

GACE Physics Practice Exam (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

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1. What does kinetic energy depend on?

- A. The mass of the object only.**
- B. The velocity of the object only.**
- C. The mass and velocity of the object.**
- D. The shape and size of the object.**

2. What is thermal conductivity?

- A. The ability of a material to store heat energy.**
- B. The property of a material to conduct heat.**
- C. The rate at which heat energy is lost through radiation.**
- D. The temperature at which a material melts.**

3. What characterizes beta decay in nuclear physics?

- A. Emission of a positron only**
- B. Emission of a beta particle from an atomic nucleus**
- C. Emission of gamma radiation**
- D. Conversion of neutrons into protons**

4. What will happen to a sample of carbon dioxide (dry ice) at 5 atm and -100°C when placed into a chamber at 1 atm and -15°C?

- A. It will immediately begin to vaporize.**
- B. It will immediately begin to melt.**
- C. It will first melt and then quickly vaporize.**
- D. It will remain as a solid.**

5. When a ball is thrown horizontally from a height of 6 feet, which of the following accurately describes the motion of the thrown ball compared to a ball that is dropped from the same height?

- A. The thrown ball will hit the ground first because it is moving with a greater speed.**
- B. The thrown ball will hit the ground first because it has a greater acceleration.**
- C. The dropped ball will hit the ground first because it has a shorter distance to travel.**
- D. Both balls will hit the ground at the same time.**

6. What does the Doppler effect explain?

- A. The change in energy levels of electrons in an atom.**
- B. The change in frequency or wavelength of a wave due to relative motion.**
- C. The behavior of light waves in different media.**
- D. The speed of sound in various materials.**

7. Which of the following statements reflects appropriate laboratory safety standards?

- A. An emergency shower is located within a travel time of 10 seconds**
- B. Prescription eyeglasses provide sufficient eye protection**
- C. Short pants are proper laboratory attire**
- D. Closed-toe shoes should always be worn**

8. What does Bernoulli's principle assert about fluid speed and pressure?

- A. An increase in fluid speed results in an increase in pressure**
- B. Fluid speed does not affect pressure**
- C. An increase in fluid speed occurs simultaneously with a decrease in pressure**
- D. Pressure is constant in all fluids**

9. What is the unit of force in the SI system?

- A. Joule (J)**
- B. Pound (lb)**
- C. Newton (N)**
- D. Pascal (Pa)**

10. What distinguishes an elastic collision from an inelastic collision?

- A. In an elastic collision, momentum is not conserved.**
- B. Inelastic collisions involve no energy exchange.**
- C. In an elastic collision, kinetic energy is conserved, while in an inelastic collision, it is not conserved.**
- D. Elastic collisions only occur in any perfectly rigid body.**

Answers

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

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Explanations

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1. What does kinetic energy depend on?

- A. The mass of the object only.
- B. The velocity of the object only.
- C. The mass and velocity of the object.**
- D. The shape and size of the object.

Kinetic energy is a measure of the energy an object possesses due to its motion, and it is calculated using the formula: $KE = \frac{1}{2}mv^2$ where (KE) represents kinetic energy, (m) represents the mass of the object, and (v) represents its velocity. This formula clearly shows that kinetic energy depends on both the mass of the object and the square of its velocity. The mass directly influences how much kinetic energy an object has; a more massive object will have more kinetic energy at the same velocity compared to a less massive object. Similarly, the velocity has a significant impact because kinetic energy increases with the square of the velocity. This means that even a small increase in velocity can lead to a large increase in kinetic energy. Therefore, the correct answer highlights the fact that both the mass and velocity of an object are essential factors in determining its kinetic energy.

2. What is thermal conductivity?

- A. The ability of a material to store heat energy.
- B. The property of a material to conduct heat.**
- C. The rate at which heat energy is lost through radiation.
- D. The temperature at which a material melts.

Thermal conductivity refers to the property of a material that determines how effectively it conducts heat. It is an intrinsic characteristic, often denoted by the symbol 'k', that quantifies the rate at which heat passes through a unit thickness of a material per unit area per degree of temperature difference. Materials with high thermal conductivity, such as metals, allow heat to pass through them easily, leading to efficient heat transfer. Conversely, materials with low thermal conductivity, like wood or insulating foam, are less effective at transferring heat, making them suitable for thermal insulation purposes. This fundamental concept is essential in engineering, construction, and materials science, where understanding heat transfer is crucial for designing efficient systems and structures.

