IB PHYSICS HIGHER LEVEL (HL) PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR THE FULL VERSION STUDY GUIDE

https://ibphysicshl.examzify.com

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.

SAMPLE

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!

SAMPLE

Questions

SAMPLE

1. What characterizes an isothermal process in thermodynamics?

A. The pressure of the system remains constant

B. The internal energy of the system changes

C. The temperature of the system remains constant

D. The volume of the system remains constant

2. What effect does increasing temperature have on the resistance of electrical conductors generally?

A. Resistance decreases

B. Resistance remains unchanged

C. Resistance increases

D. Only affects semiconductors

3. What does gravitational mass measure?

A. The mass based on the volume of an object

B. The mass of a body determined by its gravitational attraction to other bodies

C. The mass of a body when subject to inertial frameworks

D. The mass relative to its resistance in motion

4. Which of the following describes the relationship between voltage, current, and resistance?

A. $V = IR$

B. $I = VR$

C. $R = IV$

D. $V = I/R$

5. What is the SI unit of electric charge?

A. Coulomb (C)

B. Volt (V)

C. Ohm (Ω)

D. Ampere (A)

SAMPLE

6. How would you express the total energy of an object in orbit?

A. 0.5 (GMm)/r - (GMm)/r

B. (GMm)/r + ½mv²

C. ½ (GMm)/r

D. ½ (GMm)/r - (GMm)/r

7. What is an electronvolt?

A. A unit of electric current

B. A unit of energy equal to work done by an electron through a potential difference of 1 volt

C. A measure of electrical resistance

D. A way to define electric potential

8. In a parallel circuit, how do the components connect?

A. In multiple pathways

B. In a single pathway only

C. In series with each other

D. In radial symmetry

9. How can RMS voltage be calculated from peak voltage?

A. Vrms = Vpeak × √2

B. Vrms = Vpeak / 2

C. Vrms = Vpeak / √2

D. Vrms = √2 × Vpeak

10. In an inelastic collision, what is conserved?

A. Energy and momentum

B. Momentum only

C. Kinetic energy only

D. Neither energy nor momentum

SAMPLE

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. What characterizes an isothermal process in thermodynamics?

A. The pressure of the system remains constant

B. The internal energy of the system changes

C. The temperature of the system remains constant

D. The volume of the system remains constant

An isothermal process is characterized by the temperature of the system remaining constant throughout the entire process. This means that any heat added to or removed from the system is perfectly balanced by the work done by or on the system. In thermodynamics, for an ideal gas undergoing an isothermal process, the internal energy remains constant as well since the internal energy of an ideal gas is a function of temperature. The fact that temperature does not change during this process is crucial because it implies that the system is in thermal equilibrium with its surroundings. It helps to understand how processes can be conducted in such a way that the temperature does not fluctuate, often requiring careful control of heat exchanges. In contrast, processes where pressure, internal energy, or volume remain constant are described as isobaric, isoenergetic, and isochoric respectively, and these do not fit the definition of isothermal processes. Therefore, the option identifying the constant temperature is indeed the defining characteristic of an isothermal process.

2. What effect does increasing temperature have on the resistance of electrical conductors generally?

A. Resistance decreases

B. Resistance remains unchanged

C. Resistance increases

D. Only affects semiconductors

Increasing temperature generally results in an increase in the resistance of electrical conductors. This behavior primarily arises from the increase in lattice vibrations within the conductor's atomic structure. As temperature rises, atoms in the conductor vibrate more intensely and impede the flow of electrons, which is the primary carrier of current in conductors. In metallic conductors, this phenomenon occurs because the free electrons encounter greater obstacles as they move through the increasingly agitated atomic lattice, leading to an overall increase in resistance. This is in contrast to semiconductors, where resistance can decrease with increased temperature due to the increased number of free charge carriers available for conduction; however, this property is not applicable to typical conductors. Thus, the correct answer reflects the general behavior observed in most electrical conductors at elevated temperatures. The fundamental principles of resistivity and temperature dependence support this conclusion, aligning with the notion that resistance tends to increase with temperature in conductors.

