

DIVE Integrated Chemistry and Physics (ICP) Quarterly Exam 3 Practice (Sample)

Study Guide



Everything you need from our exam experts!

This is a sample study guide. To access the full version with hundreds of 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. Don't worry about getting everything right, 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, and take breaks to retain information better.

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.

7. Use Other Tools

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!

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Questions

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- 1. What is the standard SI unit of energy, defined by the energy used when a force of one newton moves an object one meter?**
 - A. Watt**
 - B. Calorie**
 - C. Joule**
 - D. Newton-meter**
- 2. What type of energy is related to the flow of charged particles in a conductor?**
 - A. Chemical energy**
 - B. Electrical energy**
 - C. Mechanical energy**
 - D. Thermal energy**
- 3. Under which conditions does the law of conservation of momentum apply?**
 - A. In isolated systems**
 - B. In all types of collisions**
 - C. When temperature changes**
 - D. In non-isolated systems**
- 4. What does pressure measure in relation to force?**
 - A. The total force of an object**
 - B. The force applied over a unit area**
 - C. The weight of an object**
 - D. The energy transferred by a force**
- 5. What term describes the rate at which an object changes position, including direction?**
 - A. Speed**
 - B. Velocity**
 - C. Acceleration**
 - D. Kinematics**

6. What is the standard SI unit of energy defined as the energy used by a force of one newton moving an object a distance of one meter?

- A. Watt**
- B. Joule**
- C. Calorie**
- D. Newton**

7. Which simple machine consists of a flat surface set at an angle, making one end higher than the other?

- A. Wedge**
- B. Wheel and axle**
- C. Inclined plane**
- D. Pulley**

8. What is ionic bonding characterized by?

- A. Covalent sharing of electrons**
- B. Electrostatic attraction between charged particles**
- C. Weak interactions between nonpolar molecules**
- D. Attraction between neutral atoms**

9. What is the term for the rate at which velocity increases over time?

- A. Speed**
- B. Acceleration**
- C. Momentum**
- D. Displacement**

10. Which type of energy is associated with an object in motion?

- A. Kinetic energy**
- B. Potential energy**
- C. Thermal energy**
- D. Chemical energy**

Answers

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

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Explanations

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1. What is the standard SI unit of energy, defined by the energy used when a force of one newton moves an object one meter?

- A. Watt**
- B. Calorie**
- C. Joule**
- D. Newton-meter**

The standard SI unit of energy is the joule, which is defined as the amount of energy transferred when a force of one newton is applied to move an object one meter in the direction of the force. This definition directly illustrates the relationship between force, distance, and energy, establishing the joule as a fundamental unit in both physics and chemistry. While the watt is a unit of power (energy per unit time) and the calorie is a unit of heat energy, the joule specifically quantifies work done or energy transferred in mechanical contexts. The term "newton-meter" describes work and is mathematically equivalent to a joule, but it is not used as the standard unit of energy in the SI system; instead, the term joule consolidates this concept into a singular, widely recognized unit. These distinctions clarify the proper identification of joules as the correct answer.

2. What type of energy is related to the flow of charged particles in a conductor?

- A. Chemical energy**
- B. Electrical energy**
- C. Mechanical energy**
- D. Thermal energy**

The correct choice is related to the flow of charged particles, specifically electrons, in a conductor, which defines electrical energy. When a voltage difference exists across a conductor, it creates an electric field that causes charged particles to move, resulting in an electric current. This energy is harnessed for various applications, such as powering devices or performing work in circuits. In contrast, chemical energy relates to the energy stored in the bonds of chemical compounds and is released in a chemical reaction. Mechanical energy pertains to the energy associated with the motion and position of objects. Thermal energy involves the internal energy of particles in a substance, which is related to temperature. Electrical energy stands out because it is the direct result of the movement of charged particles through a conductor, emphasizing its unique characteristics in the realm of energy types.

