OnRamps Physics Practice Test (Sample)

Study Guide

Everything you need from our exam experts!

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 **15**

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 is the formula for average acceleration?

A. Time divided by velocity

B. Change in velocity divided by time

C. Velocity divided by time

D. Mass times acceleration

2. If the length L of a simple pendulum is doubled, by what factor does its period increase?

A. sqrt(2)

B. 2

C. 1

D. sqrt(1/2)

3. Frequency is defined as the number of cycles per unit time. If an oscillator completes 5 cycles in 2 seconds, what is its frequency?

A. 2.5 Hz

B. 0.4 Hz

C. 2 Hz

D. 0.5 Hz

4. Torque produced by a horizontal lever arm of length l with a perpendicular force F is equal to which expression?

A. tau = F / l

B. tau = F

C. tau = l^2

D. tau = l * F

5. For the nth harmonic with two fixed ends, lambda_n = 2L/n. What is lambda_1?

A. L

B. L/2

C. 4L

D. 2L

6. What is the SI unit of pressure?

A. Pascal (Pa)

B. Newton (N)

C. Watt (W)

D. Joule (J)

7. When a book rests on a table, which statement correctly describes the normal force?

A. Perpendicular to the surface

B. Parallel to the surface

C. In the same direction as gravity

D. Always equal to mg

8. Which statement best describes average velocity vs. average speed?

A. Average velocity is the velocity averaged over a time interval; instantaneous velocity is the velocity at a single moment.

B. Average velocity is always greater than instantaneous velocity.

C. Instantaneous velocity is the same as average velocity for any motion.

D. Average velocity is a scalar.

9. Wave Rule #2 states what about frequency when a wave passes into a new medium?

A. The speed remains the same.

B. The wavelength remains the same.

C. The frequency stays the same.

D. The amplitude changes.

10. In a tube closed at one end, the fundamental frequency f1 is related to v and L by f1 = v/(4L). If v = 340 m/s and L = 0.85 m, what is f1 when L doubles to 1.70 m?

A. 50 Hz

B. 100 Hz

C. 200 Hz

D. 25 Hz

Answers

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

Explanations

1. What is the formula for average acceleration?

A. Time divided by velocity

B. Change in velocity divided by time

C. Velocity divided by time

D. Mass times acceleration

Average acceleration is the rate at which velocity changes over a given time interval. It measures how quickly the velocity vector is changing, including both speed and direction. The correct relation is ā = Δv / Δt, where Δv is the change in velocity and Δt is the time over which that change occurs. This formula captures not just how fast you're moving, but how your motion is evolving during that interval. For example, if a car speeds up from 4 m/s to 10 m/s in 2 seconds, Δv = 6 m/s and Δt = 2 s, so ā = 3 m/s^2. The direction matters too, since Δv includes any changes in direction. Velocity divided by time would not generally give acceleration, because it ignores how much the velocity actually changes during the interval. Mass times acceleration is F = ma, which relates to force, not the definition of average acceleration. Time divided by velocity is not a meaningful measure of how velocity changes.

2. If the length L of a simple pendulum is doubled, by what factor does its period increase?

A. sqrt(2)

B. 2

C. 1

D. sqrt(1/2)

The period of a simple pendulum (for small angles) depends on the length as T ∝ sqrt(L). More precisely, T = 2π sqrt(L/g). If you double the length, substitute 2L into the formula: T' = 2π sqrt(2L/g) = sqrt(2) × [2π sqrt(L/g)] = sqrt(2) × T. So the period increases by a factor of sqrt(2) (about 1.414, roughly 41% longer). This relationship relies on small-angle motion and neglects air resistance and other non-idealities.

3. Frequency is defined as the number of cycles per unit time. If an oscillator completes 5 cycles in 2 seconds, what is its frequency?

A. 2.5 Hz

B. 0.4 Hz

C. 2 Hz

D. 0.5 Hz

Frequency is how many cycles occur each second. If 5 cycles happen in 2 seconds, you divide the number of cycles by the time: 5 ÷ 2 = 2.5. So the frequency is 2.5 Hz, meaning 2.5 cycles per second. Hz represents cycles per second. Check quickly: at 0.4 Hz you'd get 0.4 × 2 = 0.8 cycles in 2 seconds (not 5); at 2 Hz you'd get 2 × 2 = 4 cycles in 2 seconds; at 0.5 Hz you'd get 0.5 × 2 = 1 cycle in 2 seconds.

4. Torque produced by a horizontal lever arm of length l with a perpendicular force F is equal to which expression?

A. tau = F / l

B. tau = F

C. tau = l^2

D. tau = l * F

Torque about a pivot is the rotational effect of a force and is given by tau = r F sin theta, where r is the distance from the pivot to where the force is applied and theta is the angle between the force and the lever arm. If the force is perpendicular to the lever arm, theta = 90°, so sin theta = 1 and tau = r F. With a lever arm of length l, that becomes tau = l F. This matches the idea that both a longer arm and a stronger perpendicular force increase the twisting effect. The other expressions don't fit because they miss either the distance, the angle dependence, or give incorrect units (for example, F/l has units of force per length, and l^2 has units of length squared).

