

IB Physics Higher Level (HL) Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

Copyright © 2026 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain accurate, complete, and timely information about this product from reliable sources.

SAMPLE

Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	16

SAMPLE

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

SAMPLE

- 1. Which of the following statements corresponds to the concept of impulse?**
 - A. Impulse is the product of mass and velocity**
 - B. Impulse is the area under a force-time graph**
 - C. Impulse measures the speed of an object**
 - D. Impulse is described as a body's acceleration factor**

- 2. In thermodynamics, what happens to the internal energy of a system during an isochoric process?**
 - A. The internal energy decreases while external work is done**
 - B. The internal energy remains constant**
 - C. The internal energy increases while temperature decreases**
 - D. The internal energy increases or decreases depending on heat exchange**

- 3. How do hard materials differ from soft materials in materials science?**
 - A. Soft materials resist deformation and abrasion**
 - B. Hard materials can be easily deformed under stress**
 - C. Hard materials resist deformation and abrasion**
 - D. Soft materials are used in all construction applications**

- 4. In the context of waves, what does amplitude represent?**
 - A. The speed of the wave through a medium**
 - B. The frequency of the wave over time**
 - C. The maximum displacement from rest position**
 - D. The total energy carried by the wave**

- 5. How does the acceleration due to gravity affect vertical projectile motion?**
 - A. It acts as a constant force leading to varying speeds**
 - B. It remains negligible throughout the motion**
 - C. It induces deceleration in the upward trajectory only**
 - D. It has no influence on vertical motion**

- 6. What does the term 'electric current' signify?**
- A. The speed of electrical charge flow**
 - B. The amount of charge per unit area**
 - C. The rate of flow of electrical charge**
 - D. The pressure of electrons in a conductor**
- 7. Which of the following describes Newton's law of gravitation?**
- A. Objects in free-fall will accelerate equally**
 - B. Any two bodies attract each other based on mass and distance**
 - C. The weight of an object is constant regardless of location**
 - D. The gravitational force is independent of mass**
- 8. What is an environmental impact of the greenhouse effect?**
- A. Reduced air quality**
 - B. Increased ocean acidity**
 - C. Destruction of the ozone layer**
 - D. Lower average temperatures**
- 9. How is the change in momentum expressed mathematically?**
- A. Impulse = Force x Time**
 - B. Impulse = mass x acceleration**
 - C. Impulse = energy x distance**
 - D. Impulse = force ÷ area**
- 10. What happens to the entropy of a system as it undergoes a spontaneous process?**
- A. The entropy increases**
 - B. The entropy decreases**
 - C. The entropy remains constant**
 - D. The entropy becomes zero**

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. Which of the following statements corresponds to the concept of impulse?

- A. Impulse is the product of mass and velocity**
- B. Impulse is the area under a force-time graph**
- C. Impulse measures the speed of an object**
- D. Impulse is described as a body's acceleration factor**

Impulse is directly related to the change in momentum of an object, which is defined as the product of mass and velocity. However, impulse specifically refers to the effect of a force applied over a certain time interval, leading to that change in momentum. The correct statement highlights that impulse can be visualized as the area under a force-time graph. When you graph force against time, the area beneath the curve represents the total impulse delivered to an object. This area effectively captures the product of the average force applied over a time duration, correlating to the change in momentum experienced by the object. The other statements do not accurately capture the essence of impulse. For instance, the definition of impulse as the product of mass and velocity relates to momentum rather than impulse itself. While speed is a factor of motion, it does not directly define impulse, which is concerned with force and the time it is applied. Lastly, describing impulse as a body's acceleration factor is misleading, as impulse involves force over time rather than just acceleration. Thus, the statement about impulse being the area under a force-time graph clearly aligns with the fundamental physics principles surrounding impulse.

