ONRAMPS PHYSICS PRACTICE TEST (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

1. Which statement best expresses Newton's second law in impulse form?

A. $J = F\,\Delta t$

B. $J = \Delta t$

C. $J = \Delta p$

D. $J = \Delta p / \Delta t$

2. Which equation describes vertical velocity as a function of time in projectile motion near Earth's surface, taking upward as positive?

A. V_y = V0y + g t

B. V_y = V0y - g t

C. V_y = -V0y + g t

D. V_y = V0y - (1/2) g t^2

3. What is the expression for the sound intensity I in terms of the source power P and the area A over which the power spreads?

A. I = P*A

B. I = A/P

C. I = P/A

D. I = P^2/A^2

4. Speed has no _____ and is always taken as _____.

A. Magnitude; negative

B. Direction; positive

C. Velocity; zero

D. Reference frame; positive

5. Which statement correctly defines the wavelength of a wave?

A. Wavelength is the distance between successive crests or successive troughs

B. Crest is the maximum value of the wave

C. Amplitude is the distance from the middle to the crest

D. Trough is the minimum value of the wave

6. Which formula expresses Newton's Second Law?

A. F_net = ma

B. F = m v

C. F = mg

D. Force is proportional to velocity

7. According to Hooke's Law as stated, what is the restoring force F_s when displacement is x?

A. F_s = -kx

B. F_s = k/x

C. F_s = kx

D. F_s = mg

8. Which quantity has both magnitude and direction?

A. Time

B. Distance

C. Velocity

D. Speed

9. Horizontal acceleration?

A. a_x = g

B. a_x = v0x

C. a_x = 2

D. a_x = 0

10. Which quantity can be negative depending on the chosen coordinate direction?

A. Displacement

B. Speed

C. Distance

D. Time

Answers

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

Explanations

1. Which statement best expresses Newton's second law in impulse form?

A. $J = F\,\Delta t$

B. $J = \Delta t$

C. $J = \Delta p$

D. $J = \Delta p / \Delta t$

Impulse is the total effect of a net force over a time interval, and it directly changes an object's momentum. The precise relation is that the impulse equals the change in momentum: $J = \Delta p$. This comes from the fact that impulse is defined as the integral of force over time, $J = \int F\,dt$, which, by Newton's second law, equals $p_{final} - p_{initial}$. This holds no matter how the force varies during the interval. If the force is constant, you could write $J = F\Delta t$, but that's only a special case. The option $J = \Delta p/\Delta t$ would give average force, not the total impulse, and $J = \Delta t$ isn't dimensionally meaningful for impulse. So the statement $J = \Delta p$ best expresses the impulse form of Newton's second law.

2. Which equation describes vertical velocity as a function of time in projectile motion near Earth's surface, taking upward as positive?

A. $V_y = V0y + g\,t$

B. $V_y = V0y - g\,t$

C. $V_y = -V0y + g\,t$

D. $V_y = V0y - (1/2)\,g\,t^2$

When gravity is constant and upward is taken as positive, the vertical acceleration is downward and equal to -g. With constant acceleration, velocity changes linearly in time: $v_y(t) = v_{y0} + a_y t$. Substituting $a_y = -g$ gives $v_y(t) = V0y - g\,t$. This form matches the initial condition that at time zero the vertical velocity is V0y, and it shows that the upward velocity decreases by g each second due to gravity, eventually reaching zero at the top of the trajectory and becoming negative as the object falls. The other expressions don't fit the situation: one would imply gravity is acting upward, which is incorrect; another would flip the initial sign of the velocity; and the last uses t^2, which is appropriate for displacement, not velocity (the displacement is $y = y0 + V0y\,t - (1/2)\,g\,t^2$).

3. What is the expression for the sound intensity I in terms of the source power P and the area A over which the power spreads?

A. $I = P*A$

B. $I = A/P$

C. $I = P/A$

D. $I = P^2/A^2$

Sound intensity is the power per unit area—the rate at which energy passes through a given area. If a source emits power P and that power spreads over an area A, the intensity is $I = P/A$. This makes intuitive sense: more area means the same amount of power is spread thinner, so the intensity goes down in proportion to 1/A. In free space, a point source radiates over a spherical area $A = 4\pi r^2$, giving $I = P/(4\pi r^2)$. The units are watts per square meter. Expressions that multiply by area or square the power don't match the idea of energy crossing area, which is why they aren't correct.

