INTEGRATED SCIENCE AND TECHNOLOGY (ISAT) EXAM 3 PRACTICE (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.

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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!

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Questions

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1. **Why does the concentration of ozone in metropolitan areas decrease at night?**

   A. Temperature drop

   B. The absence of traffic

   C. The formation of ozone requires sunlight

   D. Increased air pressure

2. **What occurs to the oxygen gas in the atmosphere upon absorbing photons of light?**

   A. It combines to form ozone

   B. It is converted into carbon dioxide

   C. It splits into individual oxygen atoms

   D. It is released as a gas without change

3. **What property of ice core samples helps scientists determine the average global temperature over the last 160,000 years?**

   A. The 1H/2H ratio

   B. The depth of the ice layers

   C. The density of the ice

   D. The color of the ice layers

4. **What role do plants play with regard to energy absorbed by Earth?**

   A. They convert it directly into heat

   B. They conduct photosynthesis

   C. They reflect it back into space

   D. They store it as chemical energy

5. **Which airborne material is least likely to be affected by air filters or indoor air handling equipment?**

   A. Particulate Matter

   B. Water Vapor

   C. Carbon Dioxide

   D. Carbon Monoxide

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6. Which process is considered crucial for the greenhouse effect?

A. Energy radiated by the earth is absorbed by the atmosphere

B. Ozone depletion in the stratosphere

C. The increasing levels of methane emissions

D. The reflection of sunlight by polar ice

7. How do you convert 0.0341% to ppm?

A. Move the decimal 3 places to the right

B. Move the decimal 4 places to the right

C. Move the decimal 5 places to the right

D. Move the decimal 6 places to the right

8. How do plants help reduce CO_2 levels in the atmosphere?

A. Through photosynthesis

B. By emitting oxygen

C. By absorbing nitrogen

D. By releasing methane

9. What are the main stages of the cell cycle?

A. Prophase, Metaphase, Anaphase, Telophase

B. Interphase and Apoptosis

C. Interphase and the Mitotic phase

D. G1, S, G2, and Cytokinesis only

10. Describe the greenhouse effect.

A. A process that cools the Earth's temperature

B. The warming of Earth's surface due to greenhouse gases trapping heat in the atmosphere

C. A phenomenon related to volcanic activity

D. A temporary change in weather patterns

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Answers

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

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Explanations

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1. Why does the concentration of ozone in metropolitan areas decrease at night?

A. Temperature drop

B. The absence of traffic

C. The formation of ozone requires sunlight

D. Increased air pressure

The concentration of ozone in metropolitan areas decreases at night primarily due to the fact that ozone formation relies on the presence of sunlight. During the day, ultraviolet (UV) light from the sun catalyzes chemical reactions between pollutants such as volatile organic compounds (VOCs) and nitrogen oxides (NOx) in the atmosphere, resulting in the creation of ozone at ground level. At night, the absence of sunlight halts these reactions, leading to a decrease in ozone production. Even though other factors, such as traffic and temperature changes, can influence air quality and pollution levels, they do not directly result in the significant reduction of ozone itself as the lack of sunlight does. Understanding the role of sunlight in the chemical processes that generate ground-level ozone is essential for comprehending daily variations in ozone levels in urban environments.

2. What occurs to the oxygen gas in the atmosphere upon absorbing photons of light?

A. It combines to form ozone

B. It is converted into carbon dioxide

C. It splits into individual oxygen atoms

D. It is released as a gas without change

When oxygen gas in the atmosphere absorbs photons of light, particularly high-energy ultraviolet (UV) radiation, it can undergo a process known as photodissociation. This process involves the breaking of the molecular bonds in diatomic oxygen (O), resulting in the formation of individual oxygen atoms (O). This reaction is significant in the upper atmosphere, where high-energy sunlight is prevalent, and is a crucial part of the ozone formation process, as these free oxygen atoms can then react with other oxygen molecules to form ozone (O). The absorption of light energy leads to the splitting of the O molecules into separate atoms, which is an essential mechanism that influences atmospheric chemistry and is central to the formation of the ozone layer that protects life on Earth from harmful UV radiation. Thus, the correct understanding of what happens to oxygen gas when it absorbs light is that it splits into individual oxygen atoms.

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3. What property of ice core samples helps scientists determine the average global temperature over the last 160,000 years?

