

TEXAS A&M UNIVERSITY (TAMU) GEOL 104 PHYSICAL GEOLOGY EXAM 1 PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. The Earth's magnetic field is generated by what process?**
 - A. The Sun's magnetic field
 - B. The crustal magnetization
 - C. A giant bar magnet produced by currents in the liquid outer core
 - D. External planetary alignment
- 2. What term describes minerals with identical chemical composition but different crystalline structures (for example, diamond and graphite)?**
 - A. Isomorphs
 - B. Crystallographic Alternates
 - C. Silicates
 - D. Polymorphs
- 3. The theory of plate tectonics states that Earth's lithosphere is broken into huge plates that move and change in size over time.**
 - A. Ocean currents drive plate motion
 - B. The atmosphere controls plate tectonics
 - C. The theory of plate tectonics states Earth's lithosphere is broken into huge plates that move and change in size over time
 - D. Subduction only at trenches moves plates
- 4. Ocean basins are composed of basaltic rocks about how thick?**
 - A. About 3 km Thick
 - B. About 7 km Thick
 - C. About 12 km Thick
 - D. About 1 km Thick
- 5. What causes mineral precipitation from solution?**
 - A. Saturation of ions in solution or evaporation
 - B. Increase in pressure
 - C. Addition of water
 - D. Decrease in temperature only

6. Which statement describes the Layer Cake Model of mantle convection?

- A. Whole Mantle Convection (plume model) cold lithosphere sinks to the core-mantle boundary and stirs entire mantle
- B. Layer Cake Model; 2 zones of convection of thin upper layer and larger sluggish one
- C. Ridge-Push Force drives plate motion
- D. Slab-Pull Force dominates plate tectonics

7. How are igneous rocks categorized by silica content, and what are examples?

- A. Felsic rocks have high silica and light minerals; examples include granite and rhyolite
- B. Felsic rocks have low silica content and darker minerals; examples include basalt and gabbro
- C. Igneous rocks are classified only by texture, not composition
- D. Ultramafic rocks are high silica with light minerals

8. Outer Core is characterized as

- A. Rigid mantle portion.
- B. Crustal lid above mantle.
- C. Liquid outer layer of core.
- D. A solid inner layer of core.

9. Which view posits that Earth's landscape has been shaped primarily by catastrophes in the past?

- A. Uniformitarianism
- B. Evolution
- C. Plate tectonics
- D. Catastrophism

10. Which field of science pursues an understanding of planet Earth?

- A. Astronomy
- B. Meteorology
- C. Geology
- D. Oceanography

Answers

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

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Explanations

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1. The Earth's magnetic field is generated by what process?

- A. The Sun's magnetic field
- B. The crustal magnetization
- C. A giant bar magnet produced by currents in the liquid outer core**
- D. External planetary alignment

Earth's magnetic field is produced by a dynamo in the outer core, where liquid iron moves and carries electric currents. Heat-driven convection in this electrically conducting molten layer, aided by the planet's rotation, creates organized flow that generates and maintains magnetic fields. The result is a global field that resembles a giant dipole, even though it is continuously sustained by the ongoing motion of the core material. This is not due to a fixed bar magnet or any external source. The Sun's magnetic field is generated by its own dynamo and does not drive Earth's field, crustal magnetization only records past fields in rocks rather than producing current, and there isn't a mechanism for planetary alignment to create such a field.

2. What term describes minerals with identical chemical composition but different crystalline structures (for example, diamond and graphite)?

- A. Isomorphs
- B. Crystallographic Alternates
- C. Silicates
- D. Polymorphs**

Polymorphism is when a single chemical composition forms more than one crystal structure. Diamond and graphite are classic examples of polymorphs of carbon: both are pure carbon, but their atoms bond and arrange differently. Diamond creates a three-dimensional covalent network, making it extremely hard and an insulator, while graphite forms planar layers with weaker interlayer bonds, making it soft and a lubricant and giving it electrical conductivity along the planes. The different arrangements explain why the same element can have very different properties. The term that describes this situation is polymorphs.

3. The theory of plate tectonics states that Earth's lithosphere is broken into huge plates that move and change in size over time.

- A. Ocean currents drive plate motion
- B. The atmosphere controls plate tectonics
- C. The theory of plate tectonics states Earth's lithosphere is broken into huge plates that move and change in size over time**
- D. Subduction only at trenches moves plates

The main idea being tested is that the lithosphere is made up of large, rigid plates that move relative to one another and can change in size over geological time. The statement that describes this exactly captures the essence of plate tectonics: Earth's outer shell is not a single solid surface but a mosaic of moving plates whose interactions drive the growth, destruction, and reshaping of continents and ocean basins. Ocean currents do not drive plate motion; they are surface patterns that respond to the geometry of coastlines and ocean basins, not the engine behind mantle convection. The atmosphere likewise has no control over the deep processes that move plates. Subduction at trenches is a crucial part of how plates recycle and interact, but it's only one piece of the whole mechanism; plate tectonics as a theory includes multiple processes such as seafloor spreading at mid-ocean ridges and slab pull that collectively cause plates to move and change size. In short, the correct statement concisely defines plate tectonics by describing moving, interacting plates that can grow or shrink over time, driven by deep-Earth dynamics rather than surface conditions.

