A Level Physics Practice Exam (Sample)

Study Guide

BY EXAMZIFY

Everything you need from our exam experts!

Table of Contents

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. **What type of state does an electron with no excess energy occupy?**
   - A. Excited state
   - B. Ground state
   - C. Ionized state
   - D. Transient state

2. **Which point on the stress-strain graph indicates the yield point?**
   - A. The limit beyond which the material deforms plastically
   - B. The maximum stress the material can withstand
   - C. The point at which the material exhibits no further strain
   - D. The point where the material breaks

3. **What happens to the internal resistance of a power source as current increases?**
   - A. The internal resistance decreases
   - B. The internal resistance remains constant
   - C. The internal resistance increases
   - D. The internal resistance oscillates

4. **In terms of energy transformation, what does electromotive force (emf) do?**
   - A. Transforms potential energy to kinetic energy
   - B. Transforms chemical energy into electrical energy
   - C. Transforms electrical energy to thermal energy
   - D. Transforms kinetic energy into sound energy

5. **Why is it important to prevent 'crossover' of signals in optical fiber communications?**
   - A. To maintain the integrity of data transmission
   - B. To optimize the core's thermal conductivity
   - C. To increase the working voltage
   - D. To reduce the weight of the fiber optics

6. When does total internal reflection occur?

- **A. When the angle of incidence is equal to the critical angle**
- **B. When the angle of incidence is less than the critical angle**
- **C. When the angle of incidence is greater than the critical angle**
- **D. When light enters a medium**

7. What is the wavelength if the speed of a wave is 1500 m/s and frequency is 2500 Hz?

- **A. 0.2 m**
- **B. 0.6 m**
- **C. 0.3 m**
- **D. 3 m**

8. What type of quark configurations are present in a neutron?

- **A. Up, Up, Down**
- **B. Down, Down, Down**
- **C. Up, Down, Down**
- **D. Up, Up, Up**

9. What is true of the stress-strain graph of a brittle material?

- **A. It has a distinct plastic region**
- **B. It exhibits a high yield point**
- **C. It has no plastic region**
- **D. It shows extensive ductility**

10. What occurs to the emitted electrons when the intensity of the incident radiation is doubled while keeping the frequency constant?

- **A. The number of emitted electrons decreases**
- **B. The kinetic energy of electrons doubles**
- **C. The number of emitted electrons increases**
- **D. The emitted electrons are unaffected**

Answers

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

Explanations

1. What type of state does an electron with no excess energy occupy?

A. Excited state

B. Ground state

C. Ionized state

D. Transient state

An electron with no excess energy occupies the ground state of an atom. The ground state is defined as the lowest energy configuration of an electron in an atom, meaning it is at its most stable condition. In this state, electrons are not in any higher energy levels and cannot lose or gain energy in the form of photons or other interactions. When an electron is in the ground state, it is filled in accordance with the principles of quantum mechanics, where it occupies the closest possible orbit around the nucleus. This state is essential for the stability of the atom and is the basis for understanding atomic structure and behavior. In contrast, an excited state refers to an electron that has absorbed energy and moved to a higher energy level. An ionized state involves an electron being completely removed from the atom, leading to a charged ion, while a transient state describes a temporary condition that may occur during energy transitions but does not define a stable configuration for the electron in the absence of excess energy.

2. Which point on the stress-strain graph indicates the yield point?

A. The limit beyond which the material deforms plastically

B. The maximum stress the material can withstand

C. The point at which the material exhibits no further strain

D. The point where the material breaks

The yield point is indicated by the limit beyond which the material deforms plastically. This is the critical point on a stress-strain graph where the material starts to experience permanent deformation. Up until this yield point, if the material is subjected to stress and subsequently unloaded, it will return to its original shape. However, once the stress exceeds this point, any deformation caused will not be fully recovered, and the material will not return entirely to its initial state. This concept is fundamental in materials science and engineering because understanding the yield point helps in predicting how materials will behave under different stress conditions and ensuring that structures are designed within safe limits to avoid permanent deformation.