3. What characterizes beta decay in nuclear physics?

- A. Emission of a positron only
- B. Emission of a beta particle from an atomic nucleus**
- C. Emission of gamma radiation
- D. Conversion of neutrons into protons

Beta decay is characterized by the emission of a beta particle from an atomic nucleus. This process can occur in two forms: beta-minus decay, where a neutron is transformed into a proton with the release of an electron (the beta particle) and an antineutrino, and beta-plus decay, where a proton is converted into a neutron with the emission of a positron (the beta particle) and a neutrino. In both cases, beta decay results in a transformation of the nucleus and the release of energy in the form of kinetic energy carried by the emitted beta particle. This emission is fundamental to the understanding of nuclear reactions, as it highlights the conversion processes within an atomic nucleus and the balance of atomic number and mass number. The other options do not fully encapsulate the essence of beta decay. For example, while the conversion of neutrons into protons is a part of beta-minus decay, it is not the only defining aspect of beta decay as a whole, making it too narrow. The simple emission of a positron refers specifically to beta-plus decay, and does not encompass the broader context. Emission of gamma radiation is a separate type of decay that typically occurs alongside alpha or beta decay but is not a characteristic of beta decay itself

4. What will happen to a sample of carbon dioxide (dry ice) at 5 atm and -100°C when placed into a chamber at 1 atm and -15°C?

- A. It will immediately begin to vaporize.**
- B. It will immediately begin to melt.
- C. It will first melt and then quickly vaporize.
- D. It will remain as a solid.

When dry ice, which is solid carbon dioxide, is placed into a chamber at a lower pressure of 1 atm and a higher temperature of -15°C, it will indeed immediately begin to vaporize. At 5 atm and -100°C, carbon dioxide is in a solid state. However, with the change in pressure and temperature, the solid dry ice finds itself in conditions that favor transition to a gaseous phase. Carbon dioxide sublimates directly from solid to gas at pressures below 5.1 atm and temperatures above -78.5°C, which is significantly higher than -15°C. As the dry ice is moved to a lower pressure environment, the conditions allow the solid carbon dioxide to transform into gas rapidly, thus causing it to vaporize. In this scenario, the pressure drop from 5 atm to 1 atm plays a crucial role in reducing the sublimation point of carbon dioxide, making it energetically favorable for the solid to change into gas immediately, rather than transitioning through a liquid phase or remaining a solid.

5. When a ball is thrown horizontally from a height of 6 feet, which of the following accurately describes the motion of the thrown ball compared to a ball that is dropped from the same height?

- A. The thrown ball will hit the ground first because it is moving with a greater speed.**
- B. The thrown ball will hit the ground first because it has a greater acceleration.**
- C. The dropped ball will hit the ground first because it has a shorter distance to travel.**

D. Both balls will hit the ground at the same time.

The correct choice is that both balls will hit the ground at the same time. This conclusion is based on the principles of projectile motion and the independence of vertical and horizontal motion. When the ball is thrown horizontally, it has an initial horizontal velocity but it still falls under the influence of gravity at the same rate as the ball that is simply dropped. In both cases, the only force acting on the balls in the vertical direction is gravity, which causes both balls to accelerate downward at a rate of approximately 9.81 m/s^2 . Because they start from the same height, their vertical motions are unaffected by any horizontal speeds. As a result, the time it takes for both balls to reach the ground depends solely on the height from which they are dropped, not on their horizontal motion. Thus, regardless of how fast the thrown ball moves horizontally, both the thrown ball and the dropped ball will hit the ground at the same time when dropped from the same height of 6 feet.

6. What does the Doppler effect explain?

- A. The change in energy levels of electrons in an atom.**
- B. The change in frequency or wavelength of a wave due to relative motion.**
- C. The behavior of light waves in different media.**
- D. The speed of sound in various materials.**

The Doppler effect describes how the frequency or wavelength of a wave changes when there is relative motion between the source of the wave and an observer. When the source of the wave moves toward the observer, the waves compress, leading to a higher frequency (or shorter wavelength), which is commonly referred to as a "blue shift." Conversely, when the source moves away from the observer, the waves stretch, resulting in a lower frequency (or longer wavelength), known as a "red shift." This effect is applicable to all types of waves, including sound and electromagnetic waves, making it a fundamental concept in understanding wave behavior in various contexts, from astronomy to everyday phenomena like the sound of a passing siren.

