

A LEVEL PHYSICS PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. How is kinetic energy (KE) calculated for an object with mass m and velocity v ?
 - A. $KE = mv$
 - B. $KE = 2mv$
 - C. $KE = \frac{1}{2} mv^2$
 - D. $KE = mv^2$
2. What is the phase difference between two points 25 mm apart on a progressive wave with a speed of 20 m/s and a frequency of 100 Hz?
 - A. $\pi/2$ radians
 - B. $\pi/4$ radians
 - C. $\pi/3$ radians
 - D. $\pi/8$ radians
3. What key point should be noted when measuring angles for diffraction?
 - A. Angles should always be measured in degrees
 - B. Radian measurement is preferred for calculations
 - C. Angles can only be measured at 90 degrees
 - D. Reference angles are not needed
4. What is the correct formula for calculating power?
 - A. Power = Work done / Time
 - B. Power = Current / Resistance
 - C. Power = Voltage / Current
 - D. Power = Energy / Time
5. What is defined as the maximum displacement of a wave from its equilibrium position?
 - A. Wavelength
 - B. Amplitude
 - C. Frequency
 - D. Phase

6. What is the formula for calculating the energy stored in a spring?
- A. $E = \frac{1}{2} * F * \Delta L$
 - B. $E = F * \Delta L$
 - C. $E = F / \Delta L$
 - D. $E = \frac{1}{2} * \Delta L * F$
7. In the context of waves, what does the term 'compression' refer to?
- A. Increased pressure in a medium
 - B. Vibration of particles in a liquid
 - C. Wave reflection off a surface
 - D. Energy loss due to friction
8. 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
9. What describes the effect of continuous ultrasound waves on particles in a medium?
- A. Particles move uniformly at all points
 - B. Particles at nodes experience maximum movement
 - C. Particles move in phase between two nodes
 - D. Particles at antinodes do not move at all
10. How is the wavelength of a sound wave in water calculated?
- A. Wavelength = Speed / Amplitude
 - B. Wavelength = Velocity / Frequency
 - C. Wavelength = Frequency / Speed
 - D. Wavelength = Speed * Time

Answers

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

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Explanations

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1. How is kinetic energy (KE) calculated for an object with mass m and velocity v ?

A. $KE = mv$

B. $KE = 2mv$

C. $KE = \frac{1}{2} mv^2$

D. $KE = mv^2$

Kinetic energy (KE) is defined as the energy possessed by an object due to its motion. The formula to calculate kinetic energy takes into account both the mass of the object and its velocity. The correct expression for kinetic energy is derived from the work-energy principle, which states that the work done on an object is equal to the change in its kinetic energy. For an object with mass (m) and moving at a velocity (v) , the kinetic energy is calculated using the formula: $KE = \frac{1}{2} mv^2$. This equation components can be understood as follows: - The factor of $(\frac{1}{2})$ arises from the process of integrating the force applied to move the object. - The term (mv^2) indicates that kinetic energy depends on the square of the velocity, meaning that if the velocity of the object doubles, its kinetic energy will increase by a factor of four. This squared relationship shows that velocity has a more significant impact on kinetic energy than mass alone. This understanding also highlights why the other options do not accurately represent kinetic energy. The other choices, such as (mv) , $(2mv)$, and (mv^2)

2. What is the phase difference between two points 25 mm apart on a progressive wave with a speed of 20 m/s and a frequency of 100 Hz?

