GEODESY BOARD PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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.

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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!

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Questions

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1. _____ gravity anomaly refers to small regional variations in the Earth's gravity field resulting from density variations in underlying rocks.

A. Bouguer

B. Free-air

C. Helmert

D. Stokes

2. In GNSS, ephemeris data describe satellite positions as a function of which variable?

A. Time

B. Altitude

C. Revolution

D. Application

3. The equation of time equals which difference of times?

A. Local Apparent Time - Local Mean Time + 12 hours

B. Local Apparent Time - Local Mean Time

C. Local Mean Time - Local Apparent Time

D. Local Apparent Time - Local Mean Time - 12 Hours

4. How are covariance and correlation used in evaluating geodetic measurements?

A. Covariance measures how two variables vary together; correlation is the standardized form, indicating strength and direction of the linear relationship.

B. Covariance and correlation are identical measures of data variability.

C. Covariance is a measure of central tendency; correlation measures spread.

D. Correlation is used only for nonlinear relationships.

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5. Name the two main GNSS observation types and summarize their characteristics.

A. Pseudorange (code) observations provide range with meter-level precision; carrier-phase observations provide phase data enabling centimeter- to millimeter-level precision with ambiguity resolution.

B. Pseudorange observations provide phase data enabling centimeter-level precision; carrier-phase observations provide range with meter-level precision.

C. Pseudorange and carrier-phase observations both provide centimeter-level precision without ambiguity resolution.

D. Carrier-phase observations provide only code-like measurements; pseudorange provides phase data.

6. In least squares adjustment, which statement best describes a residual?

A. The sum of all observations.

B. The weighted average of all residuals.

C. The final adjusted coordinate.

D. The difference between an observed value and its predicted value from the adjustment model.

7. Ephemeris data describe satellite positions as a function of time.

A. Altitude

B. Time

C. Revolution

D. Application

8. The ratio 1/133000 in the distance accuracy example represents which type of accuracy?

A. Relative accuracy

B. Absolute error

C. Percentage error

D. Scale factor

9. Which measurement is the primary focus in trilateration surveys?

A. Angles

B. Lengths

C. Pseudorange

D. Time

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10. What is the purpose of robust or outlier-tolerant least squares?

A. To reduce the influence of anomalous observations on the final solution.

B. To maximize the influence of anomalous observations on the final solution.

C. To simplify computation by discarding most data.

D. To enforce exact equality constraints on all observations.

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Answers

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

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Explanations

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1. _____ gravity anomaly refers to small regional variations in the Earth's gravity field resulting from density variations in underlying rocks.

A. Bouguer

B. Free-air

C. Helmert

D. Stokes

Seeing small regional variations in gravity that come from density differences in the rocks beneath requires removing the influence of the mass of the surface and near-surface rocks. The Bouguer gravity anomaly does exactly that: it subtracts the gravitational pull of the topography and the material between the observation point and a reference level using an assumed density. What remains highlights subsurface density contrasts in the underlying rocks, such as changes in rock type, crustal blocks, or buried structures, making it the best descriptor for these regional density variations. In contrast, the free-air anomaly only corrects for height above the reference level and still carries the gravity effect of the topography, so it doesn't isolate deeper density variations as cleanly. Helmert and Stokes refer to other correction formulations or calculations but do not define the signal from underlying rock density contrasts in the same direct way Bouguer does.

2. In GNSS, ephemeris data describe satellite positions as a function of which variable?

A. Time

B. Altitude

C. Revolution

D. Application

The satellite's position changes continuously, so ephemeris data are built to describe where a satellite will be at any given time. The orbital parameters and clock corrections in the ephemeris are evaluated as a function of time, usually using the time since the ephemeris reference epoch. To know where the satellite was (or will be) when a signal is received, you compute its position at the appropriate time t using those time-dependent parameters. Hence, time is the variable that governs the satellite's position in the ephemeris model. Altitude, revolution count, or application aren't what the model uses to define the position.

3. The equation of time equals which difference of times?

A. Local Apparent Time - Local Mean Time + 12 hours

B. Local Apparent Time - Local Mean Time

C. Local Mean Time - Local Apparent Time

D. Local Apparent Time - Local Mean Time - 12 Hours

The difference between apparent solar time and mean solar time is what the equation of time measures. Local Apparent Time is the true sun time based on the Sun's actual position in the sky, while Local Mean Time is the averaged, regular clock time that treats every hour as equal. The equation of time is LAT minus LMT, the amount by which the sundial time (apparent) leads or lags behind the clock time (mean). This difference is usually a few minutes and changes over the year because the Sun's apparent motion is affected by the Earth's elliptical orbit and axial tilt. The other formulations with a 12-hour offset or reversing the order don't describe this small seasonal difference.

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4. How are covariance and correlation used in evaluating geodetic measurements?

A. Covariance measures how two variables vary together; correlation is the standardized form, indicating strength and direction of the linear relationship.