A. The 1H/2H ratio

B. The depth of the ice layers

C. The density of the ice

D. The color of the ice layers

The 1H/2H ratio, which refers to the ratio of the two hydrogen isotopes present in water (protium and deuterium), is a critical factor in analyzing ice core samples for deducing average global temperatures over extensive periods, such as the last 160,000 years. As temperatures change, the ratio of these isotopes in ice also changes due to fractionation processes during evaporation and precipitation. When temperatures are warmer, the ratio typically indicates a higher proportion of the lighter hydrogen isotope, 1H, because lighter isotopes preferentially evaporate more readily. Conversely, during cooler periods, there is relatively more of the heavier isotope, 2H. By analyzing the isotopic composition of the gas bubbles trapped in the ice core, scientists can infer past temperatures. This information is instrumental in constructing climate models and understanding long-term climate changes. In contrast, while the depth of the ice layers can provide a timeline of accumulation and periods of melting, it does not directly relate to temperature measurements. The density of the ice may indicate compaction and the history of accumulation but does not correlate as directly with temperature changes. Similarly, the color of the ice layers can reflect certain environmental conditions or impurities but is not a direct indicator of

4. What role do plants play with regard to energy absorbed by Earth?

A. They convert it directly into heat

B. They conduct photosynthesis

C. They reflect it back into space

D. They store it as chemical energy

Plants play a crucial role in the Earth's energy dynamics primarily through the process of photosynthesis. During photosynthesis, plants absorb sunlight—a key source of energy—and convert it into chemical energy in the form of glucose. This process also involves the uptake of carbon dioxide from the atmosphere and water from the soil, which are transformed into organic compounds that serve as food for the plant and, ultimately, form the basis of the food chain for other organisms. Through photosynthesis, plants not only capture and store energy but also release oxygen as a byproduct, which is vital for the survival of aerobic life forms. This unique capability of transforming solar energy into a usable form is essential for sustaining ecosystems and contributes to the overall energy balance of the planet. While other choices mention conducting heat, reflecting energy, or storing as chemical energy, the fundamental and distinctive role that plants play is primarily through the process of photosynthesis.

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5. Which airborne material is least likely to be affected by air filters or indoor air handling equipment?

A. Particulate Matter

B. Water Vapor

C. Carbon Dioxide

D. Carbon Monoxide

The correct answer is carbon dioxide. This gas is a naturally occurring component of the air and is a byproduct of respiration, combustion, and various industrial processes. Unlike particulate matter, which consists of solid or liquid particles suspended in the air and can be trapped by filters, carbon dioxide is a gas and passes through air filters without significant obstruction. Airborne materials like particulate matter can be effectively reduced by air handling systems designed to capture these larger particles. Water vapor, as a gaseous form of moisture, also doesn't get removed by standard air filters. In contrast, carbon monoxide is a gas produced during incomplete combustion and can be detected and managed by certain ventilation systems, although it can be more readily removed from the air compared to carbon dioxide. Thus, carbon dioxide's molecular structure and behavior as a gas make it least likely to be affected by air filters or indoor air handling equipment.

6. Which process is considered crucial for the greenhouse effect?

A. Energy radiated by the earth is absorbed by the atmosphere

B. Ozone depletion in the stratosphere

C. The increasing levels of methane emissions

D. The reflection of sunlight by polar ice

The greenhouse effect is fundamentally linked to the process where energy radiated by the Earth is absorbed by the atmosphere. This phenomenon occurs when the Earth's surface absorbs sunlight and subsequently emits it as infrared radiation. Greenhouse gases in the atmosphere, such as carbon dioxide and methane, capture a portion of this infrared radiation, which warms the atmosphere and helps maintain a temperature that supports life. Without this process, Earth's climate would be significantly colder, making it inhospitable for many forms of life. The other options, while they involve important environmental concepts, do not directly describe the central mechanism of the greenhouse effect. For instance, ozone depletion impacts the stratosphere but is more related to increasing UV radiation levels rather than trapping heat. Methane emissions contribute to the greenhouse effect but do not clarify the process itself. Lastly, the reflection of sunlight by polar ice refers to albedo and influences climate but is not part of how heat is retained in the atmosphere. Thus, the absorption of energy radiated by the Earth by the atmosphere is key to understanding the greenhouse effect and its role in our climate system.

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7. How do you convert 0.0341% to ppm?