3. Under which conditions does the law of conservation of momentum apply?

- A. In isolated systems**
- B. In all types of collisions**
- C. When temperature changes**
- D. In non-isolated systems**

The law of conservation of momentum states that within an isolated system, the total momentum remains constant if no external forces act on it. This principle applies because in an isolated system, all internal forces can be considered to be balanced, meaning the momentum gained by one object must be equal and opposite to the momentum lost by another object. Isolated systems are crucial for this law because any external force - such as friction or a push from another object - can change the momentum of the system, making it impossible to rely on the conservation law. This is why the condition of being isolated is fundamental to the principle; it ensures that the influences of external forces are removed, allowing for true momentum conservation. The statement about the applicability of momentum conservation during all types of collisions is also accurate, but only when these collisions occur within isolated systems. Changes in temperature or interactions in non-isolated systems introduce variables that can affect momentum, thus invalidating conservation in those scenarios.

4. What does pressure measure in relation to force?

- A. The total force of an object**
- B. The force applied over a unit area**
- C. The weight of an object**
- D. The energy transferred by a force**

Pressure is defined as the amount of force applied per unit area. In mathematical terms, pressure is calculated by dividing the force by the area over which it is distributed. This relationship is crucial in understanding various physical phenomena, such as fluid dynamics, material strength, and atmospheric science. When considering the options provided, the correct answer emphasizes this specific relationship between force and area. It clarifies that pressure is not about the total force itself or the weight of an object, and it is certainly not about energy transfer. Instead, pressure provides insight into how concentrated a force is over a given area, which is critical in contexts such as hydraulics, aerodynamics, and even everyday situations like using a tire pump or understanding how deep underwater pressure increases with depth.

5. What term describes the rate at which an object changes position, including direction?

- A. Speed**
- B. Velocity**
- C. Acceleration**
- D. Kinematics**

The term that describes the rate at which an object changes position, including direction, is velocity. Velocity is a vector quantity, which means it has both magnitude and direction. When measuring how quickly something moves, if we take into account the direction it is traveling, we refer to this as velocity rather than speed. Speed, on the other hand, is a scalar quantity that only considers the magnitude of motion—how fast an object is moving, regardless of the direction. Acceleration describes the rate at which an object changes its velocity, which could involve increasing speed, decreasing speed, or changing direction, but it is not about the rate of change of position itself. Kinematics is the branch of physics that studies the motion of objects without considering the forces that cause the motion. It encompasses concepts such as displacement, velocity, and acceleration but does not itself refer to a specific rate or measurement. Thus, of all these terms, velocity is the one that accurately describes the change in position with direction included.

6. What is the standard SI unit of energy defined as the energy used by a force of one newton moving an object a distance of one meter?

- A. Watt**
- B. Joule**
- C. Calorie**
- D. Newton**

The standard SI unit of energy is defined as the joule. One joule is precisely the amount of energy transferred when a force of one newton moves an object a distance of one meter in the direction of the force. This relationship is grounded in the basic principles of physics, particularly in the context of work and energy. In essence, when you apply a force to move an object, the work done (which is energy) is quantified by the formula: $\text{work} = \text{force} \times \text{distance}$. Here, if the force (in newtons) is 1 and the distance (in meters) is also 1, it follows that the work done is 1 joule. This unit is widely used in various scientific applications, making it foundational to understanding energy concepts in both chemistry and physics. Other choices represent different measurements: a watt is a unit of power, which describes the rate of energy transfer, while a calorie is a unit of energy specifically related to heat. Newton, on the other hand, is a unit of force. These distinctions illuminate why the joule is the correct and preferred unit for measuring energy in this context.

