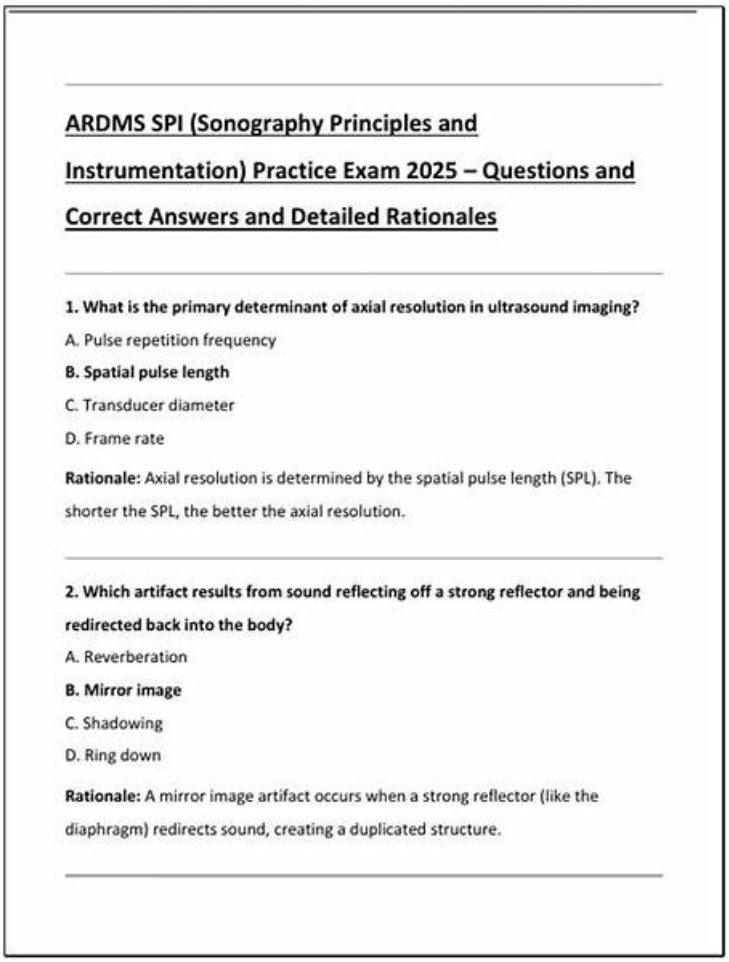
Free PDF Quiz Reliable ARDMS - SPI - Sonography Principles and Instrumentation Training For Exam



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	• 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 2	• 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 3	• 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.
Topic 4	• 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	• 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 • 4D and contrast imaging concepts, identify and correct artifacts, and follow confidentiality and privacy standards throughout the scanning process.

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ARDMS Sonography Principles and Instrumentation Sample Questions (Q47-Q52):

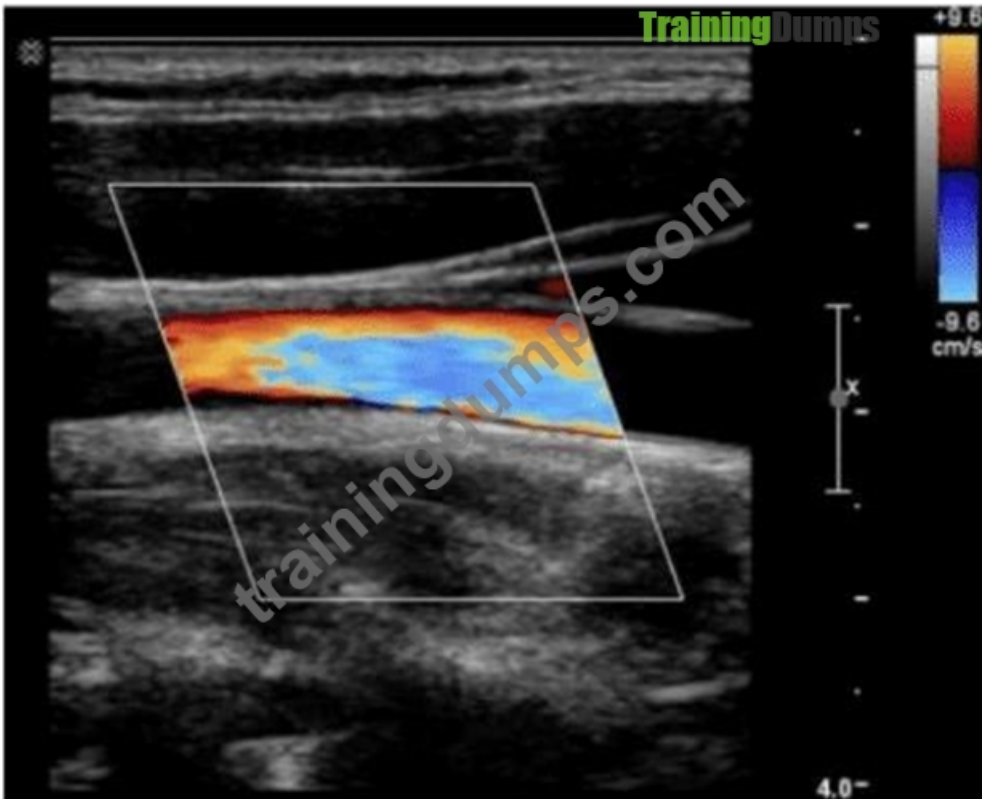
NEW QUESTION # 47
What produces increased attenuation within soft tissue?