4. Ocean basins are composed of basaltic rocks about how thick?

- A. About 3 km Thick
- B. About 7 km Thick**
- C. About 12 km Thick
- D. About 1 km Thick

Ocean basins are built from oceanic crust that forms from basaltic magma at mid-ocean ridges. This crust is relatively thin compared with continental crust, and the portion made of basaltic rocks—the main rock type of the ocean floor—has an average thickness of about 7 kilometers. The upper part consists of pillow basalts, with a deeper sheeted-dike zone transitioning down to gabbro, but the overall basaltic portion sits around seven kilometers thick. Sediments can cover the surface, but the underlying basaltic crust remains roughly that thickness.

5. What causes mineral precipitation from solution?

- A. Saturation of ions in solution or evaporation**
- B. Increase in pressure
- C. Addition of water
- D. Decrease in temperature only

Minerals precipitate from solution when the dissolved ions reach saturation and then become supersaturated, often because evaporation concentrates the ions. As water leaves or conditions shift to favor solid formation, the excess dissolved material can no longer be held in solution and a solid mineral forms. This is the direct way precipitation happens. Adding more water would dilute and reduce precipitation, while a simple decrease in temperature or a change in pressure can influence solubility for some systems, but the primary driver here is reaching saturation and, if evaporating water or other concentrating processes occur, driving the solution into supersaturation.

6. Which statement describes the Layer Cake Model of mantle convection?

- A. Whole Mantle Convection (plume model) cold lithosphere sinks to the core-mantle boundary and stirs entire mantle
- B. Layer Cake Model; 2 zones of convection of thin upper layer and larger sluggish one**
- C. Ridge-Push Force drives plate motion
- D. Slab-Pull Force dominates plate tectonics

The Layer Cake Model describes mantle convection as two separate convective zones separated by a relatively strong boundary, roughly around the mantle transition zone depth. In this view, a thin, more actively convecting upper layer sits atop a much larger, slower-moving lower mantle. That two-zone arrangement—a thin upper layer and a larger sluggish one—is exactly what the description is capturing. The other options describe different ideas: a single, whole-mantle convection system driven by plumes, or surface-plate-driven forces like ridge-push or slab-pull, which aren't about having two distinct convection layers.

7. How are igneous rocks categorized by silica content, and what are examples?

- A. Felsic rocks have high silica and light minerals; examples include granite and rhyolite**
- B. Felsic rocks have low silica content and darker minerals; examples include basalt and gabbro
- C. Igneous rocks are classified only by texture, not composition
- D. Ultramafic rocks are high silica with light minerals

Silica content is the main way we group igneous rocks. Rocks with high silica content are called felsic and tend to have light-colored minerals such as quartz and feldspar. Granite and rhyolite are classic felsic rocks, with granite forming underground (intrusive) and rhyolite erupting at the surface (extrusive). This aligns with the statement because it describes high silica and light minerals and gives granite and rhyolite as examples. In contrast, basalts and gabbros are mafic rocks with lower silica content and darker minerals like pyroxene and olivine, while ultramafic rocks have even less silica and are dominated by dark minerals. Some other descriptions mix up silica content with mineral color or misstate the ultramafic composition, which isn't correct for how these rocks are classified.

8. Outer Core is characterized as

- A. Rigid mantle portion.
- B. Crustal lid above mantle.
- C. Liquid outer layer of core.**
- D. A solid inner layer of core.

The outer core is the liquid layer of Earth's core, made mainly of iron and nickel, lying beneath the mantle and surrounding the solid inner core. Seismic evidence shows this layer is liquid because S-waves do not propagate through it, while P-waves pass through and slow down, indicating a fluid that cannot support shear. The liquid convection in this layer drives Earth's magnetic field (the geodynamo). The other descriptions point to different layers: the rigid mantle portion is the mantle, the crustal lid above the mantle is the crust, and a solid inner layer refers to the inner core, not the outer core.

9. Which view posits that Earth's landscape has been shaped primarily by catastrophes in the past?

- A. Uniformitarianism
- B. Evolution
- C. Plate tectonics
- D. Catastrophism**

Catastrophism is the notion that Earth's landscape was shaped primarily by sudden, dramatic events in the geologic past. It emphasizes large, rapid changes—floods, earthquakes, volcanic eruptions, meteor impacts—that can create major features quickly, rather than only slow, gradual processes. This contrasts with uniformitarianism, which attributes most landscape change to the steady, everyday processes we still observe today, acting over long times. Plate tectonics explains how moving crustal plates produce mountains and earthquakes, but it isn't defined by the idea that landscapes are built mainly by catastrophes. Evolution deals with biological change, not how landforms arise. So the view that landscapes were shaped primarily by catastrophes is catastrophism.

10. Which field of science pursues an understanding of planet Earth?

- A. Astronomy
- B. Meteorology
- C. Geology**
- D. Oceanography

Geology is the science that studies Earth, including its rocks, minerals, structure, processes, and history. This field concentrates on understanding the solid planet itself—from its interior to its surface and the long record of past environments preserved in rocks. By examining how rocks form, how the crust is shaped by plate tectonics, and how geologic time has unfolded, geologists piece together Earth's history and present-day processes. Astronomy looks outward to celestial bodies, meteorology focuses on the atmosphere and weather, and oceanography studies oceans; none centers on the solid Earth as a whole and its deep-time history like geology does.

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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://tamu-geol104exam1.examzify.com>

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

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