's ability to deform under tensile stress, but it does not specifically relate to the ability to support an increasing load post-yielding. Strain hardening effectively captures the increase in load-bearing capacity after the yielding phase, making it the correct term in this scenario.

7. Which term is used to describe a material that has different properties in different directions?

- A. Homogeneous material
- B. Composite material
- C. Anisotropic material**
- D. Elastic material

The term used to describe a material that exhibits different properties in different directions is anisotropic material. Anisotropic materials have directional dependence, meaning that their mechanical, thermal, or elastic properties can vary based on the orientation of the material. This characteristic can significantly impact how these materials behave under stress, temperature changes, or when subjected to various forces. In contrast, homogeneous materials have uniform properties in all directions, meaning their behavior is consistent regardless of the direction of applied forces. Composite materials consist of two or more constituent materials and may exhibit anisotropic behavior depending on their composition and structure, but the term itself does not inherently describe directional properties. Elastic materials refer to a material's ability to return to its original shape after deformation and do not specify directional behavior. Thus, the unique property of being directionally dependent is what makes anisotropic material the correct choice in this context.

8. Which property of a material indicates its ability to endure high-impact loads or shock loads?

- A. Toughness**
- B. Brittleness
- C. Malleability
- D. Stiffness

Toughness is a key property that characterizes a material's ability to absorb energy and deform plastically before fracturing, particularly under high-impact or shock loads. A tough material can withstand stress and strain without failing, making it particularly suitable for applications where sudden forces are experienced. For instance, metals like steel are often chosen for structural applications due to their toughness, allowing them to endure dynamic loads without breaking. In contrast, other properties listed do not relate favorably to the performance under high-impact conditions. Brittleness refers to a material's tendency to fracture easily without significant deformation when stressed, making it unsuitable for high-impact applications. Malleability describes how well a material can be deformed under compressive stress, such as being shaped into sheets, but does not indicate performance under impact. Stiffness measures a material's resistance to deformation under load, but it does not provide information on how a material behaves when subjected to shock loads. Therefore, toughness is the most relevant property when considering impact load resistance.

9. Which condition defines vertical geometric irregularity in a building?

- A. The horizontal dimensions of two adjacent storeys are equal
- B. The horizontal dimension of any storey exceeds 130% of an adjacent storey**
- C. The roof is lighter than the storeys below
- D. All storeys are uniform in size

Vertical geometric irregularity in a building is primarily defined by the relationship between the horizontal dimensions of adjacent storeys. When the horizontal dimension of any storey exceeds 130% of that of an adjacent storey, it indicates a significant change in geometry that can affect the building's structural performance, particularly under lateral loads such as wind or seismic forces. This irregularity can lead to uneven distribution of forces throughout the building, potentially resulting in safety issues during extreme events. The other choices do not reflect the criteria for vertical geometric irregularity. For instance, equal horizontal dimensions in adjacent storeys or uniform size throughout all storeys suggest a consistent geometry, which is typically preferable for structural stability. Similarly, the weight of the roof in comparison to the storeys below does not inherently indicate geometric irregularity but rather relates to load distribution and structural design considerations.

10. How do you determine the elevation of a point using a level instrument?

- A. By calculating the distance between two known benchmarks
- B. By measuring the difference in height from a benchmark**
- C. By averaging the heights of multiple reference points
- D. By estimating based on surrounding terrain

To determine the elevation of a point using a level instrument, measuring the difference in height from a benchmark is the fundamental method employed. A level instrument, when set up correctly, allows for accurate horizontal sighting and measurement of vertical angles, which is essential in land surveying. The process begins with identifying a known benchmark, a point of established elevation. The level instrument is then positioned to take readings to the point whose elevation needs to be determined. By sighting through the level instrument, you establish a line of sight that is level. The difference in readings from this horizontal sight line to the height of the benchmark provides the necessary elevation measurement. This method is favored because it relies on precise optical engineering, minimizing errors that can occur with estimates or averages. The accuracy and reliability of a level instrument make it the preferred choice for obtaining elevation differences in a surveying context. Estimating elevations based on surrounding terrain or averaging heights from multiple reference points lacks the precision required for official surveying tasks, while calculating distances between benchmarks serves a different purpose, often used in triangulation or establishing control networks, rather than directly determining the elevation of a new point.

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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