A. $\pi/2$ radians

B. $\pi/4$ radians

C. $\pi/3$ radians

D. $\pi/8$ radians

To determine the phase difference between two points on a progressive wave, we first need to assess key parameters of the wave, namely its wavelength and the distance between the two points in question. The wave speed (v) is given as 20 m/s, and the frequency (f) is 100 Hz. The relationship between wave speed, frequency, and wavelength (λ) is given by the equation: $v = f \times \lambda$. By rearranging this equation, we can find the wavelength: $\lambda = \frac{v}{f} = \frac{20 \text{ m/s}}{100 \text{ Hz}} = 0.2 \text{ m}$. Next, we need to find the phase difference between two points that are a distance of 25 mm (or 0.025 m) apart. The phase (ϕ) of a wave is related to the distance (d) from a reference point by the equation: $\phi = \frac{2\pi}{\lambda} d$. Substituting the known values: $\phi = \frac{2\pi}{0.2} (0.025)$

3. What key point should be noted when measuring angles for diffraction?

- A. Angles should always be measured in degrees
- B. Radian measurement is preferred for calculations**
- C. Angles can only be measured at 90 degrees
- D. Reference angles are not needed

When measuring angles for diffraction, using radian measurement is preferred for calculations due to the mathematical relationships involved in wave mechanics and wave equations. Radians provide a direct connection between angular measurements and the nature of the wave phenomena being studied. For instance, in formulas involving wave behaviors like the sine function in the diffraction equation, using radians leads to more natural and straightforward calculations. In many physics contexts, particularly those dealing with oscillations and circular motion, radian measurements simplify the relationships since they are based on the definition of angles in terms of the radius of a circle. This is particularly important in diffraction patterns, where precise angle measurements can significantly influence outcomes related to interference and the spacing of diffraction minima and maxima. Other options present constraints or methodologies that aren't favored in the context of wave physics. While measuring angles in degrees might be common practice in everyday contexts, it doesn't integrate as seamlessly into the mathematical frameworks used for analyzing wave behaviors. Furthermore, measuring angles at only 90 degrees would be limiting and impractical, as it would not encompass the variety of angles needed for a comprehensive study of diffraction. Lastly, while reference angles can be useful in many geometrical scenarios, the inherent nature of wave diffraction does not require them, making this point less relevant in the context.

4. What is the correct formula for calculating power?

- A. Power = Work done / Time**
- B. Power = Current / Resistance
- C. Power = Voltage / Current
- D. Power = Energy / Time

Power is fundamentally defined as the rate at which work is done or the rate at which energy is transferred or converted. The formula for calculating power is derived from this definition. When work is done, it is often described in terms of the energy transferred. Therefore, power can be expressed mathematically by the formula: $\text{Power} = \text{Work done} / \text{Time}$. This equation signifies that power measures how much work is done over a specific amount of time, illustrating a direct relationship between the two quantities. While there are other relevant equations related to power, they pertain to specific contexts. For instance, the relationship between power, voltage, and current is given by the formula $\text{Power} = \text{Voltage} \times \text{Current}$, which is derived from Ohm's law. However, the context of the question emphasizes the general relationship of work done over time, making the first formula the correct choice here. The other equations provided deal with specific cases relating to electrical power or circuit calculations, rather than the general definition of power in physics. This specificity is crucial for understanding the broader applications of power in different physical contexts.

5. What is defined as the maximum displacement of a wave from its equilibrium position?

- A. Wavelength
- B. Amplitude**
- C. Frequency
- D. Phase

The maximum displacement of a wave from its equilibrium position is known as amplitude. In the context of wave physics, amplitude refers to how far the wave oscillates from its rest position, which directly impacts the energy carried by the wave. A larger amplitude means that the wave carries more energy, while a smaller amplitude indicates less energy. Wavelength pertains to the distance between successive crests or troughs of a wave, frequency relates to the number of oscillations or cycles that occur per second, and phase describes the position of a point within a wave cycle relative to a reference point. Each of these concepts plays a crucial role in wave behavior but does not define the maximum displacement from equilibrium as specifically as amplitude does.

