

University of Central Florida (UCF) PHY1038 Physics of Energy, Climate Change and Environment Final Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

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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. What is the significance of the Paris Agreement?**
 - A. It aims to eliminate fossil fuels by 2030**
 - B. It assigns specific emission targets to each country**
 - C. It aims to limit global warming to below 2 degrees Celsius**
 - D. It promotes deforestation to combat climate change**
- 2. Which of the following is not a recognized unit of energy?**
 - A. kWh**
 - B. Quad**
 - C. Calorie**
 - D. Watt**
- 3. Which series of energy transformations correctly describes hydropower?**
 - A. Solar energy -> thermal energy -> gravitational potential energy -> electricity**
 - B. Solar energy -> gravitational potential energy -> electricity**
 - C. Solar energy -> thermal energy -> kinetic energy -> electricity**
 - D. Solar energy -> thermal energy -> gravitational potential energy -> kinetic energy -> electricity**
- 4. Which renewable energy source is generated from the sun?**
 - A. Wind energy**
 - B. Hydropower**
 - C. Solar energy**
 - D. Geothermal energy**
- 5. What effect do increased carbon emissions have on the planet?**
 - A. They decrease temperature**
 - B. They stabilize the climate**
 - C. They contribute to climate change**
 - D. They reduce energy consumption**

- 6. Are nuclear power plants limited by the second law of thermodynamics?**
- A. True**
 - B. False**
- 7. Are internal combustion engines subject to the limits of the second law of thermodynamics?**
- A. True**
 - B. False**
- 8. What can be said about atomic nuclei A with 96 protons and 148 neutrons, and B with 94 protons and 150 neutrons?**
- A. They are different isotopes of the same element**
 - B. They are different elements**
 - C. They are the same element and the same isotope**
 - D. They are nuclear fission compounds**
- 9. What does "net-zero emissions" mean?**
- A. The balance of emissions produced and emissions removed**
 - B. The complete elimination of all greenhouse gases**
 - C. The increase in fossil fuel extraction**
 - D. The reduction of carbon footprints by individuals**
- 10. What is one primary use of solar concentrating thermoelectric power plants?**
- A. Hot water for home use**
 - B. Electricity generation**
 - C. Warm water for home heating**
 - D. Cooling systems for buildings**

Answers

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

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Explanations

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1. What is the significance of the Paris Agreement?

- A. It aims to eliminate fossil fuels by 2030
- B. It assigns specific emission targets to each country
- C. It aims to limit global warming to below 2 degrees Celsius**
- D. It promotes deforestation to combat climate change

The Paris Agreement is significant primarily because it aims to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with efforts to restrict the temperature increase to 1.5 degrees Celsius. This target is critical in reducing the risks and impacts of climate change, which include severe weather events, rising sea levels, and disruptions to ecosystems and food security. The emphasis on these temperature goals highlights the scientific consensus that limiting warming is essential to avoid the most dangerous effects of climate change. The Agreement serves as a framework for international cooperation in addressing climate change, encouraging countries to commit to reducing their greenhouse gas emissions and to report on their progress. This collective action is vital in mitigating climate impacts and promoting sustainable development worldwide. While the Agreement encourages countries to set their own emission reduction targets, it does not impose specific targets on individual nations, nor does it promote deforestation as a solution to climate issues. Instead, it encourages conservation and sustainable land management practices to enhance carbon sinks and reduce emissions.

2. Which of the following is not a recognized unit of energy?

- A. kWh
- B. Quad
- C. Calorie
- D. Watt**

Watt is indeed a unit of power, not energy. Power is defined as the rate at which energy is used or transferred over time, typically measured in joules per second, while the watt itself quantifies this rate. In contrast, the other options are all recognized units that measure energy. For example, kilowatt-hours (kWh) is a common unit used to quantify electrical energy consumed over time, such as in home electricity bills. A quad is a larger unit often used in energy statistics, representing one quadrillion (10^{15}) BTUs. The calorie is primarily used in the context of heat energy, especially in the dietary field or thermodynamics, where it reflects the amount of energy needed to raise the temperature of one gram of water by one degree Celsius. Each of these units effectively measures energy, while watt conveys a different concept related to the rate of energy consumption or production.

