

SONOGRAPHY CANADA PHYSICS CORE PRACTICE EXAM (SAMPLE)

STUDY GUIDE



**SAMPLE STUDY GUIDE
WITH LIMITED QUESTIONS**

**VISIT US ONLINE FOR
THE FULL VERSION STUDY GUIDE**

<https://sonographycanadaphysicscore.examzify.com>



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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

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- 1. What does a duty factor of 0% indicate?**
 - A. The system is idle
 - B. The system is in standby mode
 - C. The system is off
 - D. The system is actively imaging
- 2. What is the typical range of power in clinical ultrasound imaging?**
 - A. 0.001-0.050 watts
 - B. 0.004-0.090 watts
 - C. 0.1-0.5 watts
 - D. 1-10 watts
- 3. What happens to the half layer thickness as frequency increases?**
 - A. It becomes thicker
 - B. It remains constant
 - C. It decreases
 - D. It varies widely
- 4. In an oblique incidence reflection scenario, which of the following is true about the incident angle?**
 - A. It has no effect on reflection
 - B. It determines the amount of energy reflected
 - C. It is always equal to the angle of transmission
 - D. It is irrelevant to the reflection process
- 5. Which pulse parameters are determined solely by the sound source?**
 - A. Pulse duration, PRP, PRF, duty factor
 - B. Spatial pulse length, PRP, frequency, wavelength
 - C. Propagation speed, frequency, spatial pulse length, duty factor
 - D. Pulse duration, intensity, amplitude, wavelength
- 6. What do acoustic propagation properties refer to?**
 - A. The effects of the medium upon the sound wave
 - B. The speed of sound in vacuum
 - C. The frequency of sound waves
 - D. The temperature of the medium

- 7. What is the approximate typical range of values for wavelength in sonography?**
- A. 0.01-0.1 mm
 - B. 0.1-0.8 mm
 - C. 0.5-2.0 mm
 - D. 1.0-3.0 mm
- 8. What can be said about energy values when discussing conservation of energy in reflection at an oblique angle?**
- A. Total energy must be lost
 - B. Energy is transformed but not lost
 - C. Energy is not conserved
 - D. Total energy must remain constant
- 9. Half layer thickness relates to what phenomenon?**
- A. Reflection
 - B. Refraction
 - C. Attenuation
 - D. Transmission
- 10. Which intensity measurement applies specifically to the peak intensity within a single pulse?**
- A. Pulsed average intensity
 - B. Temporal peak intensity
 - C. Temporal average intensity
 - D. Instantaneous intensity

Answers

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

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Explanations

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1. What does a duty factor of 0% indicate?

- A. The system is idle
- B. The system is in standby mode
- C. The system is off**
- D. The system is actively imaging

A duty factor of 0% indicates that the ultrasound system is not emitting any sound waves, which essentially means that the system is off. In ultrasound imaging, the duty factor refers to the proportion of time the ultrasound system is actively sending and receiving pulses compared to the total time. When the duty factor is at 0%, this signifies that there is no active transmission of ultrasound, thus the system is completely non-functional in terms of imaging. Understanding the practical implications of a 0% duty factor is crucial. For example, in an active clinical environment, knowing when the system is off helps to ensure that no measurements or imaging are taking place inadvertently, which might affect patient safety or the integrity of the imaging process. While options such as "idle" or "standby mode" might imply some level of readiness or capability for imaging, a duty factor of 0% clearly denotes that the system is not engaged in ultrasound production at all, confirming its state of being off.

2. What is the typical range of power in clinical ultrasound imaging?

- A. 0.001-0.050 watts
- B. 0.004-0.090 watts**
- C. 0.1-0.5 watts
- D. 1-10 watts

In clinical ultrasound imaging, the typical range of power is commonly recognized to fall within 0.004 to 0.090 watts. This power range is crucial because it balances the need for adequate image quality with safety considerations for both the patient and the operators. The power in this range is sufficient to ensure that the ultrasound waves effectively penetrate the tissues and return sufficient echoes to create high-quality images. Lower power levels may not provide the necessary energy for optimal imaging, while higher power levels could result in excess heating or damage to the tissues being examined, which is a significant concern in sonography. Understanding this power range helps practitioners select appropriate settings on their ultrasound machines and ensures that they adhere to safety standards while obtaining the best diagnostic information.