7. Which simple machine consists of a flat surface set at an angle, making one end higher than the other?

- A. Wedge**
- B. Wheel and axle**
- C. Inclined plane**
- D. Pulley**

The correct choice is the inclined plane, which is a simple machine that consists of a flat surface set at an angle relative to the horizontal. This design allows for the elevation of objects with less force than lifting them straight upwards. When an object is moved up the inclined plane, gravity acts on it, and by increasing the distance covered along the inclined surface, less force is needed to lift the object to a higher elevation compared to lifting it vertically. Inclined planes are particularly useful in various applications, such as ramps for wheeling heavy items to a higher level or removing loads from vehicles. The gradual slope reduces the effort required. In contrast, a wedge is a variation of an inclined plane that is usually used to separate two objects or portions of an object. The wheel and axle is a different type of simple machine that allows for the easier rotation of an object, and a pulley utilizes ropes and wheels to lift objects vertically. Each of these choices represents a distinct mechanism functioning differently from the inclined plane.

8. What is ionic bonding characterized by?

- A. Covalent sharing of electrons**
- B. Electrostatic attraction between charged particles**
- C. Weak interactions between nonpolar molecules**
- D. Attraction between neutral atoms**

Ionic bonding is characterized by the electrostatic attraction between charged particles, specifically between positively charged cations and negatively charged anions. In the formation of ionic bonds, atoms transfer electrons, resulting in the generation of ions. For example, when sodium (Na) loses an electron, it becomes a positively charged ion (Na^+), while chlorine (Cl) gains that electron and becomes a negatively charged ion (Cl^-). The opposite charges of these ions create a strong electrostatic attraction, which is the essence of ionic bonding. This fundamental interaction leads to the formation of ionic compounds, which typically exhibit high melting and boiling points due to the strong forces of attraction between the ions. The stability of such compounds originates from the significant energy released during the formation of ionic bonds, which is much greater compared to other types of bonding, such as covalent bonds where electrons are shared rather than transferred. In contrast, covalent bonding involves sharing electrons, the other choice refers to weak interactions, and attraction between neutral atoms is not typical of ionic bonding as it involves charged species. Thus, the distinct nature of ionic bonds lies in the strong attractions formed between ions of opposite charges.

9. What is the term for the rate at which velocity increases over time?

- A. Speed**
- B. Acceleration**
- C. Momentum**
- D. Displacement**

The term that describes the rate at which velocity increases over time is acceleration. Acceleration is a vector quantity, meaning it has both magnitude and direction. It represents how quickly an object's velocity changes, which can occur as an increase in speed, a decrease in speed (deceleration), or a change in direction. Mathematically, acceleration is defined as the change in velocity divided by the time over which the change occurs. This concept is fundamental in physics as it helps explain how objects move and respond to forces. For instance, when a car speeds up, it is experiencing positive acceleration, while when it comes to a stop, it is experiencing negative acceleration. The other terms listed refer to different concepts. Speed is the distance traveled per unit of time but does not account for direction. Momentum relates to the product of an object's mass and its velocity, providing insight into how hard it would be to stop an object in motion. Displacement refers to the change in position of an object and is a measure of the distance and direction from the starting point to the final position. Understanding acceleration is crucial for analyzing motion, impacting areas such as mechanics, vehicle dynamics, and various engineering applications.

10. Which type of energy is associated with an object in motion?

- A. Kinetic energy**
- B. Potential energy**
- C. Thermal energy**
- D. Chemical energy**

Kinetic energy is the energy that an object possesses due to its motion. This form of energy depends on two main factors: the mass of the object and its velocity. The formula for kinetic energy is given by $(KE = \frac{1}{2}mv^2)$, where (m) is the mass and (v) is the velocity of the object. This means that as an object moves faster or has more mass, its kinetic energy increases. The other types of energy mentioned do not relate to motion in the same way. Potential energy refers to the energy stored in an object due to its position or configuration, such as an object held at a height or a compressed spring. Thermal energy is related to the temperature of an object and the motion of its particles but does not specifically describe an object's overall motion through space. Chemical energy, meanwhile, is stored in the bonds of chemical compounds and is released during chemical reactions. Understanding how kinetic energy operates allows us to analyze objects in motion effectively, highlighting its importance in various physical contexts such as mechanics and dynamics.

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://diveicpquarterly3.examzify.com>

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

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