HOAE General Science Practice Test (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

1. Which planet does not have a well developed atmosphere because of its small size?

A. Mercury

B. Earth

C. Mars

D. Venus

2. Which of the following is NOT a primary function of ribosomes?

A. Protein synthesis

B. Peptide bond formation

C. Assembly of proteins

D. DNA replication

3. In 2006, the IAU voted to reclassify Pluto from a planet to a?

A. Gas giant

B. Terrestrial planet

C. Dwarf planet

D. Star

4. Which carbon isotope is radioactive?

A. Carbon-12

B. Carbon-13

C. Carbon-15

D. Carbon-14

5. The human body primarily operates on which form of energy?

A. Electrical energy

B. Kinetic energy

C. Nuclear energy

D. Chemical potential energy

6. Which theory did Albert Einstein develop?

A. Quantum theory

B. General theory of relativity

C. Special theory of relativity

D. Thermodynamics

7. Common table salt NaCl is formed by attraction between which ions?

A. Sodium ions and oxide ions

B. Potassium ions and chloride ions

C. Calcium ions and chloride ions

D. Sodium ions and chloride ions

8. Which RNA type is most often used in broad evolutionary comparisons due to its universality?

A. mRNA

B. tRNA

C. snRNA

D. rRNA

9. What is the effect called when spectral lines from a distant galaxy shift toward longer wavelengths?

A. Blueshift

B. Redshift

C. No shift

D. Random shift

10. The nanosecond is one ___ of one second.

A. Hundredth

B. Thousandth

C. Millionth

D. Billionth

Answers

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

Explanations

1. Which planet does not have a well developed atmosphere because of its small size?

A. Mercury

B. Earth

C. Mars

D. Venus

A planet's ability to keep an atmosphere depends on gravity and temperature: gases stay bound only if the planet's gravity is strong enough to prevent them from escaping into space, which is harder to do when the molecules move faster at higher temperatures. Mercury, being the smallest planet, has the weakest gravity, so it can't hold onto gases well. Its close proximity to the Sun also heats its surface, speeding up gas molecules and making escape more likely. Add in the lack of a strong magnetic field to shield against solar wind, and any trace gases are continually stripped away. That's why Mercury has almost no atmosphere. Earth and Venus have strong, substantial atmospheres, while Mars has a thinner one, but their larger sizes and other protective factors help them retain gases much more effectively than Mercury.

2. Which of the following is NOT a primary function of ribosomes?

A. Protein synthesis

B. Peptide bond formation

C. Assembly of proteins

D. DNA replication

Ribosomes are the cellular machines that translate genetic information into proteins. They link amino acids together in the order specified by messenger RNA, forming peptide bonds in the ribosome's active site to build a polypeptide chain. That assembly of amino acids into proteins is the core activity of ribosomes during protein synthesis. DNA replication, on the other hand, is carried out by DNA polymerases and related enzymes that copy the cell's DNA before division. So the activity that does not fit as a ribosome function is DNA replication.

3. In 2006, the IAU voted to reclassify Pluto from a planet to a?

A. Gas giant

B. Terrestrial planet

C. Dwarf planet

D. Star

The main idea is how the IAU defines what counts as a planet and why Pluto fits a different category. In 2006, the IAU set three conditions for a body to be a planet: it must orbit the Sun, be nearly round in shape from its own gravity, and have cleared its orbital neighborhood of other debris. Pluto meets the first two, but it hasn't cleared its orbit because it shares its space with many other objects in the Kuiper Belt. So it doesn't qualify as a full planet and is classified as a dwarf planet, a category for rounded bodies that orbit the Sun but haven't cleared their surroundings. This differs from a gas giant or a terrestrial planet, which are both full planets that have cleared their neighborhoods and can be much larger or smaller in composition (gas giants are large and gaseous, terrestrial planets are rocky). A star is a completely different kind of object altogether, powered by nuclear fusion.

4. Which carbon isotope is radioactive?

A. Carbon-12

B. Carbon-13

C. Carbon-15

D. Carbon-14

Isotopes of the same element can have different stability because their nuclei contain different numbers of neutrons. Stability depends on how the protons and neutrons balance each other. Carbon-12 and carbon-13 have a neutron count that keeps the nucleus stable, so they do not decay. Carbon-14 has two extra neutrons, which makes its nucleus unstable. An unstable nucleus will transform to a more stable configuration by emitting radiation. Carbon-14 undergoes beta decay, turning one neutron into a proton and becoming nitrogen-14, while releasing a beta particle. This radioactive decay occurs with a measurable, finite half-life (about 5,730 years), which is why carbon-14 is the isotope used in radiocarbon dating. The essential idea is that radioactivity in an isotope comes from nuclear instability caused by an imbalanced neutron-to-proton ratio.