3. Which series of energy transformations correctly describes hydropower?

- A. Solar energy -> thermal energy -> gravitational potential energy -> electricity
- B. Solar energy -> gravitational potential energy -> electricity
- C. Solar energy -> thermal energy -> kinetic energy -> electricity
- D. Solar energy -> thermal energy -> gravitational potential energy -> kinetic energy -> electricity**

The correct transformation series for hydropower involves a sequence that links various forms of energy, ultimately resulting in the generation of electricity. In this case, the process begins with solar energy, which influences the climate and contributes to the water cycle. As sunlight heats water bodies, some water evaporates and eventually condenses, leading to precipitation, which flows over land and creates gravitational potential energy as it gathers in higher altitudes. When this water is released or flows downward in a dam, its gravitational potential energy is converted into kinetic energy. This kinetic energy is harnessed by turbines in hydropower plants, which then convert it into mechanical energy, and finally into electrical energy through generators. Thus, the series of transformations accurately reflects the journey from solar energy to electricity, passing through thermal energy (influencing the water cycle), gravitational potential energy (stored in elevated water), and kinetic energy (as the water flows down). Other options miss key transformations or incorrectly sequence them, making D the most comprehensive and accurate description of the energy transformations involved in hydropower.

4. Which renewable energy source is generated from the sun?

- A. Wind energy
- B. Hydropower
- C. Solar energy**
- D. Geothermal energy

Solar energy is the correct choice because it specifically refers to the energy harnessed from sunlight. This energy is captured using various technologies, such as solar panels, which convert sunlight directly into electricity, or solar thermal systems, which use sunlight to heat a fluid to produce steam for power generation. Wind energy, though renewable, is generated by the movement of air and is influenced by solar radiation, but it is not directly derived from the sun. Hydropower relies on the gravitational force of falling or flowing water rather than sunlight, while geothermal energy harnesses heat from the Earth's interior, which is not solar-derived. Thus, solar energy is defined explicitly by its origin from the sun, making it the correct answer in this context.

5. What effect do increased carbon emissions have on the planet?

- A. They decrease temperature**
- B. They stabilize the climate**
- C. They contribute to climate change**
- D. They reduce energy consumption**

Increased carbon emissions primarily contribute to climate change by enhancing the greenhouse effect. Carbon dioxide, along with other greenhouse gases, traps heat in the Earth's atmosphere, leading to a rise in global temperatures. This warming can disrupt weather patterns, resulting in more extreme weather events, rising sea levels, and various ecological impacts. The accumulation of carbon emissions from human activities, such as fossil fuel combustion and deforestation, is a key driver of climate change, emphasizing the urgent need for mitigation strategies to reduce these emissions and stabilize the climate system. Understanding this relationship is crucial for recognizing the broader impacts on both the environment and society.

6. Are nuclear power plants limited by the second law of thermodynamics?

- A. True**
- B. False**

Nuclear power plants operate within the framework of the second law of thermodynamics, which states that energy systems will tend toward increasing entropy. This principle highlights that not all energy can be converted into useful work; some energy will always be lost as waste heat during energy conversion processes. In the context of a nuclear power plant, the nuclear fission reactions generate heat, which is used to produce steam that drives turbines to generate electricity. However, not all of the thermal energy generated can be converted into electrical energy due to inherent inefficiencies described by the second law. This means that a portion of the energy will be dissipated, contributing to increased entropy in the overall system. Consequently, while nuclear power plants are a significant source of energy and can operate efficiently compared to other energy sources, they are indeed limited by the principles set forth by the second law of thermodynamics. This law effectively constrains the maximum efficiency of the energy conversion processes employed in nuclear generation.