2. In thermodynamics, what happens to the internal energy of a system during an isochoric process?

- A. The internal energy decreases while external work is done**
- B. The internal energy remains constant**
- C. The internal energy increases while temperature decreases**
- D. The internal energy increases or decreases depending on heat exchange**

During an isochoric process, the volume of the system remains constant. Given that no work is done by or on the system (as work in thermodynamics is related to changes in volume), any change in internal energy must be due to heat exchange with the surroundings. If the system absorbs heat, the internal energy will increase, which typically corresponds to an increase in temperature. Conversely, if the system loses heat, the internal energy will decrease, leading to a temperature drop. Therefore, the internal energy of the system can either increase or decrease depending on the amount of heat exchanged with the environment. This aspect is what makes the fourth option the correct choice, as it encompasses both possibilities regarding heat exchange and its effect on internal energy. In contrast, stating that the internal energy remains constant would ignore the influence of heat transfer, which can cause changes. Similarly, saying that the internal energy increases while temperature decreases does not align with the principles of thermodynamics, as an increase in internal energy would generally accompany an increase in temperature, under constant volume conditions. Finally, indicating a decrease in internal energy while external work is done does not apply here since no work is done in an isochoric process.

3. How do hard materials differ from soft materials in materials science?

- A. Soft materials resist deformation and abrasion
- B. Hard materials can be easily deformed under stress
- C. Hard materials resist deformation and abrasion**
- D. Soft materials are used in all construction applications

Hard materials are characterized by their ability to resist deformation and abrasion, making them suitable for applications that require durability and strength. This resistance typically results from a strong atomic or molecular structure, which allows these materials to withstand various types of forces without undergoing significant changes in shape. In contrast to soft materials, which generally tend to deform more easily under stress and may wear down more quickly due to abrasion, hard materials maintain their integrity when subjected to external forces. This quality is essential for materials used in construction, tools, and various industrial applications where wear and tear are critical concerns. Thus, the correct understanding is that hard materials possess the properties of high resistance to deformation and abrasion, distinguishing them from softer counterparts that are more susceptible to changes in shape and wear over time.

4. In the context of waves, what does amplitude represent?

- A. The speed of the wave through a medium
- B. The frequency of the wave over time
- C. The maximum displacement from rest position**
- D. The total energy carried by the wave

Amplitude represents the maximum displacement of a wave from its rest position, making it a key characteristic of wave behavior. In wave mechanics, the amplitude is the height of the wave peaks from the equilibrium position, indicating the extent of the wave's oscillation. A higher amplitude means a greater disturbance from the rest position, which often correlates with more energy being carried by the wave, particularly in mechanical and electromagnetic waves. The distinction is important as it helps in understanding wave properties such as sound intensity, light brightness, and energy transfer in waves. This concept is fundamental in various applications, including acoustics, optics, and even in analyzing waves in quantum mechanics scenarios. It is crucial to note that amplitude does not represent speed, frequency, or total energy directly, even though they are interconnected in wave theory.

5. How does the acceleration due to gravity affect vertical projectile motion?

- A. It acts as a constant force leading to varying speeds**
- B. It remains negligible throughout the motion**
- C. It induces deceleration in the upward trajectory only**
- D. It has no influence on vertical motion**

In the context of vertical projectile motion, the acceleration due to gravity is a constant force that influences the motion of the projectile throughout its trajectory. This force acts downward with a magnitude of approximately (9.81 m/s^2) near the surface of the Earth. Because of this constant acceleration, the speed of the projectile changes continuously as it moves upward and downward. When a projectile is thrown upwards, the acceleration due to gravity acts against its initial upward velocity, causing it to decelerate until it reaches its maximum height, where the velocity becomes zero before it begins to descend. As the projectile falls back to the ground, gravity causes it to accelerate downwards, increasing its speed until it impacts the ground. This consistent influence of gravity means the motion can be analyzed using equations of motion that factor in this constant acceleration. Consequently, recognizing that gravity is not negligible or absent during the projectile's motion is crucial in understanding the overall dynamics involved. The varying speeds of the projectile, influenced by the constant gravitational force, are essential concepts in projectile motion analysis.

6. What does the term 'electric current' signify?

- A. The speed of electrical charge flow**
- B. The amount of charge per unit area**
- C. The rate of flow of electrical charge**
- D. The pressure of electrons in a conductor**

Electric current fundamentally refers to the flow of electric charge through a conductor. It is defined specifically as the rate at which charge passes a given point in the circuit over time. This concept can be mathematically expressed using the equation $I = Q/t$, where I represents electric current, Q denotes the total charge, and t is the time interval during which the charge flows. Therefore, the unit of electric current, the ampere (A), characterizes how much charge flows through a circuit per second. The correct interpretation highlights that current is not just about the speed at which individual charges move, but rather the overall rate of charge flow within the circuit. This makes current a crucial parameter in understanding electrical circuits and systems.