- A. Higher intensity of the ultrasound beam
- B. Higher frequency of the ultrasound beam
- C. Lower intensity of the ultrasound beam
- D. Lower frequency of the ultrasound beam

Answer: B

Explanation:
Attenuation refers to the reduction in the intensity of the ultrasound beam as it travels through tissue. Higher frequency ultrasound beams experience more attenuation because they are absorbed and scattered more than lower frequency beams. This is due to the fact that higher frequency waves have shorter wavelengths and interact more with the small particles in tissues, causing greater energy loss.
Reference: ARDMS Sonography Principles and Instrumentation, Chapter on Ultrasound Physics and Instrumentation.

NEW QUESTION # 48
Which setting is the most likely cause of the artifact displayed in this image?
A close-up of a ultrasound Description automatically generated



- A. Color gain set too high
- B. Velocity scale set too low
- C. Color gain set too low
- D. Velocity scale set too high

Answer: B

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
The image shows color aliasing, where the colors abruptly change within the vessel indicating wrap-around of Doppler shifts. This happens when the velocity scale (PRF) is set too low, causing velocities exceeding the Nyquist limit to alias.
According to sonography instrumentation reference:
"Aliasing occurs in color Doppler when the flow velocities exceed the Nyquist limit, commonly due to a low velocity scale (PRF)."
Therefore, the correct answer is D: Velocity scale set too low.
-

NEW QUESTION # 49
At which angle to blood flow would the maximum Doppler shift occur?

- A. 60 degrees
- B. 90 degrees
- C. 30 degrees
- D. 0 degrees

Answer: D

Explanation:
The Doppler shift is highest when the angle between the ultrasound beam and the direction of blood flow is 0 degrees. This is because the cosine of 0 degrees is 1, maximizing the Doppler frequency shift. As the angle increases towards 90 degrees, the cosine value decreases, reducing the Doppler shift.

Reference:
ARDMS Sonography Principles and Instrumentation guidelines
Hoskins, P. R., Thrush, A., Martin, K., & Whittingham, T. A. (2010). Diagnostic Ultrasound: Physics and Equipment.