B. Covariance and correlation are identical measures of data variability.

C. Covariance is a measure of central tendency; correlation measures spread.

D. Correlation is used only for nonlinear relationships.

Covariance and correlation describe how two quantities move together in geodetic measurements. Covariance tells you whether deviations of two variables from their means tend to occur together: a positive covariance means they tend to be high or low together, a negative covariance means they move in opposite directions, and the size depends on the units of the variables. Correlation is the standardized form of this idea—covariance divided by the product of the variables' standard deviations—giving a dimensionless value between -1 and 1 that shows both the strength and direction of the linear relationship. In practice, geodetic analyses use the covariance to express how errors in different observations or parameters are related, and this relationship feeds into the overall uncertainty through the covariance matrix. The correlation coefficient helps interpret how strongly two parameters are coupled, which is important for understanding identifiability and how errors propagate in the adjustment. The covariance matrix (not just variances) is fundamental to least-squares adjustments and uncertainty propagation, while correlation provides a normalized measure to compare relationships across quantities with different units. So, covariances and correlations are related but not identical; covariance depends on units and shows joint variability, while correlation is a unitless, standardized measure of the linear relationship's strength and direction. Covariance is not a measure of central tendency, and correlation is not restricted to nonlinear relationships.

5. Name the two main GNSS observation types and summarize their characteristics.

A. Pseudorange (code) observations provide range with meter-level precision; carrier-phase observations provide phase data enabling centimeter- to millimeter-level precision with ambiguity resolution.

B. Pseudorange observations provide phase data enabling centimeter-level precision; carrier-phase observations provide range with meter-level precision.

C. Pseudorange and carrier-phase observations both provide centimeter-level precision without ambiguity resolution.

D. Carrier-phase observations provide only code-like measurements; pseudorange provides phase data.

Two main GNSS observation types are the pseudorange (code) measurements and the carrier-phase measurements. Pseudorange uses the coded signal to estimate how long the signal took to travel from satellite to receiver, giving a distance with meter-level precision in typical standalone use. Carrier-phase looks at the phase of the carrier wave itself, and because phase can be measured with much finer resolution, it can reach centimeter- to millimeter-level precision—but you must determine the exact number of whole cycles between satellite and receiver, the integer ambiguities, to convert that phase information into a true range. Resolving these ambiguities is essential for the high-precision results. The pseudorange measurements provide robust, coarse range data, while carrier-phase measurements enable very high precision once ambiguity resolution is achieved. The other statements mix up which measurement type yields code versus phase information or claim high precision without ambiguity resolution, which doesn't fit the true characteristics.

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6. In least squares adjustment, which statement best describes a residual?

A. The sum of all observations.

B. The weighted average of all residuals.

C. The final adjusted coordinate.

D. The difference between an observed value and its predicted value from the adjustment model.

In least squares adjustment, a residual is the discrepancy for a single observation between what was actually measured and what the model predicts for that measurement. It's the difference e = observed value minus predicted value from the fitted model. This difference is what the adjustment process minimizes in a squared-sense across all data, so residuals reveal how well the model captures the measurements. Small, randomly scattered residuals suggest a good fit, while systematic patterns or large residuals point to issues like model misspecification, outliers, or changing variance. So the residual is not the sum of all observations, not a weighted average of residuals, and not the final adjusted coordinate (which is an estimate of the parameter or position). It's the per-observation difference between what was measured and what the model predicts.

7. Ephemeris data describe satellite positions as a function of time.

A. Altitude

B. Time

C. Revolution

D. Application

Ephemeris data provide the satellite's location at any given moment by tying position to time. Each data set includes a reference epoch and time parameters that let you compute the satellite's 3D coordinates for that moment, incorporating the orbital motion and perturbations. Without specifying the time, you don't know where the satellite is, even though altitude is a derived detail and revolutions are just counts of orbits based on time, while application refers to use rather than the position itself. So the variable that describes the position as the satellite moves is time.

8. The ratio 1/133000 in the distance accuracy example represents which type of accuracy?

A. Relative accuracy

B. Absolute error

C. Percentage error

D. Scale factor

That ratio expresses how large the measurement error is in relation to the distance being measured. It is a relative accuracy: the error is one part in 133,000 of the distance, a dimensionless fraction, rather than a fixed amount with units. If you convert it to a percent, it would be about 0.00075%, but as given it's the plain relative accuracy. This means the absolute error would scale with distance, while this ratio stays the same. The other ideas don't fit because absolute error would carry units (how many meters, for example), percentage error requires a percent form (the ratio times 100), and a scale factor is a multiplier used to convert or distort distances, not a measure of error.

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9. Which measurement is the primary focus in trilateration surveys?

A. Angles

B. Lengths

C. Pseudorange

D. Time

Trilateration surveys determine a position from known distances to fixed reference points. Each measured distance defines a circle (in two dimensions) or a sphere (in three dimensions) around a reference point, and the intersection of these surfaces pinpoints the unknown location. Because the fundamental data used are those distances, the primary measurement is lengths. Angles belong to triangulation rather than trilateration, and terms like pseudorange or time are related to specific systems (such as GNSS) and involve converting timing into distance, but the direct measurements used in trilateration are the lengths between points.

10. What is the purpose of robust or outlier-tolerant least squares?

A. To reduce the influence of anomalous observations on the final solution.

B. To maximize the influence of anomalous observations on the final solution.

C. To simplify computation by discarding most data.

D. To enforce exact equality constraints on all observations.

The main idea is to limit how much a few aberrant observations can pull the fitted model away from the overall pattern in the data. In ordinary least squares, residuals are squared, so a single large outlier can dominate the objective and skew the solution. Robust methods change the loss they optimize or apply weights so that large residuals contribute less, effectively downweighting outliers. This keeps the estimate anchored to the bulk of the data and makes it more resistant to anomalies. So the purpose is to reduce the influence of anomalous observations on the final solution. The other options don't fit: robust methods don't maximize outlier influence, they don't discard most data, and they don't enforce exact equality for every observation.

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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://geodesyboard.examzify.com

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

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