7. Which of the following describes Newton's law of gravitation?

- A. Objects in free-fall will accelerate equally
- B. Any two bodies attract each other based on mass and distance**
- C. The weight of an object is constant regardless of location
- D. The gravitational force is independent of mass

Newton's law of gravitation states that every point mass attracts every other point mass in the universe with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers. This foundational principle highlights that any two bodies attract each other based on their masses and the distance that separates them. As such, the larger the masses of the bodies, the stronger the gravitational force between them, and the farther apart they are, the weaker the gravitational pull. This understanding of the interaction between mass and distance is critical in explaining phenomena ranging from the motion of planets in orbit to the falling of objects on Earth, emphasizing the universal applicability of gravitational attraction between any two masses.

8. What is an environmental impact of the greenhouse effect?

- A. Reduced air quality
- B. Increased ocean acidity**
- C. Destruction of the ozone layer
- D. Lower average temperatures

The greenhouse effect is primarily responsible for the increase in global temperatures as greenhouse gases trap heat in the atmosphere. As the Earth's temperature rises, it affects various natural processes, including the absorption of carbon dioxide by oceans. Warmer temperatures lead to increased levels of dissolved CO₂ in seawater, which reacts with water to form carbonic acid, thus raising the acidity of the oceans. This process is known as ocean acidification and has detrimental effects on marine ecosystems, particularly on organisms such as coral reefs and shellfish that rely on calcium carbonate for their structures. Other options do not accurately reflect the direct consequences of the greenhouse effect. Reduced air quality is more related to emissions from burning fossil fuels rather than the greenhouse effect itself. The destruction of the ozone layer is primarily associated with chlorofluorocarbons (CFCs) and other ozone-depleting substances, rather than the greenhouse gases responsible for climate change. Lastly, lower average temperatures directly contradict the fundamental principle of the greenhouse effect, which leads to warming rather than cooling.

9. How is the change in momentum expressed mathematically?

- A. Impulse = Force x Time**
- B. Impulse = mass x acceleration**
- C. Impulse = energy x distance**
- D. Impulse = force ÷ area**

The correct expression for the change in momentum is represented by impulse, which is defined as the product of force and the time duration over which the force acts. Mathematically, this is expressed as: $\text{Impulse} = \text{Force} \times \text{Time}$. Impulse measures the change in momentum of an object. According to Newton's second law, the force acting on an object creates an impulse that results in a change in momentum, which follows the equation: $\text{Impulse} = \text{Change in Momentum}$. In this context, when a force is applied to an object for a certain period, it affects the object's momentum. Thus, the correct relationship involves the force applied, the duration of that application, and the resultant impulse leading to the change in momentum. Other options involve different physical quantities that do not accurately describe the relationship between impulse and momentum. For instance, expressing impulse in terms of mass and acceleration doesn't capture the time factor essential in momentum change. Similarly, energy multiplied by distance does not relate directly to the concept of impulse, and force divided by area refers to pressure, which is a completely different physical concept.

10. What happens to the entropy of a system as it undergoes a spontaneous process?

- A. The entropy increases**
- B. The entropy decreases**
- C. The entropy remains constant**
- D. The entropy becomes zero**

During a spontaneous process, the entropy of a system increases, reflecting the second law of thermodynamics, which states that in an isolated system, natural processes tend to move towards a state of greater disorder or randomness. Entropy is a measure of the number of microscopic configurations that correspond to a thermodynamic system's macroscopic state. As a system transitions through a spontaneous process, the arrangements of particles become more disordered, leading to an increase in the system's entropy. For example, when ice melts to form water, the molecular structure transitions from a more ordered solid state to a less ordered liquid state, resulting in an increase in entropy. In an overarching sense, this concept supports the idea that energy disperses in a system, driving processes toward equilibrium where maximum entropy is reached. Thus, for spontaneous processes, it is clear that the entropy increases.

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://ibphysicshl.examzify.com>

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

SAMPLE