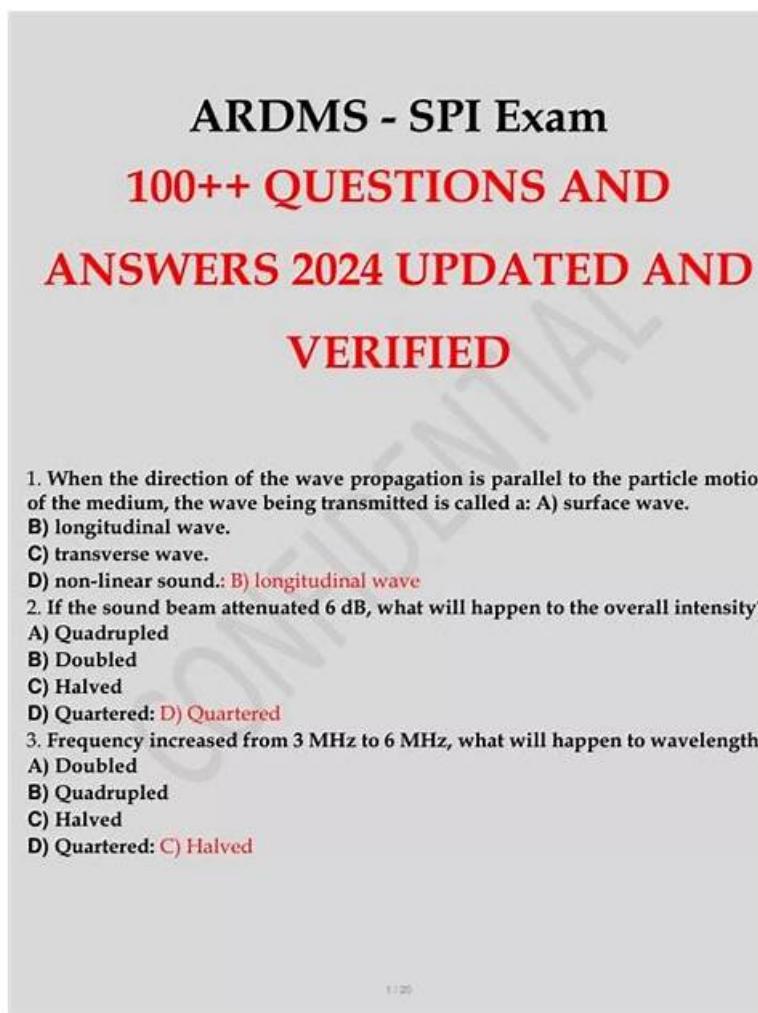


# ARDMS SPI Overview of the Problems Faced in Preparation Exam Questions



**ARDMS - SPI Exam**  
**100++ QUESTIONS AND**  
**ANSWERS 2024 UPDATED AND**  
**VERIFIED**

1. When the direction of the wave propagation is parallel to the particle motion of the medium, the wave being transmitted is called a: A) surface wave.  
B) longitudinal wave.  
C) transverse wave.  
D) non-linear sound.: B) longitudinal wave

2. If the sound beam attenuated 6 dB, what will happen to the overall intensity?  
A) Quadrupled  
B) Doubled  
C) Halved  
D) Quartered: D) Quartered

3. Frequency increased from 3 MHz to 6 MHz, what will happen to wavelength?  
A) Doubled  
B) Quadrupled  
C) Halved  
D) Quartered: C) Halved

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## ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	<ul style="list-style-type: none"><li>Optimize Sonographic Images: This section of the exam measures skills of Diagnostic Medical Sonographers and assesses their ability to enhance image quality using advanced optimization techniques. It includes understanding axial, lateral, elevational, and temporal resolution, as well as manipulating gain, depth, magnification, and dynamic range. Examinees are expected to apply harmonic imaging, spatial compounding, and gray-scale techniques to produce clear, accurate diagnostic images.</li></ul>

Topic 2	<ul style="list-style-type: none"> <li>Provide Clinical Safety and Quality Assurance: This section of the exam measures skills of Clinical Ultrasound Supervisors and focuses on maintaining safety and quality standards in ultrasound practice. It includes infection control protocols, transducer and machine integrity checks, and quality assurance testing using tissue-mimicking phantoms. The section also requires familiarity with statistical parameters like sensitivity and specificity to evaluate diagnostic performance and ensure consistent, reliable imaging outcomes.</li> </ul>
Topic 3	<ul style="list-style-type: none"> <li>Perform Ultrasound Examinations: This section of the exam measures skills of Sonographers and covers how to conduct ultrasound procedures while ensuring patient safety and diagnostic accuracy. It includes understanding of imaging protocols, ergonomics, patient care, and the interaction between sound and tissue. Candidates are expected to demonstrate abilities to manage patient encounters, apply 3D</li> <li>4D and contrast imaging concepts, identify and correct artifacts, and follow confidentiality and privacy standards throughout the scanning process.</li> </ul>
Topic 4	<ul style="list-style-type: none"> <li>Apply Doppler Concepts: This section of the exam measures skills of Vascular Sonographers and evaluates understanding and application of Doppler ultrasound principles. It includes knowledge of Doppler angle, flow dynamics, and color and spectral Doppler imaging. The section also covers eliminating aliasing, interpreting waveforms, applying continuous and pulsed wave Doppler, and optimizing Doppler gain and scale to accurately measure blood flow and velocity within vessels.</li> </ul>
Topic 5	<ul style="list-style-type: none"> <li>Manage Ultrasound Transducers: This section of the exam measures skills of Ultrasound Technicians and focuses on the management and proper use of different types of transducers. It evaluates knowledge of transducer components, frequency selection, and application of various 2D, 3D, 4D, and nonimaging transducer concepts. Candidates must show they can choose the appropriate transducer for specific examinations and make necessary frequency adjustments to ensure image quality.</li> </ul>

