Arizona State University (ASU) PHY101 Introduction to 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. **Which concept describes observable patterns and laws in nature?**
   - A. Philosophy
   - B. Science
   - C. Religion
   - D. Mathematics

2. **How much work is done when pushing a crate horizontally with a force of 90N across a distance of 15m?**
   - A. 900J
   - B. 1350J
   - C. 1400J
   - D. 1500J

3. **What concept explains why an object weighs less on the Moon than on Earth?**
   - A. Reduced mass in a microgravity environment
   - B. Differences in gravitational field strength
   - C. Increased radius of the Moon
   - D. Universal gravitation constant variations

4. **What equation shows a freely falling rock drops a distance of 80m when it falls from rest for 4s?**
   - A. s=g*t^2/2=(10m/s^2)*(4s)^2/2
   - B. s=t^2/2g=(4s)^2/2(10m/s^2)
   - C. s=g(t/2)=(10m/s^2)*4s/2
   - D. s=g^2*t/2=(10m/s^2)^2*4s/2

5. **What principle is highlighted by the law of conservation of energy?**
   - A. Energy can be created
   - B. Energy can be destroyed
   - C. Energy is always conserved
   - D. Energy can be amplified

6. **Does an object have less inertia on the Moon than on Earth due to its lower weight?**

   A. Yes, because inertia is weight-dependent

   B. No, inertia depends on mass, not weight

   C. Yes, because it moves slower on the Moon

   D. No, inertia is irrelevant to weight

7. **What conclusion can be drawn from the fact that all celestial bodies appear to circle a stationary Earth?**

   A. Earth is the center of the universe

   B. The universe does not move

   C. Heavenly bodies are stationary

   D. The laws of motion do not apply

8. **Which energy remains unchanged as the block slides down the ramp?**

   A. Potential energy

   B. Kinetic energy

   C. Total energy

   D. Heat energy

9. **If Earth were to shrink without a change in its mass, what effect would this have on your weight at the surface?**

   A. Your weight would decrease

   B. Your weight would remain the same

   C. Your weight would increase

   D. Your weight would fluctuate unpredictably

10. **What unexpected celestial body was discovered due to the perturbations in the orbit of Uranus?**

   A. Jupiter

   B. Pluto

   C. Neptune

   D. Saturn

Answers

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

Explanations

1. Which concept describes observable patterns and laws in nature?

A. Philosophy

B. Science

C. Religion

D. Mathematics

The concept that best describes observable patterns and laws in nature is science. Science is fundamentally based on empirical evidence and systematic experimentation, aiming to study, explain, and predict natural phenomena. Through observation and experimentation, scientists gather data and form hypotheses, which can then be tested and refined. This process leads to the development of theories and laws that accurately depict how various aspects of the natural world operate. Philosophy, while it explores fundamental questions about existence, knowledge, and ethics, does not focus specifically on observable patterns in the same empirical way that science does. Religion often provides spiritual or moral frameworks but does not primarily concern itself with patterns or laws derived from systematic observation of the natural world. Mathematics, on the other hand, serves as a language and tool for quantifying and modeling phenomena but does not itself describe the observable patterns; rather, it helps analyze and interpret them. Therefore, science stands out as the discipline specifically dedicated to uncovering and understanding the laws governing the natural environment through a structured approach grounded in observation and experimentation.

2. How much work is done when pushing a crate horizontally with a force of 90N across a distance of 15m?

A. 900J

B. 1350J

C. 1400J

D. 1500J

To determine the work done when pushing a crate, we utilize the formula for work, which is defined as the product of the force applied and the distance over which that force is applied, specifically when the force and distance are in the same direction. The formula can be expressed as: \[\text{Work} = \text{Force} \times \text{Distance} \] In this scenario, the force exerted on the crate is 90 Newtons, and the distance over which this force is applied is 15 meters. Plugging these values into the formula gives us: \[\text{Work} = 90 \, \text{N} \times 15 \, \text{m} \] Calculating this yields: \[\text{Work} = 1350 \, \text{Joules} \] Thus, the correct amount of work done while pushing the crate is indeed 1350 Joules. This illustrates the relationship between force and distance in the context of work, confirming how the work performed increases with either a greater force or a longer distance. The other choices, therefore, do not reflect the accurate calculation based on the given parameters.

