

SONOGRAPHY CANADA PHYSICS CORE PRACTICE EXAM (SAMPLE)

STUDY GUIDE



Prepare with structure. Pass with confidence



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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. Which of the following contributes to the resolution of an ultrasound image?**
 - A. Spatial pulse length
 - B. Pulse repetition frequency
 - C. Number of cycles
 - D. All of the above
- 2. Which parameters are determined by the sound source?**
 - A. Amplitude, power, and speed
 - B. Period, frequency, amplitude, power, and intensity
 - C. Intensity, speed, and wavelength
 - D. Frequency and wavelength
- 3. Are sound waves classified as transverse or longitudinal waves?**
 - A. Transverse
 - B. Longitudinal
 - C. Both
 - D. Neither
- 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. What are the units and value of the SP/SA factor?**
 - A. Square centimeters with a value of less than 1
 - B. Unitless with a value of 1 or greater
 - C. Meters with a value of exactly 1
 - D. Decibels with a value of 0

- 6. What describes the distance of one complete cycle in a wave?**
- A. Amplitude
 - B. Frequency
 - C. Wavelength
 - D. Intensity
- 7. What are the typical units of half layer thickness?**
- A. Millimeters
 - B. Centimeters
 - C. Inches
 - D. Meters
- 8. What is the average intensity during the Pulse Repetition Period (PRP) called?**
- A. Pulsed Average Intensity
 - B. Temporal Average Intensity
 - C. Spatial Average Intensity
 - D. Maximum Intensity
- 9. How is PRP related to imaging depth?**
- A. Indirectly
 - B. Directly
 - C. Not at all
 - D. Only at shallow depths
- 10. What is the value of one megahertz in hertz?**
- A. 1,000 hertz
 - B. 1,000,000 hertz
 - C. 10 hertz
 - D. 100 hertz

Answers

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

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Explanations

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1. Which of the following contributes to the resolution of an ultrasound image?

- A. Spatial pulse length
- B. Pulse repetition frequency
- C. Number of cycles
- D. All of the above**

Resolution in an ultrasound image is influenced by various factors, making the choice of "all of the above" the most comprehensive answer. Spatial pulse length is crucial because it directly affects axial resolution. A shorter spatial pulse length results in better resolution, allowing for finer details to be distinguished in the image. This ultimately enhances the quality and clarity of the structures being examined. Pulse repetition frequency (PRF) also plays a role, although it primarily affects frame rate and can indirectly influence the resolution by allowing more frames to be captured per second. This can lead to a smoother and more precise representation of motion and dynamic structures, which is important in imaging. The number of cycles in a pulse influences the lateral resolution. A pulse with fewer cycles tends to be more focused and results in narrower beam widths, which helps in distinguishing two closely spaced structures. Therefore, all these factors—spatial pulse length, pulse repetition frequency, and number of cycles—contribute to the overall resolution of an ultrasound image, making "all of the above" the correct choice.

2. Which parameters are determined by the sound source?

- A. Amplitude, power, and speed
- B. Period, frequency, amplitude, power, and intensity**
- C. Intensity, speed, and wavelength
- D. Frequency and wavelength

The parameters determined by the sound source primarily include frequency, period, amplitude, power, and intensity. Understanding each of these concepts is crucial when considering the characteristics of sound waves produced by an ultrasound transducer. Frequency refers to the number of cycles of sound wave produced per second and is directly dependent on the sound source. A higher frequency means more cycles per second which results in improved resolution in imaging. The period is the reciprocal of frequency; it indicates the duration of one cycle of sound and is also influenced by the sound source. Amplitude relates to the maximum displacement of particles in the medium caused by the sound wave, which in turn affects the loudness of the sound. Power, defined as the rate at which energy is transferred by a sound wave, is determined by the amplitude of the wave and is another parameter intrinsic to the sound source. Intensity, which represents the power per unit area, is also controlled by the amplitude of the wave. While speed is a characteristic of sound traveling through a medium and is mainly determined by the properties of the medium (such as density and stiffness), the rest of the parameters listed touch on properties that originate from the sound source. Thus, option B encompasses all the relevant parameters that the sound source determines, making it the

3. Are sound waves classified as transverse or longitudinal waves?

- A. Transverse
- B. Longitudinal**
- C. Both
- D. Neither

Sound waves are classified as longitudinal waves because they propagate through a medium by compressing and rarefying the particles in the direction of the wave's travel. In longitudinal waves, the displacement of the medium's particles is parallel to the direction of energy transfer. This is evident in sound waves, where areas of compression occur when air molecules are pushed together and regions of rarefaction occur when they are spread apart. This classification is crucial to understanding how sound travels through different media, including air, water, and solids. In contrast, transverse waves, like light waves, involve particle movement that is perpendicular to the wave direction, which is not applicable to sound. Thus, the nature of sound wave propagation aligns exclusively with the characteristics of longitudinal waves, confirming the classification.

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. What are the units and value of the SP/SA factor?

