

GACE PHYSICS 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. What is angular momentum?

- A. The quantity of an object's linear motion.
- B. The measure of an object's rotational motion.
- C. The total mass of an object in motion.
- D. The change in velocity of a rotating object.

2. What is the primary function of a transformer in electrical systems?

- A. Store electrical energy
- B. Convert AC to DC
- C. Change voltage levels
- D. Regulate temperature

3. Which one of the following energy conversions occurs in a ball as it bounces upward after being dropped?

- A. Kinetic energy to gravitational potential energy.
- B. Gravitational potential energy to kinetic energy.
- C. Thermal energy to kinetic energy.
- D. Potential energy to heat energy.

4. How is kinetic energy defined?

- A. The energy an object possesses due to its position.
- B. The energy an object possesses due to its motion, expressed as $KE = 1/2 mv^2$.
- C. The sum of potential and kinetic energy in a system.
- D. The energy of an object that is at rest.

5. What does Hooke's Law describe?

- A. The relationship between voltage and current in a conductor
- B. The behavior of a spring under load
- C. The conservation of mass in mechanical systems
- D. The relationship between force and velocity in motion

6. What is the speed of a wave with a frequency of 100.0 Hz and a distance between adjacent nodes of 0.500 m?
- A. 25.0 m/s
 - B. 50.0 m/s
 - C. 100.0 m/s
 - D. 200.0 m/s
7. What unit is electric current measured in?
- A. Volts
 - B. Watts
 - C. Amperes
 - D. Ohms
8. Which of the following laws defines thermal equilibrium?
- A. The first law of thermodynamics
 - B. The second law of thermodynamics
 - C. The zeroth law of thermodynamics
 - D. The third law of thermodynamics
9. How is inertia defined in the context of physics?
- A. The tendency of an object to remain stationary.
 - B. The tendency of an object to resist changes in its state of motion.
 - C. The force that acts on a mass in motion.
 - D. The acceleration of an object when a net force is applied.
10. What does the law of conservation of energy state?
- A. The total energy in a closed system increases over time.
 - B. Energy can be created from matter.
 - C. The total energy in a closed system remains constant; energy cannot be created or destroyed, only transformed.
 - D. Energy is dependent on the velocity of an object.

Answers

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

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Explanations

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1. What is angular momentum?

- A. The quantity of an object's linear motion.
- B. The measure of an object's rotational motion.**
- C. The total mass of an object in motion.
- D. The change in velocity of a rotating object.

Angular momentum is defined as the measure of an object's rotational motion. It is a vector quantity that represents the rotational analog of linear momentum and is calculated based on the object's moment of inertia and angular velocity. Angular momentum plays a significant role in physics, particularly in the study of rotational dynamics. In mathematical terms, angular momentum (L) can be expressed as the product of the moment of inertia (I) and the angular velocity (ω), represented by the equation $L = I\omega$. This relationship highlights how an object's mass distribution and rotational speed contribute to its overall rotational motion. Understanding angular momentum is crucial in various physical phenomena, such as the conservation of angular momentum, which states that in the absence of external torques, the total angular momentum of a system remains constant. This principle is observable in systems like spinning ice skaters who pull in their arms to spin faster, demonstrating how changes in the distribution of mass can affect rotational motion while conserving angular momentum.

2. What is the primary function of a transformer in electrical systems?

- A. Store electrical energy
- B. Convert AC to DC
- C. Change voltage levels**
- D. Regulate temperature

The primary function of a transformer in electrical systems is to change voltage levels. Transformers operate based on the principle of electromagnetic induction and are designed to either step up (increase) or step down (decrease) the voltage of alternating current (AC) electricity. This capability is essential for efficient power distribution and transmission. By adjusting voltage levels, transformers help minimize energy losses over long distances and ensure compatibility with electrical devices that require specific voltage levels for safe and efficient operation. In electricity transmission, high voltages are used to reduce current, which helps to decrease resistive losses in the wires. At the point of use, transformers step down the high voltage to a lower voltage that can be safely utilized in homes and businesses. This transformation enables a versatile and effective electrical grid, accommodating various applications and devices.

3. Which one of the following energy conversions occurs in a ball as it bounces upward after being dropped?

- A. Kinetic energy to gravitational potential energy.
- B. Gravitational potential energy to kinetic energy.
- C. Thermal energy to kinetic energy.
- D. Potential energy to heat energy.