3. What concept explains why an object weighs less on the Moon than on Earth?

A. Reduced mass in a microgravity environment

B. Differences in gravitational field strength

C. Increased radius of the Moon

D. Universal gravitation constant variations

The reason an object weighs less on the Moon than on Earth is due to differences in gravitational field strength. Weight is the force experienced by an object due to gravity, and it is directly proportional to the local gravitational acceleration. The Moon has only about one-sixth the gravitational acceleration that Earth has, which is approximately 1.62 m/s^2 compared to Earth's 9.81 m/s^2. This lower gravitational strength on the Moon results in a smaller weight for any object when compared to its weight on Earth, even though the object's mass remains unchanged.   To provide additional context, the concept of gravitational field strength is fundamentally linked to the mass of the celestial body and the distance from its center. While the radius of the Moon is indeed smaller than that of Earth, it is the inherent gravitational pull generated by the Moon's mass that is the primary factor impacting weight. Additionally, the universal gravitational constant remains constant throughout the universe, so variations in its force do not apply in this scenario. Therefore, the key to understanding why objects weigh less on the Moon is recognizing that the strength of gravitational attraction is less on the Moon than it is on Earth.

4. What equation shows a freely falling rock drops a distance of 80m when it falls from rest for 4s?

A. s=g*t^2/2=(10m/s^2)*(4s)^2/2

B. s=t^2/2g=(4s)^2/2(10m/s^2)

C. s=g(t/2)=(10m/s^2)*4s/2

D. s=g^2*t/2=(10m/s^2)^2*4s/2

The correct equation demonstrates that the distance traveled by a freely falling object (like the rock in this scenario) can be calculated using the formula \(s = \frac{1}{2} g t^2\), where \(s\) is the distance, \(g\) is the acceleration due to gravity (approximately \(10 \, \text{m/s}^2\) in the context of this problem), and \(t\) is the time in seconds. In this case, the rock falls from rest for \(4\) seconds. Plugging the values into the equation yields: \[s = \frac{1}{2} \cdot 10 \, \text{m/s}^2 \cdot (4 \, \text{s})^2 \] Calculating this step-by-step: 1. \((4 \, \text{s})^2 = 16 \, \text{s}^2 \) 2. \(10 \, \text{m/s}^2 \cdot 16 \, \text{s}^2 = 160 \, \text{m} \) 3. \(\frac{1}{2} \cdot

5. What principle is highlighted by the law of conservation of energy?

A. Energy can be created

B. Energy can be destroyed

C. Energy is always conserved

D. Energy can be amplified

The law of conservation of energy emphasizes that energy cannot be created or destroyed; it can only change forms. This means that the total energy of an isolated system remains constant over time, although the energy may transform from potential to kinetic energy, or even from one type (like thermal energy) to another (like mechanical energy). This principle is foundational in understanding how energy operates within various physical systems. In practical terms, when you perform work or when energy seems to dissipate as heat, the energy hasn't vanished; rather, it has transformed into another type of energy, thus preserving the total amount of energy within the system. This understanding is crucial in physics since it governs all energy interactions and transactions, from simple mechanical systems to complex biological and chemical processes.

6. Does an object have less inertia on the Moon than on Earth due to its lower weight?

A. Yes, because inertia is weight-dependent

B. No, inertia depends on mass, not weight

C. Yes, because it moves slower on the Moon

D. No, inertia is irrelevant to weight

Inertia is a property of matter that is directly related to an object's mass. It is the resistance of an object to changes in its state of motion, which means that an object with greater mass will have greater inertia, making it harder to accelerate. On the Moon, objects weigh less due to the lower gravitational pull, but their mass remains unchanged. Since inertia is a function of mass, an object's inertia does not decrease simply because it is on the Moon; it remains constant regardless of the gravitational environment surrounding it. The other choices incorrectly associate inertia with weight or movement characteristics rather than focusing on the fundamental principle of mass. Inertia is fundamentally about mass, making it independent of the object's weight, which is specifically influenced by gravitational force. Thus, the correct assertion is that inertia depends solely on mass, not on the varying weight experienced in different gravitational fields.