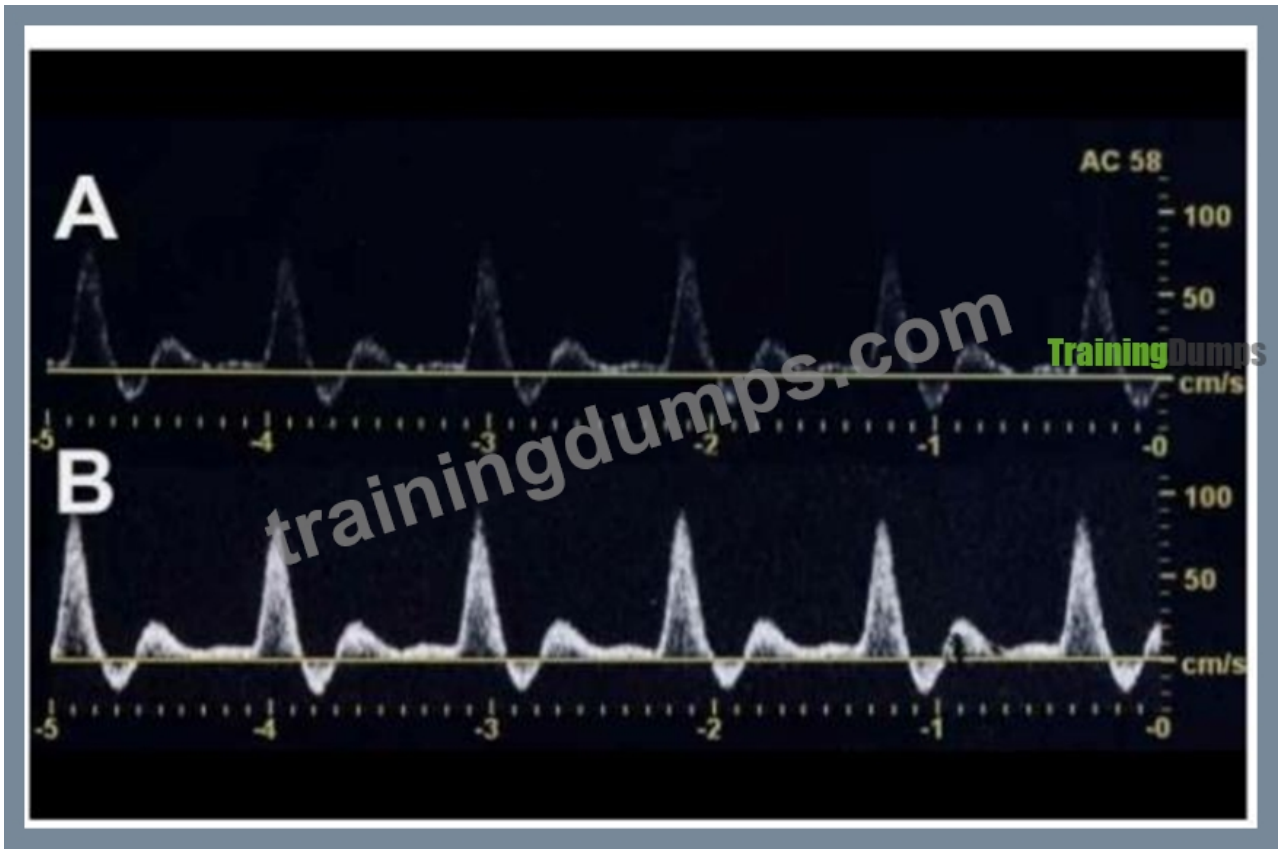
NEW QUESTION # 50
What artifact is indicated by the arrows in the image below?

- A. Enhancement
- B. Ring down
- C. Refraction
- D. Grating lobe

Answer: B

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
The image shows a bright, continuous, vertical band extending from a gas-containing structure (seen at the top). This is characteristic of ring down artifact, which occurs when multiple small gas bubbles resonate and create continuous echoes below the structure.
According to sonography instrumentation reference:
"Ring down artifact results from resonance of gas bubbles, producing a continuous series of echoes distal to the source. It appears as a bright, vertical band that does not fade with depth." Therefore, the correct answer is A: Ring down.
-

NEW QUESTION # 51
Which adjustment produced the change from waveform A to waveform B?



- A. Decreased wall filter
- B. Increased wall filter
- C. Decreased Doppler gain
- D. Increased Doppler gain

Answer: D

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
Comparing waveform A to waveform B:
In image B, the Doppler spectral waveform is brighter, with stronger signal amplitude and more clearly visible Doppler shifts.
This indicates that the Doppler gain was increased, amplifying the strength of the returning Doppler signals displayed on the spectral waveform.
According to official sonography Principles and Instrumentation:
"Doppler gain controls the amplification of returning Doppler signals. Increasing the gain enhances signal amplitude, making weaker Doppler signals more visible." Decreasing gain (B) would have produced a dimmer waveform.
Changes in wall filter (C and D) would primarily affect low-velocity signal display, not overall brightness.
Therefore, the correct answer is A: Increased Doppler gain.

NEW QUESTION # 52
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