SAMPLE

3. What does gravitational mass measure?

A. The mass based on the volume of an object

B. The mass of a body determined by its gravitational attraction to other bodies

C. The mass of a body when subject to inertial frameworks

D. The mass relative to its resistance in motion

Gravitational mass measures the mass of a body based on its gravitational attraction to other bodies. This concept is fundamental in understanding how objects interact under the influence of gravity. Gravitational mass is what causes an object to experience a force when in a gravitational field, as described by Newton's law of universal gravitation. The more massive an object is, the stronger its gravitational pull will be on other objects and vice versa. This property is critical for calculating gravitational forces and understanding the orbits of planets, moons, and other celestial bodies. In contrast, the other definitions relate to different aspects of mass. The concept of mass based on volume describes density rather than gravitational mass. The inertial frameworks refer to how mass behaves in terms of Newton's second law (force equals mass times acceleration), which is related to inertial mass. Resistance to motion pertains to the concept of inertia. Thus, gravitational mass specifically relates to gravitational interactions, making it the right measure in this context.

4. Which of the following describes the relationship between voltage, current, and resistance?

A. V = IR

B. I = VR

C. R = IV

D. V = I/R

The correct description of the relationship between voltage, current, and resistance is encapsulated in the formula V = IR, which is known as Ohm's Law. This fundamental principle of electrical circuits states that the voltage (V) across a conductor is directly proportional to the current (I) flowing through it and the resistance (R) of the conductor. In this equation, voltage is measured in volts (V), current in amperes (A), and resistance in ohms (Ω). According to Ohm's Law, if you increase the resistance in a circuit while maintaining the same voltage, the current will decrease. Conversely, if the voltage is increased, the current will also rise, provided that the resistance remains constant. This relationship is essential for understanding how electrical circuits operate and how different components affect current flow. The other relationships provided in the choices do not accurately represent the interaction of voltage, current, and resistance as defined by Ohm's Law.

SAMPLE

5. What is the SI unit of electric charge?

A. Coulomb (C)

B. Volt (V)

C. Ohm (Ω)

D. Ampere (A)

The SI unit of electric charge is indeed the coulomb, represented by the symbol (C). It quantifies the amount of electric charge transferred by a constant current of one ampere in one second. The coulomb is a fundamental unit in the International System of Units (SI) and is crucial for expressing the quantities associated with electricity and electromagnetism. To understand its importance, it helps to know that electric charge is a property of subatomic particles, such as electrons and protons, which determines how they interact with electric and magnetic fields. The coulomb is defined in terms of other units in the SI system; for instance, one coulomb is equivalent to the charge of approximately 6.242 x 10^18 elementary charges (the charge of a single proton or the negative of that of an electron). The other choices represent different physical quantities: the volt measures electric potential, the ohm measures electrical resistance, and the ampere measures electric current. These units are related to electric charge but do not represent the charge itself. The distinction emphasizes the significance of the coulomb as a measure of electric charge.

6. How would you express the total energy of an object in orbit?

A. 0.5 (GMm)/r - (GMm)/r

B. (GMm)/r + ½mv²

C. ½ (GMm)/r

D. ½ (GMm)/r - (GMm)/r

To express the total energy of an object in orbit, it's important to consider both the gravitational potential energy and the kinetic energy of the object. The gravitational potential energy (U) between two masses, such as the Earth and an object in orbit, is given by the formula: \[U = -\frac{GMm}{r} \] where \(G \) is the gravitational constant, \(M \) is the mass of the larger body (like Earth), \(m \) is the mass of the smaller object, and \(r \) is the distance between the centers of the two masses. The negative sign indicates that the gravitational potential energy is zero when the objects are infinitely far apart, and it becomes negative as they come closer together. The kinetic energy (K) of an object in orbital motion is given by: \[K = \frac{1}{2} mv^{2} \] In a stable orbit, the gravitational force provides the necessary centripetal force for circular motion, resulting in a specific relationship between the kinetic energy and the potential energy. For a satellite in a circular orbit, the magnitude of the gravitational force is equal to the centripetal force required to keep the satellite in orbit, giving you the relationship