A. Move the decimal 3 places to the right

B. Move the decimal 4 places to the right

C. Move the decimal 5 places to the right

D. Move the decimal 6 places to the right

To convert a percentage to parts per million (ppm), it's important to understand the relationship between the two. A percentage expresses a part per hundred, while ppm expresses a part per million. Starting with the percentage of 0.0341%, you need to recognize that to convert it to ppm, you can use the conversion factor that 1% is equal to 10,000 ppm. This is because there are 10,000 parts in a million when converting from a fraction of 100 (percentage) to a fraction of 1,000,000 (ppm). When you convert 0.0341% to ppm, you multiply it by 10,000. This process involves moving the decimal point four places to the right, effectively transforming the percentage into the equivalent ppm value. In this case, you take 0.0341 and move the decimal four positions to the right, resulting in 341 ppm. Thus, converting 0.0341% to ppm requires moving the decimal point four places to the right, confirming that this is indeed the correct method to achieve the conversion.

8. How do plants help reduce CO2 levels in the atmosphere?

A. Through photosynthesis

B. By emitting oxygen

C. By absorbing nitrogen

D. By releasing methane

Plants contribute to reducing CO2 levels in the atmosphere primarily through the process of photosynthesis. During photosynthesis, plants absorb carbon dioxide (CO2) from the air and utilize sunlight to convert it into glucose and oxygen. This process not only helps to lower the concentration of CO2 in the atmosphere but also produces oxygen, which is vital for the respiration of most living organisms. Photosynthesis plays a crucial role in the carbon cycle, as it acts as a natural mechanism for regulating and maintaining the balance of greenhouse gases in the atmosphere. By efficiently capturing carbon dioxide, plants act as carbon sinks, helping to mitigate climate change and its associated impacts. Other options do not directly contribute to reducing atmospheric CO2 levels. Emitting oxygen is a byproduct of photosynthesis, but it does not, by itself, diminish CO2 levels. Absorbing nitrogen is important for plant growth but does not impact CO2 levels. Releasing methane is a process that can actually contribute to greenhouse gas emissions, rather than reducing CO2 in the atmosphere.

9. What are the main stages of the cell cycle?

A. Prophase, Metaphase, Anaphase, Telophase

B. Interphase and Apoptosis

C. Interphase and the Mitotic phase

D. G1, S, G2, and Cytokinesis only

The main stages of the cell cycle include Interphase and the Mitotic phase. During Interphase, the cell prepares for division by undergoing growth and replication of its DNA. This phase can be further divided into three sub-stages: G1 (Gap 1) where the cell grows and synthesizes proteins, S (Synthesis) where the DNA is replicated, and G2 (Gap 2) where the cell continues to grow and produces the necessary components for mitosis. The Mitotic phase follows Interphase and involves the actual process of cell division, which includes mitosis (the division of the nucleus) and cytokinesis (the division of the cytoplasm), leading to the formation of two daughter cells. This division is crucial for growth, development, and tissue repair. The other options do not adequately represent the comprehensive structure of the cell cycle. For example, listing just the stages of mitosis ignores the significant preparatory phases in Interphase, and including apoptosis is not relevant to the cell cycle stages themselves, as it refers to programmed cell death rather than the cellular processes associated with division.

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10. Describe the greenhouse effect.

A. A process that cools the Earth's temperature

B. The warming of Earth's surface due to greenhouse gases trapping heat in the atmosphere

C. A phenomenon related to volcanic activity

D. A temporary change in weather patterns

The greenhouse effect is a critical process that involves the warming of the Earth's surface as a result of greenhouse gases, such as carbon dioxide, methane, and water vapor, trapping heat in the atmosphere. When sunlight reaches the Earth, some of it is reflected back into space while the rest is absorbed, heating the planet. The Earth then emits this heat in the form of infrared radiation. However, greenhouse gases allow sunlight to enter the atmosphere but hinder the escape of this infrared radiation. As a result, the heat is retained, leading to an increase in the average temperature of the Earth, which is essential for maintaining a climate that supports life. This process differs significantly from mere cooling, which is not a feature of the greenhouse effect. Also, while volcanic activity can influence climate by releasing various gases and particles, it does not represent the greenhouse effect itself. Moreover, the greenhouse effect is a long-term phenomenon concerning temperature regulation, rather than a temporary fluctuation in weather patterns. Understanding the greenhouse effect is fundamental to discussions about climate change and its impacts on global temperatures.

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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://isatexam3.examzify.com

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

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