When a ball is dropped and subsequently bounces upward, it undergoes various energy transformations throughout its motion. At the moment the ball strikes the ground, it possesses maximum kinetic energy due to its speed. As it begins to bounce upward, this kinetic energy is converted into gravitational potential energy. Gravitational potential energy is defined as the energy an object possesses due to its position relative to a reference point, typically the ground. As the ball rises, it slows down until it reaches its highest point, where all the kinetic energy from its drop has been converted into gravitational potential energy. This process is characterized by the ball losing speed while gaining height. In contrast, the other options do not accurately describe the energy transformations occurring in this scenario. For instance, while gravitational potential energy converting to kinetic energy is correct for a ball falling, it describes the initial motion rather than the bounce upward. Similarly, energy transformations involving thermal energy or heat are not relevant here, as the main interaction is between kinetic and gravitational potential energies during the bounce. Thus, the conversion from kinetic energy to gravitational potential energy accurately depicts the ball's behavior as it rises after bouncing, highlighting the changes in energy state as it moves against the force of gravity.

4. How is kinetic energy defined?

- A. The energy an object possesses due to its position.
- B. The energy an object possesses due to its motion, expressed as $KE = \frac{1}{2}mv^2$.
- C. The sum of potential and kinetic energy in a system.
- D. The energy of an object that is at rest.

Kinetic energy is specifically defined as the energy that an object has due to its motion. This is mathematically expressed by the formula $KE = \frac{1}{2}mv^2$, where m represents the mass of the object and v is its velocity. This relationship highlights that the kinetic energy increases with the square of the velocity, illustrating how a small increase in speed can result in a significantly larger amount of kinetic energy. Understanding kinetic energy is crucial in various fields, including mechanics and engineering, because it helps in analyzing motion and the interactions of moving objects. The concept emphasizes that energy is not just a static measurement; it changes according to the state of an object's motion. The other definitions provided do not accurately represent kinetic energy. The first option refers to potential energy, which depends on an object's position rather than its motion. The third option discusses both potential and kinetic energies collectively, while the fourth option describes a state where an object possesses no kinetic energy since it is at rest. Thus, the definition of kinetic energy is clear and specific, focusing solely on its relationship to motion.

5. What does Hooke's Law describe?

- A. The relationship between voltage and current in a conductor
- B. The behavior of a spring under load**
- C. The conservation of mass in mechanical systems
- D. The relationship between force and velocity in motion

Hooke's Law specifically describes the behavior of a spring when it is subjected to an external force. It states that the force exerted by a spring is directly proportional to the displacement or stretch of the spring from its equilibrium position, assuming the deformation is within the elastic limit of the spring. Mathematically, it is often represented as $F = kx$, where F is the force exerted by the spring, k is the spring constant (which measures the stiffness of the spring), and x is the displacement from the original length of the spring. This principle is fundamental in understanding how elastic materials behave when they are stretched or compressed. The law applies not only to springs but to a wide variety of materials that exhibit elastic behavior. When the load exceeds the elastic limit, the material may no longer return to its original shape, which underscores the importance of the linear relationship described by Hooke's Law when it is applicable. In contrast, the other options pertain to different physical relationships: one relates to electrical components, another addresses the conservation principles in mechanics, and the last option deals with the dynamics of motion, none of which are described by Hooke's Law.

6. What is the speed of a wave with a frequency of 100.0 Hz and a distance between adjacent nodes of 0.500 m?

- A. 25.0 m/s
- B. 50.0 m/s
- C. 100.0 m/s**
- D. 200.0 m/s

To determine the speed of a wave, we can use the relationship between speed, frequency, and wavelength. The formula that relates these quantities is given by: $v = f \lambda$ where v is the wave speed, f is the frequency, and λ is the wavelength. In this case, the frequency of the wave is provided as 100.0 Hz. The distance between adjacent nodes in a wave is also critical; for standing waves, this distance is equal to half of the wavelength. Therefore, if the distance between adjacent nodes is 0.500 m, the wavelength can be calculated as: $\lambda = 2 \times \text{distance between adjacent nodes} = 2 \times 0.500 \text{ m} = 1.0 \text{ m}$. Plugging in the frequency and the wavelength into the wave speed equation results in: $v = 100.0 \text{ Hz} \times 1.0 \text{ m} = 100.0 \text{ m/s}$. This calculation shows that the speed of the wave is 100.0 m/s, which aligns with the