- A. Square centimeters with a value of less than 1
- B. Unitless with a value of 1 or greater**
- C. Meters with a value of exactly 1
- D. Decibels with a value of 0

The SP/SA factor represents the relationship between the spatial pulse length (SP) and the spatial average intensity (SA). It is an important parameter in ultrasound physics that helps characterize the focus and resolution of an ultrasound beam. The SP/SA factor is unitless because it is a ratio comparing two intensities, which both have the same unit (watts per square centimeter, for example). When one quantity is divided by another having the same unit, the units cancel out, resulting in a dimensionless or unitless value. A value of 1 or greater indicates that the spatial pulse length is at least equal to or exceeds the spatial average intensity; this is consistent with the behavior of ultrasound beams, where focusing can lead to increased intensity. Understanding that the SP/SA factor is unitless and typically has a value of 1 or greater allows for better insight into ultrasound beam characteristics and behavior in clinical applications. This parameter plays a vital role in optimizing image quality and understanding the trade-offs in resolution and penetration in ultrasound imaging.

6. What describes the distance of one complete cycle in a wave?

- A. Amplitude
- B. Frequency
- C. Wavelength**
- D. Intensity

The term that describes the distance of one complete cycle in a wave is wavelength. Wavelength is defined as the distance between two consecutive points that are in phase on a wave, typically measured from crest to crest or trough to trough. It gives a vital understanding of the wave's properties and behavior in different mediums. In the context of sound waves, for example, wavelength plays a key role in determining how we perceive pitch; shorter wavelengths correspond to higher frequencies, while longer wavelengths correlate with lower frequencies. Amplitude refers to the height of the wave, which relates to the energy or intensity of the wave, but does not give any information about the distance of one complete cycle. Frequency is the number of cycles that occur in a certain amount of time, typically measured in hertz, but it also does not indicate the distance of a cycle. Intensity measures the power carried by the wave per unit area but is unrelated to the physical distance of a wave cycle. Understanding wavelength is essential for analyzing how waves propagate and interact with different environments, making it a fundamental concept in both physics and various applications in sonography.

7. What are the typical units of half layer thickness?

- A. Millimeters
- B. Centimeters**
- C. Inches
- D. Meters

The typical units of half layer thickness are most commonly expressed in centimeters. Half layer thickness (HVT) refers to the thickness of a material required to reduce the intensity of radiation (such as ultrasound) by half. In the context of sonography and radiological physics, this measurement is significant for understanding how various tissues and materials attenuate sound waves or radiation. Centimeters provide a practical scale for measuring half layer thickness in sonography, as they fall within the range of thicknesses encountered in biological tissues. Although other units such as millimeters and inches can also measure thickness, centimeters offer a balance of convenience and clarity when discussing biological tissues and the interactions of ultrasound with different media. In summary, using centimeters as the unit of measurement for half layer thickness aligns with the practical applications in sonography, ensuring accurate communication of data related to tissue characteristics and attenuation properties.

8. What is the average intensity during the Pulse Repetition Period (PRP) called?

- A. Pulsed Average Intensity
- B. Temporal Average Intensity**
- C. Spatial Average Intensity
- D. Maximum Intensity

The average intensity during the Pulse Repetition Period (PRP) is referred to as Temporal Average Intensity. This is because Temporal Average Intensity accounts for the fact that ultrasound is not continuously transmitted but rather in pulses. Therefore, it considers the total energy transmitted over the entire duration of the PRP, which includes both the "on" (pulse) and "off" (between pulses) times. In ultrasound, a distinction is made between different types of intensity measurements. The Temporal Average Intensity specifically gives a holistic view of the average power across the entire PRP, making it crucial for understanding how ultrasound energy is distributed over time. This measurement is particularly relevant in assessing the potential thermal effects of ultrasound on tissues. The other options represent different concepts in ultrasound intensity measurements. Pulsed Average Intensity relates to the average intensity only when the pulse is on and does not include the off time. Spatial Average Intensity refers to the average intensity over the area of the beam, and Maximum Intensity measures the highest intensity at any point during the pulse. Understanding these distinctions helps to better appreciate how ultrasound energy is utilized and its implications in clinical settings.

9. How is PRP related to imaging depth?

- A. Indirectly
- B. Directly**
- C. Not at all
- D. Only at shallow depths

The correct relationship between pulse repetition period (PRP) and imaging depth is direct. In ultrasound imaging, PRP refers to the time taken for one complete pulse cycle, including the time it takes for the pulse to be emitted and for the returning echo to be received. When imaging at greater depths, the ultrasound waves must travel further to reach the tissue and return. This necessitates a longer PRP since the system must accommodate the time required for these signals to travel to the deeper structures and back. Consequently, as imaging depth increases, the PRP must also increase to ensure that the system can capture the echoes from those deeper structures effectively. In shallower imaging scenarios, the PRP is shorter, as the ultrasound signals need less time to travel to the target tissue and return. However, the fundamental relationship remains that increased depth requires a proportionate increase in PRP. Therefore, this direct relationship is essential for ensuring that imaging settings are appropriately adjusted based on the depth being assessed.

10. What is the value of one megahertz in hertz?

- A. 1,000 hertz
- B. 1,000,000 hertz**
- C. 10 hertz
- D. 100 hertz

One megahertz is defined as one million hertz. The prefix 'mega-' in the metric system signifies a factor of one million, which is equivalent to 10^6 . Therefore, when converting megahertz to hertz, you multiply by one million. This means that 1 megahertz (1 MHz) corresponds to 1,000,000 hertz (Hz). This conversion is crucial in various fields, including sonography, where understanding frequency ranges in hertz is essential for interpreting ultrasound technologies and their applications. Recognizing this relationship between megahertz and hertz helps in comprehending how frequencies are used in medical imaging and other applications, aiding in analyses and operational uses in the field.

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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