7. Which of the following statements reflects appropriate laboratory safety standards?

- A. An emergency shower is located within a travel time of 10 seconds**
- B. Prescription eyeglasses provide sufficient eye protection**
- C. Short pants are proper laboratory attire**
- D. Closed-toe shoes should always be worn**

The statement regarding the emergency shower being located within a travel time of 10 seconds reflects appropriate laboratory safety standards because it emphasizes the importance of quick access to safety equipment. In the event of a chemical spill or exposure, immediate decontamination is crucial to minimizing injury. Having an emergency shower readily accessible within a short distance ensures that individuals can respond swiftly and effectively to accidents, thereby enhancing safety protocols within the laboratory environment. In contrast, other options do not align with comprehensive safety standards. For instance, prescription eyeglasses are not adequate for eye protection in a lab setting, as they do not provide the necessary shield against potential hazards like chemical splashes or flying debris. Similarly, wearing short pants is not considered safe attire for a laboratory, where skin exposure could lead to chemical burns or injury. Finally, while closed-toe shoes are appropriate footwear, the statement as a standalone measure does not fully encapsulate the broad range of protective attire recommended in a lab, such as lab coats or gloves. Overall, the balance of immediate access to emergency equipment and adequate protective measures is essential in maintaining a safe laboratory environment.

8. What does Bernoulli's principle assert about fluid speed and pressure?

- A. An increase in fluid speed results in an increase in pressure**
- B. Fluid speed does not affect pressure**
- C. An increase in fluid speed occurs simultaneously with a decrease in pressure**
- D. Pressure is constant in all fluids**

Bernoulli's principle describes the relationship between the speed of a fluid and its pressure. Specifically, it asserts that as the speed of a fluid increases, the pressure within the fluid decreases. This principle is derived from the conservation of energy for flowing fluids, which indicates that the total mechanical energy in a streamline flow remains constant. When a fluid flows through a constricted area, it must speed up to conserve mass, leading to a decrease in pressure in that region. This counterintuitive relationship is key in various applications, such as in the design of airplane wings, where the faster airflow over the wing creates lower pressure above it, generating lift. In summary, the assertion that an increase in fluid speed occurs simultaneously with a decrease in pressure aligns perfectly with Bernoulli's principle, illustrating how the properties of fluid dynamics interact in real-world scenarios.

9. What is the unit of force in the SI system?

- A. Joule (J)**
- B. Pound (lb)**
- C. Newton (N)**
- D. Pascal (Pa)**

The unit of force in the SI (International System of Units) is the Newton (N). This unit is defined as the amount of force required to accelerate a one-kilogram mass by one meter per second squared. This relationship comes from Newton's second law of motion, which states that force equals mass times acceleration ($F = m * a$). The Newton is a derived SI unit, where $1 \text{ N} = 1 \text{ kg} \cdot \text{m/s}^2$. Therefore, when applying a force of one Newton, you are applying enough force to change the motion of a mass of one kilogram at an acceleration of one meter per second squared. Understanding this unit is crucial in physics because it provides a fundamental measure of how forces interact in various contexts, such as mechanics, dynamics, and even in engineering applications. Other units listed, such as the Joule (which measures energy), the Pound (a unit of force commonly used in the imperial system), and the Pascal (which measures pressure), do not serve as measures of force in the SI system.

10. What distinguishes an elastic collision from an inelastic collision?

- A. In an elastic collision, momentum is not conserved.**
- B. Inelastic collisions involve no energy exchange.**
- C. In an elastic collision, kinetic energy is conserved, while in an inelastic collision, it is not conserved.**
- D. Elastic collisions only occur in any perfectly rigid body.**

In the context of collisions, the key distinction between elastic and inelastic collisions lies in the conservation of kinetic energy. In an elastic collision, both momentum and kinetic energy are conserved. This means that the total kinetic energy of the colliding bodies before the collision is equal to the total kinetic energy after the collision. This type of collision is often idealized, as it occurs in situations where no energy is lost to sound, heat, or deformation of the bodies involved. On the other hand, in an inelastic collision, while momentum is still conserved, kinetic energy is not conserved. During an inelastic collision, some of the kinetic energy is transformed into other forms of energy, such as thermal energy or energy associated with deformation. This is commonly observed in everyday collisions, like a car crash, where the vehicles crumple and thermal energy is generated. Understanding this distinction is crucial in solving problems related to momentum and energy in physics, as it affects the outcome of the collision in terms of how much kinetic energy remains within the system afterward. Thus, the statement that in an elastic collision, kinetic energy is conserved, while in an inelastic collision, it is not conserved accurately captures the essential difference between these two types of collisions.

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://gacephysics.examzify.com>

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

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