SAMPLE

7. What is an electronvolt?

A. A unit of electric current

B. A unit of energy equal to work done by an electron through a potential difference of 1 volt

C. A measure of electrical resistance

D. A way to define electric potential

An electronvolt is defined as the amount of energy gained by an electron when it is accelerated through an electric potential difference of one volt. This unit of energy is particularly useful in fields such as particle physics and quantum mechanics, where electrons are often involved in interactions and energy calculations. To put it in context, the energy associated with a charge (like that of an electron) moving through an electric field can be calculated using the equation $E = qV$, where E is energy, q is the charge, and V is the potential difference. For the charge of an electron, which is approximately 1.6×10^{-19} coulombs, if it moves through a potential difference of 1 volt, the energy gained is exactly 1 electronvolt, or 1.6×10^{-19} joules. This definition of electronvolts allows for easier and more intuitive calculations in energy exchange processes that occur in atomic and subatomic physics, making it a crucial concept in understanding phenomena like photon interactions and ionization energy.

8. In a parallel circuit, how do the components connect?

A. In multiple pathways

B. In a single pathway only

C. In series with each other

D. In radial symmetry

In a parallel circuit, the components are connected in multiple pathways. This configuration allows each component to receive the full voltage of the power supply independently. As a result, if one component fails or is removed, the current can still flow through the other components without interruption. This is distinctly different from a series circuit, where components are connected one after another in a single pathway, causing all components to rely on each other for current flow. The multiple pathways in a parallel circuit enhance reliability and allow for different components to operate simultaneously, each with the same voltage drop across them.

9. How can RMS voltage be calculated from peak voltage?

A. Vrms = Vpeak × √2

B. Vrms = Vpeak / 2

C. Vrms = Vpeak / √2

D. Vrms = √2 × Vpeak

The root mean square (RMS) voltage is a measure of the effective value of an alternating current (AC) voltage. It can be derived from the peak voltage (also known as the maximum voltage or amplitude) of a sinusoidal waveform. For a sinusoidal wave, the relationship between the RMS voltage and the peak voltage can be expressed by the formula: $$V_{rms} = \frac{V_{peak}}{\sqrt{2}}$$ This formula comes from the mathematical definition of RMS voltage. The RMS value represents the equivalent direct current (DC) voltage that would produce the same power dissipation in a resistive load. Specifically, since the peak voltage represents the maximum value that the voltage reaches during one cycle, dividing it by $\sqrt{2}$ accounts for the distribution of this voltage over time throughout the cycle. When you plug in the peak voltage into this formula, you effectively convert it to the RMS value, which is a practical value used in electrical engineering and physics for calculations involving AC circuits. Thus, the other options do not accurately represent the relationship between RMS and peak voltages, as they either incorrectly operate the peak voltage mathematically or suggest a misunderstanding of the RMS calculation specific to sinus

SAMPLE

10. In an inelastic collision, what is conserved?

A. Energy and momentum

B. Momentum only

C. Kinetic energy only

D. Neither energy nor momentum

In an inelastic collision, momentum is conserved while kinetic energy is not. This situation occurs when two objects collide and stick together or deform, resulting in some of the initial kinetic energy being transformed into other forms of energy, such as thermal energy or sound. Momentum conservation can be understood through the principle that the total momentum before the collision is equal to the total momentum after the collision, as long as no external forces are acting on the system. This applies to all types of collisions, including inelastic ones. In contrast, kinetic energy is not preserved in inelastic collisions because the energy transformation into other forms leads to a decrease in the total kinetic energy of the objects involved. Therefore, the accurate description of what is conserved in an inelastic collision is momentum alone.

SAMPLE

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