3. What happens to the internal resistance of a power source as current increases?

- **A. The internal resistance decreases**
- **B. The internal resistance remains constant**
- **C. The internal resistance increases**
- **D. The internal resistance oscillates**

The internal resistance of a power source generally increases as current increases due to several factors related to the physical properties and dynamics of the components within the power source, such as batteries or generators. As the current flowing through the power source rises, it can lead to an increase in heat generated within the internal components. This heating affects the resistance of the materials; for example, resistance in conductive materials usually increases with temperature due to the increased vibrational energy of the atoms, which impedes the flow of electrons. Moreover, some power sources may also experience changes in their chemical composition or physical structure when subjected to higher currents, further contributing to an increase in internal resistance. In devices like batteries, higher currents can lead to increased polarization and possible depletion of active materials, causing the effective resistance to rise. In contrast, a decrease in internal resistance or oscillatory behavior would not be typically observed in standard power sources under increasing load conditions. Instead, a constant internal resistance does not adequately account for the thermally and chemically influenced changes that occur with current flow.

4. In terms of energy transformation, what does electromotive force (emf) do?

- **A. Transforms potential energy to kinetic energy**
- **B. Transforms chemical energy into electrical energy**
- **C. Transforms electrical energy to thermal energy**
- **D. Transforms kinetic energy into sound energy**

Electromotive force (emf) refers to the energy provided per unit charge by a source such as a battery or generator. Primarily, it is associated with the conversion of chemical energy into electrical energy in electrochemical cells, like batteries. In these devices, chemical reactions occur that produce a flow of electrons, generating electrical energy that can be used in a circuit. This transformation is crucial for powering electrical devices, as it enables the stored energy from chemicals to be utilized as electrical energy, allowing for the operation of various electrical components and systems. Thus, the concept of emf perfectly aligns with this transition from chemical to electrical energy, emphasizing its role in energy transformation processes within circuits and devices. Understanding this context clarifies why this choice is considered correct, as the other energy transformation scenarios presented do not directly relate to the function of emf as it pertains to typical energy sources in electrical contexts.

5. Why is it important to prevent 'crossover' of signals in optical fiber communications?

A. To maintain the integrity of data transmission

B. To optimize the core's thermal conductivity

C. To increase the working voltage

D. To reduce the weight of the fiber optics

Preventing 'crossover' of signals in optical fiber communications is crucial to maintaining the integrity of data transmission. Crossover refers to the unwanted mixing or interaction of light signals traveling through the same optical fiber. This issue can lead to signal degradation, crosstalk, and a decline in performance, ultimately resulting in errors in data interpretation at the receiving end. In optical fibers, light signals are transmitted through a core surrounded by a cladding that reflects the light back into the core. If signals from different channels cross over, they can interfere with each other, leading to a loss of information and possible miscommunication. As data rates increase and more channels are accommodated within the same fiber, maintaining clear separation between individual signals becomes even more critical. Hence, ensuring that signals do not crossover is vital for effective communication and the reliability of transmitted data. Other options are not directly relevant to the core issue here. Thermal conductivity, working voltage, and fiber weight do not fundamentally relate to the fidelity of signal transmission within optical fibers. Consequently, while those factors may have their own importance, they are not the primary concern when discussing the necessity of preventing signal crossover.

6. When does total internal reflection occur?

A. When the angle of incidence is equal to the critical angle

B. When the angle of incidence is less than the critical angle

C. When the angle of incidence is greater than the critical angle

D. When light enters a medium

Total internal reflection occurs when the angle of incidence in a denser medium exceeds the critical angle, which is the minimum angle at which light can be completely reflected back into that medium rather than passing into a less dense medium. This phenomenon can be understood by considering Snell's law, which relates the angles of incidence and refraction to the indices of refraction of the two media involved. When the angle of incidence is greater than the critical angle, no refracted ray is produced, and all of the light is reflected back into the denser medium. This is a key principle in optics and is the reason why optical fibers can transmit light over long distances with minimal loss. In the other situations described: when the angle of incidence is equal to the critical angle, some light is refracted and some is reflected; when the angle of incidence is less than the critical angle, light will mostly refract into the less dense medium; and when light enters a medium, total internal reflection is not yet applicable until the criteria involving angles and indices of refraction are met.