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## ARDMS Sonography Principles and Instrumentation Sample Questions (Q127-Q132):

### NEW QUESTION # 127

Which target group is used to evaluate transverse distance measurement accuracy in this tissue-mimicking phantom image?

□

- A. Option D
- B. Option A
- C. Option B
- D. Option C

### Answer: A

#### Explanation:

In the tissue-mimicking phantom image, Option D (blue box) is used to evaluate transverse distance measurement accuracy. Phantoms are used to simulate human tissue and provide a standardized way to test the accuracy and precision of ultrasound machines. Transverse distance measurement accuracy is assessed by measuring known distances between targets in the phantom. The blue box (Option D) typically contains targets positioned to specifically test the accuracy of transverse measurements, ensuring that the ultrasound system provides reliable and precise distance readings.

Reference:

ARDMS Sonography Principles and Instrumentation (SPI) Exam Study Guide

"Quality Assurance for Ultrasound Imaging Systems" by AAPM (American Association of Physicists in Medicine)

### NEW QUESTION # 128

What is required when interrogating higher blood velocities at angles closer to zero degrees?

- A. Increased Doppler scale settings
- B. Decreased Doppler scale settings
- C. Increased Doppler wall filter settings
- D. Decreased Doppler wall filter settings

**Answer: A**

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

When evaluating high blood velocities, especially at angles closer to zero degrees (which produces maximum Doppler shifts), aliasing can easily occur because the Doppler frequency shift increases. To avoid aliasing, you must increase the Doppler scale (which increases the pulse repetition frequency, PRF) to accommodate these higher velocities.

According to sonography instrumentation references:

"The Doppler scale (PRF) must be increased when high velocities are anticipated to prevent aliasing, especially at optimal Doppler angles near zero degrees where maximum frequency shifts occur." Therefore, the correct answer is C: Increased Doppler scale settings.

### NEW QUESTION # 129

In addition to velocity, which factor affects acoustic impedance?

- A. Penetration depth
- B. Transducer frequency
- C. Tissue density
- D. Attenuation coefficient

**Answer: C**

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Acoustic impedance (Z) is determined by the product of tissue density (#) and propagation speed (c), expressed as:

$$Z = \# \times c$$

According to Principles and Instrumentation:

"Acoustic impedance is a property of the tissue, determined by its density and the speed of sound through it."

\* Penetration depth (A) does not affect impedance directly.

\* Attenuation coefficient (B) affects signal loss, not impedance.

\* Transducer frequency (D) is independent of tissue impedance.

Therefore, the correct answer is C: Tissue density.

### NEW QUESTION # 130

What is effected by increasing the color scale?

- A. The color priority decreases
- B. More colors are displayed
- C. The Nyquist limit is increased
- D. The color box width decreases

**Answer: C**

Explanation:

The Nyquist limit, which is the maximum detectable velocity before aliasing occurs, is directly related to the pulse repetition frequency (PRF). Increasing the color scale on the ultrasound machine effectively increases the PRF. When the PRF is increased, the Nyquist limit is also increased, allowing for the measurement of higher velocities without aliasing.

ARDMS Sonography Principles and Instrumentation guidelines

Kremkau, F. W. (2015). Diagnostic Ultrasound: Principles and Instruments. Elsevier.

### NEW QUESTION # 131

Which method of sanitizing the transducer would damage piezoelectric crystals?

- A. Autoclave
- B. Bleach
- C. Glutaraldehyde
- D. Alcohol

**Answer: A**

Explanation:

Autoclaving involves high-pressure steam at high temperatures, which can damage the delicate piezoelectric crystals within the ultrasound transducer. These crystals are responsible for converting electrical energy into sound waves and vice versa. Exposure to the extreme conditions of an autoclave can cause thermal and mechanical damage to the crystals, rendering the transducer ineffective.

ARDMS Sonography Principles and Instrumentation guidelines

Zagzebski, J. A. (1996). Essentials of Ultrasound Physics.

### NEW QUESTION # 132

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