7. What unit is electric current measured in?

- A. Volts
- B. Watts
- C. Amperes
- D. Ohms

Electric current is measured in amperes, often abbreviated as "A." This unit defines the flow of electric charge in a circuit. Specifically, one ampere is equivalent to the flow of one coulomb of charge per second. It is a fundamental quantity in electrical physics, as it quantifies how much charge is moving past a given point in a circuit within a certain time period. Understanding electric current in terms of its unit, amperes, is crucial for analyzing electrical systems and circuits. In practical applications, measuring current in amperes helps in determining the performance of electrical devices and in ensuring safe and efficient operation within the circuit. The other units mentioned serve different roles: volts measure electric potential difference, watts quantify electrical power (the rate at which energy is used or transferred), and ohms represent electrical resistance. Each of these concepts relates to current but does so from different perspectives in the context of electricity.

8. Which of the following laws defines thermal equilibrium?

- A. The first law of thermodynamics
- B. The second law of thermodynamics
- C. The zeroth law of thermodynamics
- D. The third law of thermodynamics

The concept of thermal equilibrium is defined by the zeroth law of thermodynamics. This law states that if two systems are each in thermal equilibrium with a third system, then they are in thermal equilibrium with each other. This foundational principle allows us to define temperature in a consistent manner across different systems. When two systems are at the same temperature and no heat flows between them, they are considered to be in thermal equilibrium. The zeroth law is fundamental because it establishes the basis for temperature measurement and the concept that temperature is a property that can be used to determine thermal equilibrium between different systems. In the context of thermodynamic laws, the first law focuses on the conservation of energy, the second law deals with the direction of spontaneous processes and the concept of entropy, and the third law addresses the behavior of systems as they approach absolute zero. None of these laws specifically describe the condition of thermal equilibrium, which is why the zeroth law is the correct answer.

9. How is inertia defined in the context of physics?

- A. The tendency of an object to remain stationary.
- B. The tendency of an object to resist changes in its state of motion.
- C. The force that acts on a mass in motion.
- D. The acceleration of an object when a net force is applied.

Inertia is defined as the tendency of an object to resist changes in its state of motion, which is accurately captured by the selected answer. This principle is rooted in Newton's First Law of Motion, which states that an object at rest will remain at rest, and an object in motion will continue in motion with the same speed and in the same direction unless acted upon by a net external force. This inherent property of matter means that the more massive an object is, the greater its inertia, and consequently, the more force will be needed to alter its motion. Inertia is not a force itself but rather a characteristic of an object's mass, indicating how difficult it is to change its state, whether at rest or in motion. While other choices mention aspects related to motion and forces, they do not appropriately encapsulate the concept of inertia. For example, simply stating that an object tends to remain stationary does not account for its behavior when already in motion. Similarly, the idea of force acting on a mass without the context of resistance to change does not accurately capture what inertia entails. Hence, the definition that highlights resistance to changes in motion is the most fitting representation of inertia in physics.

10. What does the law of conservation of energy state?

- A. The total energy in a closed system increases over time.
- B. Energy can be created from matter.
- C. The total energy in a closed system remains constant; energy cannot be created or destroyed, only transformed.**
- D. Energy is dependent on the velocity of an object.

The law of conservation of energy is a fundamental principle in physics that asserts that the total energy in a closed system remains constant. This means that energy cannot be created or destroyed; it can only change from one form to another. For instance, in a mechanical system, potential energy can be converted into kinetic energy and vice versa, but the overall energy of the system does not change. This principle is essential in understanding various physical phenomena, from simple mechanical systems, like a swinging pendulum, to complex thermodynamic processes. It underscores the interconnectedness of different forms of energy and supports the idea that while energy may appear to dissipate, it is merely converting into another form that may not be immediately visible or usable in the same way. Understanding that energy transformations happen without a net loss or gain in a closed system helps explain a wide range of processes in physics, from engines to ecosystems. The conservation of energy is a cornerstone of both classical and modern physics, providing deep insights into the behavior of physical systems.

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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:

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

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