

Free PDF Quiz ARDMS - SPI - Sonography Principles and Instrumentation—High Pass-Rate New Exam Discount

ARDMS SPI (Sonography Principles and Instrumentation) Practice Exam 2025 – Questions and Correct Answers and Detailed Rationales

1. What is the primary determinant of axial resolution in ultrasound imaging?

- A. Pulse repetition frequency
- B. Spatial pulse length**
- C. Transducer diameter
- D. Frame rate

Rationale: Axial resolution is determined by the spatial pulse length (SPL). The shorter the SPL, the better the axial resolution.

2. Which artifact results from sound reflecting off a strong reflector and being redirected back into the body?

- A. Reverberation
- B. Mirror image**
- C. Shadowing
- D. Ring down

Rationale: A mirror image artifact occurs when a strong reflector (like the diaphragm) redirects sound, creating a duplicated structure.

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ARDMS SPI Exam Syllabus Topics:

Topic	Details

Topic 1	<ul style="list-style-type: none"> • 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.
Topic 2	<ul style="list-style-type: none"> • 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 and 4D and contrast imaging concepts, identify and correct artifacts, and follow confidentiality and privacy standards throughout the scanning process.
Topic 3	<ul style="list-style-type: none"> • 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.
Topic 4	<ul style="list-style-type: none"> • 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.
Topic 5	<ul style="list-style-type: none"> • 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.

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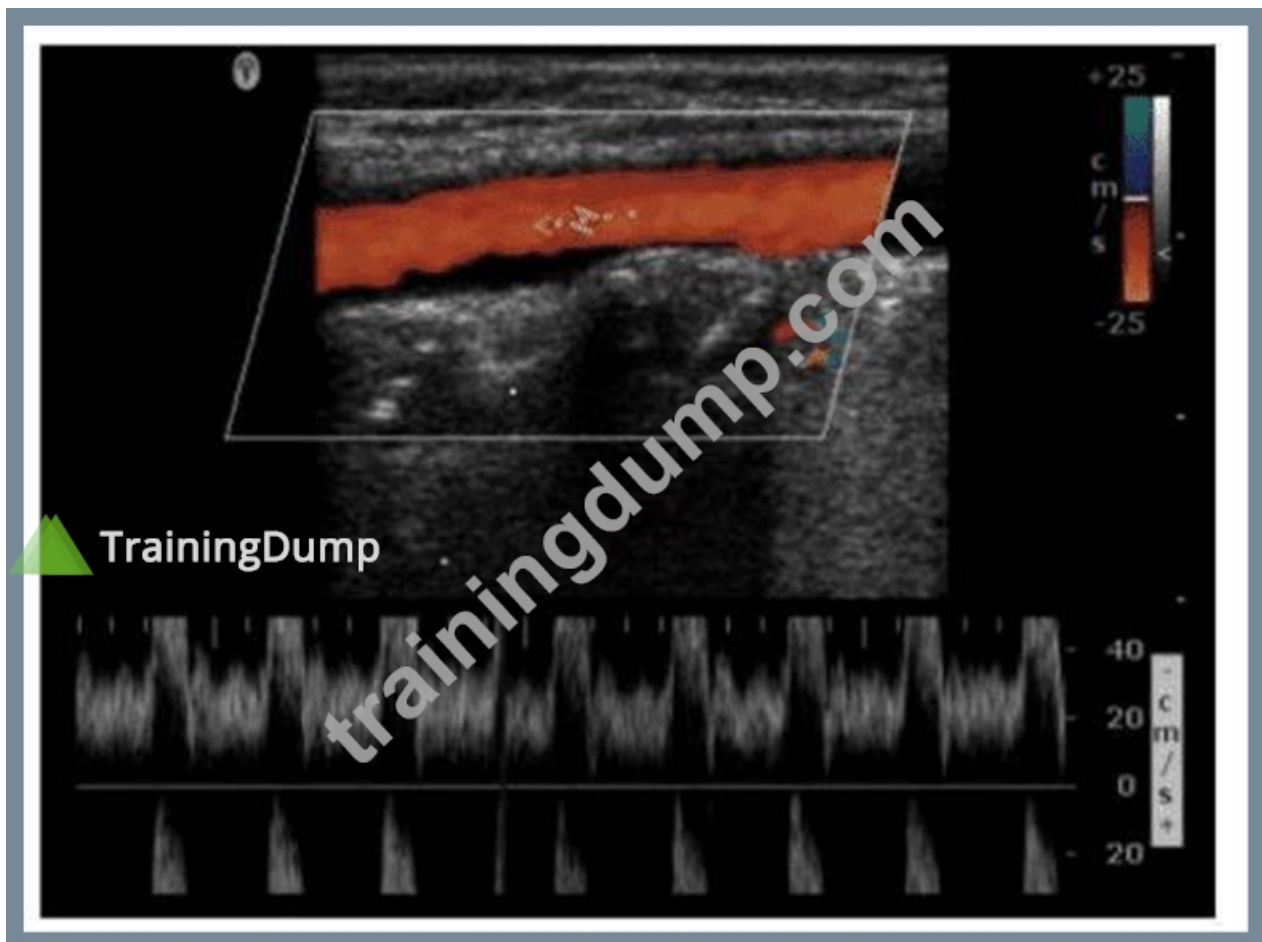
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ARDMS Sonography Principles and Instrumentation Sample Questions (Q157-Q162):