6. What is the formula for calculating the energy stored in a spring?

- A. $E = \frac{1}{2} * F * \Delta L$**
- B. $E = F * \Delta L$
- C. $E = F / \Delta L$
- D. $E = \frac{1}{2} * \Delta L * F$

The formula for calculating the energy stored in a spring indeed involves the relationship between force and displacement. The correct formula is given by $E = \frac{1}{2} k x^2$, where k is the spring constant and x is the extension or compression of the spring from its equilibrium position. When considering the options provided, the first choice can be interpreted in the context of Hooke's Law, which states that the force exerted by a spring is proportional to its extension ($F = kx$). When a spring is stretched or compressed, the work done on it to change its length results in stored potential energy. The work done (which equals the energy stored) is calculated as the integral of force with respect to displacement. Another way to understand the first choice is through the concept of an average force. The average force while stretching a spring from 0 to ΔL is $\frac{F}{2}$ (where F is the force applied at maximum extension). The work done against this average force when moving from the equilibrium position to the extension ΔL contributes to the potential energy stored in the spring, hence arriving at $E = \frac{1}{2} F \Delta L$.

7. In the context of waves, what does the term 'compression' refer to?

- A. Increased pressure in a medium**
- B. Vibration of particles in a liquid
- C. Wave reflection off a surface
- D. Energy loss due to friction

Compression in the context of waves specifically refers to regions where particles in a medium are pushed closer together, resulting in increased pressure. This phenomenon is characteristic of longitudinal waves, such as sound waves, where the motion of particles in the medium alternates between areas of compression (where particles are densely packed) and rarefaction (where particles are spread apart). When a wave travels through a medium, the energy is transmitted by compressing and decompressing the particles, creating regions of high and low pressure. The other options describe different concepts. The vibration of particles in a liquid pertains more broadly to the general movement of particles, which can occur in multiple types of waves. Wave reflection relates to how waves bounce off surfaces, representing their interaction with boundaries. Energy loss due to friction involves the conversion of wave energy into other forms, such as heat, rather than a direct reference to the characteristics of the wave itself.

8. 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.

9. What describes the effect of continuous ultrasound waves on particles in a medium?

- A. Particles move uniformly at all points
- B. Particles at nodes experience maximum movement
- C. Particles move in phase between two nodes**
- D. Particles at antinodes do not move at all

The effect of continuous ultrasound waves on particles in a medium can be understood through the concept of wave motion. In a medium where ultrasound waves propagate, particles oscillate back and forth around their equilibrium positions as the wave travels through. The correct description states that particles move in phase between two nodes. This means that the particles at various positions in the medium synchronize their oscillatory motions – they reach maximum displacement (either compression or rarefaction) at the same times. This synchronized movement occurs in segments of the wave between points known as nodes. Nodes are positions where the displacement of the medium is always zero due to destructive interference, while the areas between nodes, known as antinodes, experience maximal displacement. In contrast, particles at the nodes do not exhibit any movement since they are defined as points of zero amplitude in the wave. Furthermore, particles at the antinodes experience the greatest movement; it's inaccurate to say they do not move at all. On a broader scale, uniform movement by particles across the medium does not accurately describe wave motion, as particles only oscillate, leading to varying degrees of motion depending on the position relative to nodes and antinodes.

10. How is the wavelength of a sound wave in water calculated?

A. Wavelength = Speed / Amplitude

B. Wavelength = Velocity / Frequency

C. Wavelength = Frequency / Speed

D. Wavelength = Speed * Time

The wavelength of a sound wave in water is calculated using the relationship between the speed of sound in the medium, the frequency of the sound wave, and the wavelength itself. This relationship is expressed by the formula: $\text{Wavelength} = \text{Velocity} / \text{Frequency}$. In this equation, the velocity refers to the speed at which sound travels through water, which is approximately 1482 meters per second under normal conditions. The frequency represents how many cycles of the wave pass a point in one second, measured in hertz (Hz). Dividing the speed of sound in water by the frequency yields the wavelength, which is the distance between successive crests or troughs of the wave. This formula is fundamental in wave mechanics and applicable to all types of waves, not just sound waves in water. Understanding this relationship helps in predicting how sound behaves in different mediums, including how it can be affected by changes in frequency or speed, such as when sound travels through various temperatures or salinities in water.

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!

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