7. What is the wavelength if the speed of a wave is 1500 m/s and frequency is 2500 Hz?

A. 0.2 m

B. 0.6 m

C. 0.3 m

D. 3 m

To determine the wavelength of a wave, you can use the fundamental wave equation: \[\text{Speed} = \text{Wavelength} \times \text{Frequency} \] In this case, the speed of the wave is given as 1500 m/s and the frequency is 2500 Hz. Rearranging the wave equation to solve for wavelength gives: \[\text{Wavelength} = \frac{\text{Speed}}{\text{Frequency}} \] Substituting the known values into this equation provides: \[\text{Wavelength} = \frac{1500 \, \text{m/s}}{2500 \, \text{Hz}} = 0.6 \, \text{m} \] This calculation shows that when you divide the speed of the wave by the frequency, you arrive at a wavelength of 0.6 meters. Thus, the correct answer aligns with this calculation, confirming that the wavelength is indeed 0.6 m.

8. What type of quark configurations are present in a neutron?

A. Up, Up, Down

B. Down, Down, Down

C. Up, Down, Down

D. Up, Up, Up

The neutron is a type of baryon, a subatomic particle made up of three quarks. In the case of a neutron, its specific quark configuration is one up quark and two down quarks. This combination gives the neutron its neutral charge, as the up quark carries a charge of +2/3, and each down quark carries a charge of -1/3. When you combine these charges (1 x +2/3 from the up quark and 2 x -1/3 from the down quarks), the overall charge sums to zero: \[\frac{2}{3} + \left(-\frac{1}{3}\right) + \left(-\frac{1}{3}\right) = 0 \] This neutral charge is a defining characteristic of neutrons. The other configurations listed do not accurately reflect the quark composition of a neutron, as they either involve incorrect numbers of quark types or would result in particles with different properties, such as charge. Therefore, the correct answer, which identifies the correct configuration of one up quark and two down quarks, accurately describes the structure of a neutron.

9. What is true of the stress-strain graph of a brittle material?

A. It has a distinct plastic region

B. It exhibits a high yield point

C. It has no plastic region

D. It shows extensive ductility

The stress-strain graph of a brittle material is characterized by its lack of a plastic deformation region. Brittle materials, such as glass and ceramics, do not undergo significant deformation before they fail. Instead, they tend to fracture soon after they reach their elastic limit, which is represented on the graph by a steep slope reaching a maximum stress point, followed by a sudden drop to zero stress when fracture occurs. In contrast to ductile materials that can deform plastically, brittle materials exhibit elastic behavior until they reach their ultimate tensile strength and then fracture almost immediately. This means that once the material surpasses its elastic limit, there is no gradual plastic deformation that takes place; instead, it translates directly from elastic behavior to rupture. Hence, the absence of a plastic region in the stress-strain graph is a defining feature of brittle materials.

10. What occurs to the emitted electrons when the intensity of the incident radiation is doubled while keeping the frequency constant?

A. The number of emitted electrons decreases

B. The kinetic energy of electrons doubles

C. The number of emitted electrons increases

D. The emitted electrons are unaffected

When the intensity of the incident radiation is doubled while keeping the frequency constant, the number of emitted electrons increases. This is because intensity is related to the amount of energy delivered per unit area per unit time, which can be viewed as the number of photons striking a surface per second. In the context of the photoelectric effect, each photon incident on a material can release an electron if its energy (which depends on the frequency of the radiation) meets or exceeds the work function of the material. Doubling the intensity means that there are now twice as many photons hitting the surface per second compared to the original intensity. Since the frequency remains constant, the energy of each photon does not change, but the increased number of photons results in a greater number of interactions with the material, ultimately leading to more emitted electrons. This increase in the number of emitted electrons does not affect their kinetic energy since that parameter is determined by the frequency of the incident radiation rather than the intensity. Therefore, as a result of the increased intensity, more electrons are emitted from the surface of the material.

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://alevelphysics.examzify.com

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