7. What conclusion can be drawn from the fact that all celestial bodies appear to circle a stationary Earth?

A. Earth is the center of the universe

B. The universe does not move

C. Heavenly bodies are stationary

D. The laws of motion do not apply

The conclusion that Earth is the center of the universe stems from ancient astronomical observations where celestial bodies, such as the sun, moon, and stars, seemed to orbit around a fixed Earth. This geocentric perspective was predominant before the advent of the heliocentric model proposed by Copernicus, which positioned the sun at the center of the solar system. In a geocentric model, the apparent motion of celestial bodies can be interpreted as evidence supporting the idea that Earth holds a central position in the universe. The daily and yearly movements observed in the sky, which appear to create paths around the Earth, contributed to this belief, leading to the conclusion that Earth is stationary and serves as the focal point of celestial motion. This concept was critically challenged and ultimately replaced by the heliocentric model, where the sun is at the center and the planets, including Earth, orbit around it. However, within the context of the question and its options, the historical perspective aligns with the conclusion that Earth is the center of the universe. This choice represents the mindset of early astronomers before advancements in understanding celestial mechanics altered this view significantly.

8. Which energy remains unchanged as the block slides down the ramp?

A. Potential energy

B. Kinetic energy

C. Total energy

D. Heat energy

The total energy of the system remains constant as the block slides down the ramp, assuming that there are no non-conservative forces (like friction) acting on it. This concept is rooted in the principle of conservation of energy, which states that energy cannot be created or destroyed, but can only change forms. As the block descends, its potential energy is converted into kinetic energy. At the top of the ramp, the block possesses a certain amount of potential energy due to its height, and as it moves down, this potential energy decreases while its kinetic energy increases due to acceleration. The sum of kinetic and potential energy (the total mechanical energy) remains constant throughout the sliding motion, assuming ideal conditions with no friction or air resistance. Other forms of energy, like heat energy, may not necessarily be part of the consideration unless non-conservative forces are introduced into the scenario. However, in the context of this question, focusing solely on potential and kinetic energy shows that while individual forms may change, the total energy remains unchanged throughout the sliding process.

9. If Earth were to shrink without a change in its mass, what effect would this have on your weight at the surface?

A. Your weight would decrease

B. Your weight would remain the same

C. Your weight would increase

D. Your weight would fluctuate unpredictably

When considering the effects of Earth's size changing while keeping its mass constant, it is essential to recall the relationship between gravity, mass, and distance. Your weight is determined by the gravitational force acting on you, which is influenced by the mass of the Earth and your distance from its center. The gravitational force can be described by the formula: $$F = \frac{G \cdot m_1 \cdot m_2}{r^2}$$ where F is the gravitational force (your weight), G is the gravitational constant, m_1 is the mass of the Earth, m_2 is your mass, and r is the distance between the center of the Earth and your position. If the Earth shrinks but its mass remains unchanged, the radius r decreases. Since the gravitational force is inversely proportional to the square of the distance r, if you reduce r, the gravitational force (your weight) will increase. A smaller radius means you are closer to the center of the Earth, resulting in a stronger gravitational pull acting on you. Thus, under these circumstances, your weight would indeed increase as a consequence of the

10. What unexpected celestial body was discovered due to the perturbations in the orbit of Uranus?

A. Jupiter

B. Pluto

C. Neptune

D. Saturn

The discovery of Neptune was a significant milestone in astronomy, stemming from the observed perturbations in the orbit of Uranus. When astronomers noted that Uranus did not follow a precise path as predicted by Newton's laws of motion and gravitation, they hypothesized that another, as yet unseen planet might be exerting gravitational influence on it. Using mathematical predictions, astronomers were able to locate Neptune in 1846, just a short distance away from where they expected it to be, based on the discrepancies in Uranus's orbit. This discovery confirmed the validity of Newtonian physics and the influence of gravitational forces from distant celestial bodies. The other options are prominent celestial bodies within our solar system as well. Jupiter and Saturn are gas giants that were known long before Uranus's anomalies were investigated. Pluto, discovered in 1930, did not play a role in the perturbations affecting Uranus; its orbit has been primarily influenced by the presence of Neptune and not vice versa. Thus, the most fitting answer regarding the unexpected celestial body discovered due to the perturbations in Uranus's orbit is Neptune.

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://asu-phy101.examzify.com

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