NEW QUESTION # 157

Which adjustment would eliminate aliasing in the Doppler waveform in this image?

A close-up of an ultrasound Description automatically generated



- A. Decrease Doppler gain.
- **B. Increase velocity scale.**
- C. Decrease wall filter.
- D. Increase sample size.

Answer: B

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Aliasing occurs when Doppler frequency shifts exceed the Nyquist limit (which equals half the pulse repetition frequency). Increasing the velocity scale (which increases PRF) raises the Nyquist limit, reducing or eliminating aliasing.

Principles and Instrumentation state:

"Aliasing in pulsed-wave Doppler can be corrected by increasing the pulse repetition frequency (velocity scale), allowing higher velocities to be displayed without wraparound."

* Decreasing gain affects amplitude, not aliasing.

* Wall filter adjustments remove low-velocity signals, not aliasing.

* Increasing sample size affects spatial resolution and may reduce frame rate but does not address aliasing.

Therefore, the correct answer is C: Increase velocity scale.

NEW QUESTION # 158

Which resolution is degraded with multiple electronic foci?

- A. Elevational
- **B. Temporal**
- C. Lateral
- D. Axial

Answer: B

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Using multiple focal zones improves lateral resolution but requires additional time for each focal zone acquisition, which reduces frame rate and therefore degrades temporal resolution.

According to sonography instrumentation reference:

"Multiple focal zones improve lateral resolution but at the expense of temporal resolution due to longer acquisition time for each frame." Therefore, the correct answer is D: Temporal.

NEW QUESTION # 159

If the speed of sound in a medium is less than the average speed of sound in soft tissue, where will the echo be placed on an image?

- A. Not visualized
- B. Laterally
- C. Too deep
- D. Too shallow

Answer: C

Explanation:

The placement of an echo on an ultrasound image is dependent on the assumption that the speed of sound in soft tissue is 1540 m/s. If the speed of sound in the medium is less than this assumed speed, the ultrasound system will interpret the returning echo as taking longer to return than it actually does. This causes the system to place the echo deeper in the image than its actual position. Therefore, the echo will be displayed "too deep" in the image.

Reference:

ARDMS Sonography Principles & Instrumentation Guidelines

Krenkau FW. Sonography Principles and Instruments. 9th ed. Philadelphia, PA: Elsevier; 2016.

NEW QUESTION # 160

Which function can decrease noise?

- A. Frequency
- B. Depth
- C. Sector width
- D. Persistence

Answer: D

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Persistence is a frame averaging function that combines multiple sequential frames to smooth random noise and reduce speckle, particularly effective in stationary or slow-moving structures.

According to official Principles and Instrumentation guidelines:

"Persistence reduces random noise by averaging multiple frames over time, improving image clarity but potentially reducing temporal resolution." Increasing frequency improves resolution but may increase attenuation.

Sector width affects frame rate.

Depth affects penetration but not noise reduction.

Therefore, the correct answer is D: Persistence.

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NEW QUESTION # 161

What is an advantage of pulsed-wave Doppler over continuous-wave Doppler?

- A. Range resolution
- B. High signal-to-noise ratio
- C. Unlimited maximum detectable velocity
- D. Increased sensitivity to slow flow

Answer: A

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

The primary advantage of pulsed-wave Doppler is its ability to provide range resolution. This means the operator can select a specific depth (sample volume) from which Doppler signals are acquired, allowing precise localization of blood flow velocities. According to sonography instrumentation reference:

"Pulsed-wave Doppler allows for range resolution, enabling velocity measurements at a specific depth along the ultrasound beam path." Continuous-wave Doppler does not have range resolution, as it measures velocities along the entire beam path. Therefore, the correct answer is C: Range resolution.

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NEW QUESTION # 162

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