3. What happens to the half layer thickness as frequency increases?

- A. It becomes thicker
- B. It remains constant
- C. It decreases**
- D. It varies widely

As frequency increases, the half layer thickness decreases. This relationship is primarily due to the fact that higher frequency ultrasound waves have shorter wavelengths and are more readily absorbed by tissue. The half layer thickness is a measure of the depth of tissue required to attenuate the intensity of the ultrasound beam to half its original value. Since higher frequencies are subject to greater attenuation due to their increased absorption, the distance required to reach that half intensity point is reduced, resulting in a thinner half layer thickness at higher frequencies. This principle is important in sonography as it affects image quality and the choice of frequency for different clinical applications.

4. In an oblique incidence reflection scenario, which of the following is true about the incident angle?

- A. It has no effect on reflection
- B. It determines the amount of energy reflected**
- C. It is always equal to the angle of transmission
- D. It is irrelevant to the reflection process

In an oblique incidence reflection scenario, the incident angle significantly influences the amount of energy that is reflected at an interface between two different media. The greater the incident angle, the more complex the reflection phenomena become due to the physics of wave behavior at interfaces. According to the laws of reflection, the angle of incidence—the angle between the incident wave and the normal (a line perpendicular to the reflecting surface)—affects how much of the incident energy is reflected versus transmitted. When the incident angle increases, the reflection coefficient generally increases for most scenarios, meaning that more energy is reflected back into the original medium rather than transmitted. This behavior is governed by the Fresnel equations, which describe how light behaves at an interface based on the angles of incidence and refraction, along with the properties of the materials involved. Understanding the relationship between the incident angle and the reflected energy is crucial in sonography, where optimizing image quality often involves adjusting angles for better reflection and transmission of ultrasound waves through tissues.

5. Which pulse parameters are determined solely by the sound source?

- A. Pulse duration, PRP, PRF, duty factor**
- B. Spatial pulse length, PRP, frequency, wavelength
- C. Propagation speed, frequency, spatial pulse length, duty factor
- D. Pulse duration, intensity, amplitude, wavelength

The correct choice focuses on pulse parameters that are influenced only by the sound source and are essential for understanding how ultrasound waves operate. Pulse duration refers to the time it takes for one pulse of sound to occur, and it is determined by the characteristics of the transducer. Since the transducer generates sound waves, factors such as the number of cycles in a pulse and the frequency directly influence pulse duration. Pulse repetition period (PRP) is the total time from the beginning of one pulse to the beginning of the next. It is determined by the sound source because the pulse duration and the listening time, which is also influenced by the source, dictate the overall PRP. Pulse repetition frequency (PRF) is defined as the number of pulses emitted per second. It is inversely related to the PRP and is entirely a function of the sound source, as it represents how often the source sends out pulses. Duty factor is the fraction of time that the ultrasound machine is actively transmitting sound compared to the total time (transmitting plus listening). It depends solely on the parameters set by the transducer itself, namely the pulse duration and PRP, making it another sound source-derived parameter. Together, pulse duration, PRP, PRF, and duty

6. What do acoustic propagation properties refer to?

A. The effects of the medium upon the sound wave

B. The speed of sound in vacuum

C. The frequency of sound waves

D. The temperature of the medium

Acoustic propagation properties encompass how sound waves travel through different mediums, which is influenced by factors such as the medium's density, elasticity, and temperature. These properties determine how effectively sound waves can propagate, reflecting how the characteristics of the medium impact the behavior of the sound wave. For instance, in diagnostic imaging, variations in tissue types (such as fat, muscle, and fluid) affect the speed of sound and the attenuation of the waves, which is vital for accurate imaging and diagnosis. Understanding this relationship is essential for sonographers when assessing and interpreting ultrasound images, as different tissues will interact with sound waves in distinct ways, affecting the quality of the image produced. Focusing on the other options, the speed of sound in a vacuum is not applicable to most acoustic applications since sound requires a medium to propagate. The frequency of sound waves pertains more to the pitch and detail of the sound rather than how it travels through the medium. The temperature of the medium can influence sound speed but is just one factor among many that contribute to the overall acoustic propagation properties.