5. The human body primarily operates on which form of energy?

A. Electrical energy

B. Kinetic energy

C. Nuclear energy

D. Chemical potential energy

Chemical potential energy stored in the bonds of molecules powers nearly all activities in the body. During digestion and cellular respiration, chemical bonds in nutrients like glucose and fats are broken and their energy is captured in ATP, the cell's main energy currency. That chemical energy is then used to drive muscle contraction, build and maintain tissues, power nerve signaling, and keep the body warm. Electrical energy shows up in nerve impulses, and kinetic energy appears when you move, but they are consequences of releasing chemical energy, not the primary store of energy itself. Nuclear energy isn't part of everyday metabolism.

6. Which theory did Albert Einstein develop?

A. Quantum theory

B. General theory of relativity

C. Special theory of relativity

D. Thermodynamics

Gravity isn't a force pulling objects toward each other in the usual sense; it's the result of spacetime bending under mass and energy. Einstein's general theory of relativity captures this by saying that mass-energy tells spacetime how to curve, and that curved spacetime guides how objects move. The equivalence principle is a key idea here: locally, being in a gravitational field feels the same as being in an accelerating frame, which leads to predictions like light skimming past massive bodies and time running slower in stronger gravity. This theory extends the earlier ideas of special relativity, which deal with observers in uniform motion, to include gravity and accelerating reference frames. Other options point to different areas—quantum theory and thermodynamics—but the framework that specifically describes gravity through spacetime geometry is the general theory of relativity.

7. Common table salt NaCl is formed by attraction between which ions?

A. Sodium ions and oxide ions

B. Potassium ions and chloride ions

C. Calcium ions and chloride ions

D. Sodium ions and chloride ions

Table salt forms as an ionic compound when a metal transfers electrons to a nonmetal, creating oppositely charged ions that attract each other. Sodium loses one electron to become Na^+, while chlorine gains one to become Cl^-. The strong electrostatic pull between Na^+ and Cl^- holds them together in a stable compound with a 1:1 ratio, known as NaCl. If you pair different ions, you get different substances. Oxide ions would pair with sodium to form Na_2O, a different compound. A different metal with chloride could form other salts like KCl or $CaCl_2$, but the specific combination that yields NaCl is sodium ions with chloride ions.

8. Which RNA type is most often used in broad evolutionary comparisons due to its universality?

A. mRNA

B. tRNA

C. snRNA

D. rRNA

The main idea is that rRNA serves as a universal, reliable clock for broad evolution. Ribosomal RNA is found in all living cells because it's part of the ribosome, essential for protein synthesis, so its genes are present across all domains of life. Because certain regions of rRNA stay highly conserved, scientists can align these sequences even between very distant organisms, while other parts vary enough to reveal evolutionary differences. That combination—universal presence plus a mix of conserved and variable regions—lets researchers compare distant species and build phylogenies, making rRNA the go-to marker for broad evolutionary comparisons. Other RNA types aren't as useful for this purpose: mRNA reflects only expressed genes and can differ wildly between organisms; tRNA is highly conserved but usually offers less information for deep relationships, and snRNA is primarily a eukaryotic feature tied to splicing, not universal across all life.

9. What is the effect called when spectral lines from a distant galaxy shift toward longer wavelengths?

A. Blueshift

B. Redshift

C. No shift

D. Random shift

Light from a galaxy that is moving away from us stretches as it travels, so the wavelengths of its spectral lines shift toward the red end of the spectrum. This shift toward longer wavelengths is called redshift. It happens because of the Doppler effect: recession makes light appear redder. If an object were moving toward us, the lines would shift toward shorter wavelengths, which is blueshift. No shift would mean there's no relative motion affecting the light. The idea that light shifts randomly isn't a standard concept in astronomy. In cosmology, redshift also increases with distance, reflecting the expansion of the universe, and helps scientists measure how far galaxies are.

10. The nanosecond is one ___ of one second.

A. Hundredth

B. Thousandth

C. Millionth

D. Billionth

The concept here is how time prefixes represent fractions of a second. The prefix nano- means one part in a billion. So a nanosecond is 1 × 10^-9 seconds, which is one billionth of a second. Among the common fractions, a hundredth is 10^-2 seconds, a thousandth is 10^-3 seconds, and a millionth is 10^-6 seconds. Since 10^-9 is one billionth, a nanosecond is the smallest of these options by a large margin. This tiny interval is why nanoseconds are used to describe incredibly fast events, like the cycles of modern computer clocks (roughly one nanosecond per cycle at a 1 GHz clock). Remember: 1 second contains 1,000,000,000 nanoseconds.

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://hoaegenscience.examzify.com

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