5. For the nth harmonic with two fixed ends, lambda_n = 2L/n. What is lambda_1?

A. L

B. L/2

C. 4L

D. 2L

Two fixed ends impose nodes at both ends, so the standing wave must contain an integer number of half-wavelengths along the length. For the fundamental (the first harmonic) there is just one half-wavelength in the length, so L equals lambda_1 divided by 2. Solve for lambda_1: lambda_1 = 2L. This matches the given formula when n = 1. The other numbers would correspond to higher harmonics, not the first, so the correct wavelength is 2L.

6. What is the SI unit of pressure?

A. Pascal (Pa)

B. Newton (N)

C. Watt (W)

D. Joule (J)

Pressure is the force pressed perpendicularly on a surface divided by the area over which that force acts. Since force is measured in Newtons and area in square meters, the unit becomes Newtons per square meter, defined as the Pascal (Pa). So 1 Pa = 1 N/m^2, which is also 1 kg/(m·s^2) when you substitute N = kg·m/s^2. A helpful number to keep in mind: atmospheric pressure at sea level is about 101,325 Pa, or 101 kPa. This concept is distinct from the other units listed: Newton is a unit of force, Watt is a unit of power, and Joule is a unit of energy.

7. When a book rests on a table, which statement correctly describes the normal force?

A. Perpendicular to the surface

B. Parallel to the surface

C. In the same direction as gravity

D. Always equal to mg

Normal force is the contact force that acts perpendicular to the surface at the point of contact. For a book resting on a table, the table pushes on the book along a line normal to the surface, pointing upward. Gravity pulls the book downward with magnitude mg. On a horizontal table with no other vertical forces, these vertical forces balance, so the normal force has the same magnitude as the weight in this simple case. The crucial feature is that the normal force is perpendicular to the surface, not along it, not in the direction of gravity, and not automatically equal to mg in every situation. The other statements describe friction (parallel to the surface), gravity's direction, or a universal equality to mg, which aren't generally correct.

8. Which statement best describes average velocity vs. average speed?

A. Average velocity is the velocity averaged over a time interval; instantaneous velocity is the velocity at a single moment.

B. Average velocity is always greater than instantaneous velocity.

C. Instantaneous velocity is the same as average velocity for any motion.

D. Average velocity is a scalar.

Average velocity tells you how fast and in what direction the position changes on average over a time interval. It's defined as the displacement (the straight-line change in position from the start to the end) divided by the time, and it's a vector, so direction matters. Instantaneous velocity is the velocity at a single moment in time—the slope of the position-versus-time graph at that moment. In contrast, average speed is the total distance traveled divided by the time, and it's a scalar, so it has no direction. This distinction matters because, for most motions that aren't at a steady pace in a straight line, the instantaneous velocity at a moment can point in a different direction and have a different magnitude than the average velocity computed over the interval. Only if the motion is at a constant velocity in a straight line do the average velocity and the instantaneous velocity coincide. For example, if you go 100 m forward in 10 s and then 50 m backward in 5 s, the displacement is 50 m forward in 15 s, so the average velocity is about 3.3 m/s forward. The total distance is 150 m in 15 s, so the average speed is 10 m/s. The instantaneous velocity at intermediate times would reflect the changing direction and speed along the path.

9. Wave Rule #2 states what about frequency when a wave passes into a new medium?

A. The speed remains the same.

B. The wavelength remains the same.

C. The frequency stays the same.

D. The amplitude changes.

The frequency stays the same when a wave passes into a new medium. The rate at which the wave crests arrive is set by the source and doesn't change at the boundary. What changes is the speed of propagation in the new medium. Since speed changes but frequency remains fixed, the wavelength must adjust to satisfy $v = f\lambda$. If the new medium speeds up the wave, the wavelength increases; if it slows it down, the wavelength decreases. Amplitude, however, can change at the boundary because some energy is reflected and the transmitted wave can have a different amplitude depending on how well the media match.

10. In a tube closed at one end, the fundamental frequency f1 is related to v and L by $f1 = v/(4L)$. If v = 340 m/s and L = 0.85 m, what is f1 when L doubles to 1.70 m?

A. 50 Hz

B. 100 Hz

C. 200 Hz

D. 25 Hz

Fundamental frequency for a tube closed at one end scales as $f1 = v/(4L)$. Doubling the length halves the frequency because $f1 \propto 1/L$. With v = 340 m/s and L = 1.70 m, $f1 = 340/(4\times1.70) = 340/6.8 \approx 50$ Hz. So the fundamental frequency is 50 Hz.

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://onrampshysics.examzify.com

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