7. What is the approximate typical range of values for wavelength in sonography?

A. 0.01-0.1 mm

B. 0.1-0.8 mm

C. 0.5-2.0 mm

D. 1.0-3.0 mm

In sonography, the wavelength of ultrasound waves is a critical factor that influences image resolution and penetration. The typical range of values for wavelength in sonography falls between 0.1 and 0.8 mm. This range corresponds to the frequencies commonly used in diagnostic ultrasound, which are generally between 1 and 10 MHz. The speed of sound in soft tissue, which is approximately 1540 m/s, helps determine the wavelength (λ) through the relationship given by the equation: $\lambda = \frac{c}{f}$ where c is the speed of sound in the medium, and f is the frequency. When frequencies are in the range of 1 to 10 MHz, the resulting wavelengths calculated from this equation fall within the 0.1 to 0.8 mm range. Understanding the typical wavelength range is important for sonographers as it directly affects imaging quality—shorter wavelengths provide better resolution but have decreased tissue penetration. Therefore, the selected answer accurately represents the standard wavelengths encountered in clinical sonography situations.

8. What can be said about energy values when discussing conservation of energy in reflection at an oblique angle?

- A. Total energy must be lost
- B. Energy is transformed but not lost
- C. Energy is not conserved
- D. Total energy must remain constant**

The principle of conservation of energy states that the total energy in a closed system remains constant over time. When discussing reflection at an oblique angle, this principle asserts that although energy may change forms—such as from kinetic energy to potential energy or vice versa—no energy is lost from the system as a whole. In the context of reflection, whether it is of waves, such as sound or light, or other forms of energy, when a wave encounters a boundary at an oblique angle, it reflects while conserving total energy. This means that the total energy before and after the reflection remains the same, even if individual energy components may be redistributed. Thus, saying that total energy must remain constant aligns perfectly with the laws of physics, specifically the conservation of energy. Therefore, the correct answer appropriately captures the idea that while individual energy forms may change, the overall energy remains conserved during the reflection process.

9. Half layer thickness relates to what phenomenon?

- A. Reflection
- B. Refraction
- C. Attenuation**
- D. Transmission

Half layer thickness, also known as the half-value layer (HVL), pertains to the concept of attenuation in sonography and other fields dealing with wave propagation, such as radiography. Attenuation refers to the reduction in intensity of a wave as it travels through a material. This phenomenon occurs due to various processes, including absorption, scattering, reflection, and transmission. The half layer thickness specifically is defined as the thickness of a material required to reduce the intensity of the wave to half its original value. This measure is essential in understanding how different tissues absorb and scatter ultrasound waves, which directly influences the quality of imaging and the selection of appropriate settings on ultrasound machines. In the context of diagnostic imaging, knowing the HVL helps sonographers improve their technique by allowing them to estimate how different tissues will attenuate ultrasound waves, thus influencing factors like optimal frequency selection and penetration depth in various imaging scenarios. Understanding this concept enhances the diagnostic capabilities of sonography by facilitating better imaging of structures at varying depths, especially in non-homogeneous tissues.

10. Which intensity measurement applies specifically to the peak intensity within a single pulse?

- A. Pulsed average intensity
- B. Temporal peak intensity**
- C. Temporal average intensity
- D. Instantaneous intensity

The correct choice pertains to temporal peak intensity, which specifically measures the maximum intensity within a single pulse of ultrasound. This metric is vital in sonography as it reflects the intensity at the very moment the pulse reaches its peak, allowing for a more precise understanding of the effects of ultrasound at that maximum point. Temporal peak intensity is critical when evaluating the potential biological effects of ultrasound, as higher peak intensities can correlate with increased risks of tissue heating and cavitation. By focusing on the intensity at the peak, clinicians can assess the immediate impact of the ultrasound on the tissues being examined. In contrast, the other options describe average measurements or moments that do not specifically target the peak intensity during a pulse. Pulsed average intensity looks at the average intensity over the entire pulse duration, temporal average intensity measures the average over time, and instantaneous intensity considers the intensity at a specific instant rather than at the peak of a pulse. Thus, temporal peak intensity is uniquely positioned to convey information about the peak behavior of a pulse in sonography.

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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://sonographycanadaphysicscore.examzify.com>

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

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