4. Speed has no _____ and is always taken as _____.

A. Magnitude; negative

B. Direction; positive

C. Velocity; zero

D. Reference frame; positive

Speed is a scalar quantity that measures how fast something is moving, giving only the magnitude of motion. Because it describes how much motion, not where it's headed, speed has no direction. That's why the blank is filled with "direction." And since speed is the magnitude of motion, it's taken as a positive value (in practice nonnegative; you can have zero when at rest, but we usually express speed as a positive quantity when motion is occurring). In contrast, velocity includes direction and can be positive or negative depending on the chosen frame or axis, and the other options mix in properties that speed doesn't possess (like a definite magnitude being negative, or equating speed with velocity, or tying it to a reference frame).

5. Which statement correctly defines the wavelength of a wave?

A. Wavelength is the distance between successive crests or successive troughs

B. Crest is the maximum value of the wave

C. Amplitude is the distance from the middle to the crest

D. Trough is the minimum value of the wave

Wavelength is the spatial period of a wave—the distance over which the wave's pattern repeats. The distance between successive crests (or between successive troughs) is the wavelength because after you move that amount along the direction of travel, the wave looks the same again. Crest is the maximum displacement, which is a height measure, not a spacing; that height is called the amplitude when measured from the middle of the wave. Trough is the minimum displacement, also a height measure, not spacing. So the first statement correctly defines what wavelength is.

6. Which formula expresses Newton's Second Law?

A. F_net = ma

B. F = m v

C. F = mg

D. Force is proportional to velocity

Newton's second law says that motion changes in response to the total force acting on an object: the net force equals the object's mass times its acceleration. In symbols, F_net = m a. The net force is the vector sum of all forces on the object, and the acceleration points in the same direction as that net force. This rule explains why heavier objects need more force to achieve the same acceleration, and it implies that if there's no net force, the object moves with constant velocity. The given correct formula captures this general relationship: force is linked to acceleration through mass. The other expressions don't fit because they either mix up physical quantities or describe special cases. For example, F = m v would equate force to momentum, which has the wrong units and describes a different concept. F = m g gives the gravitational force on a mass in a gravity field, but it's just one force, not the universal relation between force and motion. Saying force is proportional to velocity incorrectly assigns velocity as the cause of force; it's acceleration that relates to force, not velocity.

7. According to Hooke's Law as stated, what is the restoring force F_s when displacement is x?

A. F_s = -kx

B. F_s = k/x

C. F_s = kx

D. F_s = mg

The restoring force from a spring is directed opposite to how the spring is displaced and grows in magnitude with that displacement. Hooke's Law is F_s = -k x, where k is the spring constant and x is the displacement from equilibrium. The negative sign means the force points back toward equilibrium: if you pull the spring to the right (positive x), the force pulls it left; if you push it to the left (negative x), the force pulls it right. The magnitude is |F_s| = k|x|. The other forms don't fit this behavior: F_s = k/x isn't proportional to x, F_s = kx points in the same direction as the displacement, and F_s = mg is a gravitational force, not the spring's restoring force.

8. Which quantity has both magnitude and direction?

A. Time

B. Distance

C. Velocity

D. Speed

Some quantities have both a size and a direction—these are vectors. Velocity is the rate at which position changes, so it tells you how fast something is moving and in which direction. That combination gives it a magnitude (the speed) and a direction. Speed, by contrast, only tells you how fast and has no direction. Time measures duration, not motion in space, and distance is how much ground is covered, but neither includes a direction component. For example, a car moving 60 km/h to the north has a velocity of 60 km/h toward the north. So, the quantity that has both magnitude and direction is velocity.

9. Horizontal acceleration?

A. a_x = g

B. a_x = v0x

C. a_x = 2

D. a_x = 0

In projectile motion with no air resistance, horizontal acceleration is zero because there's no horizontal force acting on the object. Gravity acts downward, giving a vertical acceleration of a_y = -g, while the horizontal velocity stays constant at its initial value v0x. So the correct statement for horizontal motion is a_x = 0. The other options imply horizontal forces or relationships that don't apply here: a_x = g would mean gravity acts horizontally, a_x = v0x mixes velocity with acceleration, and a_x = 2 would be a nonzero constant horizontal acceleration, which isn't present in the standard setup.

10. Which quantity can be negative depending on the chosen coordinate direction?

A. Displacement

B. Speed

C. Distance

D. Time

The thing being tested is how sign conventions affect numbers. When you set up a coordinate system, you pick a positive direction for that axis, and quantities that have direction can come out with a negative sign if they point the other way. Speed and distance are magnitudes, so they stay nonnegative. Displacement is a signed quantity along a chosen straight line, so it can be positive or negative depending on whether the motion goes with or against the positive direction. Time is usually treated as something that only increases, but time coordinates are just numbers in a chosen coordinate system. If you define the time axis to run opposite the usual forward-in-time direction, then time values can become negative for events that occur after the origin in the standard view. In that sense, time can be negative depending on how you set up the time origin and the direction of the time axis. This is why time can take negative values under a flipped convention, even though we commonly take it as positive in everyday problems.

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!