7. Are internal combustion engines subject to the limits of the second law of thermodynamics?

A. True

B. False

The statement that internal combustion engines are not subject to the limits of the second law of thermodynamics is not accurate. In fact, internal combustion engines operate under the constraints imposed by this fundamental law of thermodynamics, which states that energy systems tend to evolve toward a state of maximum entropy, or disorder. Internal combustion engines convert the chemical energy from fuel into mechanical energy. However, not all of the energy from the fuel can be converted into useful work; some of it is always lost as waste heat due to inefficiencies inherent in the process, as dictated by the second law. This law implies that no engine can be 100% efficient and that some energy will always be unavailable for doing work, therefore, internal combustion engines are indeed subject to the limits of this law. Understanding this principle is essential for recognizing the challenges in improving the efficiency of these engines as we attempt to design systems that produce less waste and reduce their environmental impact.

8. What can be said about atomic nuclei A with 96 protons and 148 neutrons, and B with 94 protons and 150 neutrons?

A. They are different isotopes of the same element

B. They are different elements

C. They are the same element and the same isotope

D. They are nuclear fission compounds

Atomic nuclei are defined by their number of protons and neutrons. The number of protons in an atomic nucleus determines the identity of the element, which is referred to as the atomic number. In this case, nucleus A has 96 protons, while nucleus B has 94 protons. Since these two nuclei have different numbers of protons, they correspond to different elements. Nucleus A, with 96 protons, is the element Curium (Cm), whereas nucleus B, with 94 protons, is Plutonium (Pu). The difference in the number of neutrons does not change the identity of the element, though it can affect the stability of the isotopes formed by those elements. Thus, the correct assessment is that A and B represent different elements, further indicated by their differing atomic numbers. As such, understanding the relationship between protons and element identity is essential in nuclear physics and helps to distinguish between isotopes of the same element, which would require identical proton counts. The other options misinterpret the atomic structure related to isotopes and elements.

9. What does "net-zero emissions" mean?

- A. The balance of emissions produced and emissions removed**
- B. The complete elimination of all greenhouse gases**
- C. The increase in fossil fuel extraction**
- D. The reduction of carbon footprints by individuals**

"Net-zero emissions" refers to the balance of emissions produced and emissions removed from the atmosphere, meaning that the total amount of greenhouse gases emitted is equal to the total amount removed, resulting in no net increase in atmospheric greenhouse gases. This concept is critical in efforts to mitigate climate change, as it aims to reduce the impact on global warming by ensuring that any emissions produced, such as from industrial processes, transportation, or energy production, are counteracted by actions that remove an equivalent amount of greenhouse gases from the atmosphere. These removal actions can include natural processes, such as afforestation, or technological solutions like carbon capture and storage. The other choices do not accurately capture the essence of "net-zero emissions." Complete elimination of all greenhouse gases implies a total eradication, which is not achievable with current technologies and practices, while the increase in fossil fuel extraction would actually contribute to higher emissions rather than achieving a balance. Lastly, while reducing individual carbon footprints contributes to the broader goal of reaching net-zero, it does not fully encapsulate the systemic approach required to balance emissions on a larger scale.

10. What is one primary use of solar concentrating thermoelectric power plants?

- A. Hot water for home use**
- B. Electricity generation**
- C. Warm water for home heating**
- D. Cooling systems for buildings**

Solar concentrating thermoelectric power plants primarily focus on electricity generation. This type of power plant uses mirrors or lenses to concentrate sunlight onto a small area, typically a receiver, where the intense heat is converted into thermal energy. This thermal energy is then used to produce steam that drives turbines connected to generators, ultimately converting the thermal energy into electrical energy. Unlike other options, which pertain to direct thermal applications, the design and function of solar concentrating thermoelectric power plants are specifically optimized for large-scale electricity output. While there are technologies that can use solar energy for water heating or cooling systems, these applications are distinct from the primary operation of thermoelectric power plants aimed at generating electricity for the grid.

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://ucf-phy1038-final.examzify.com>

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