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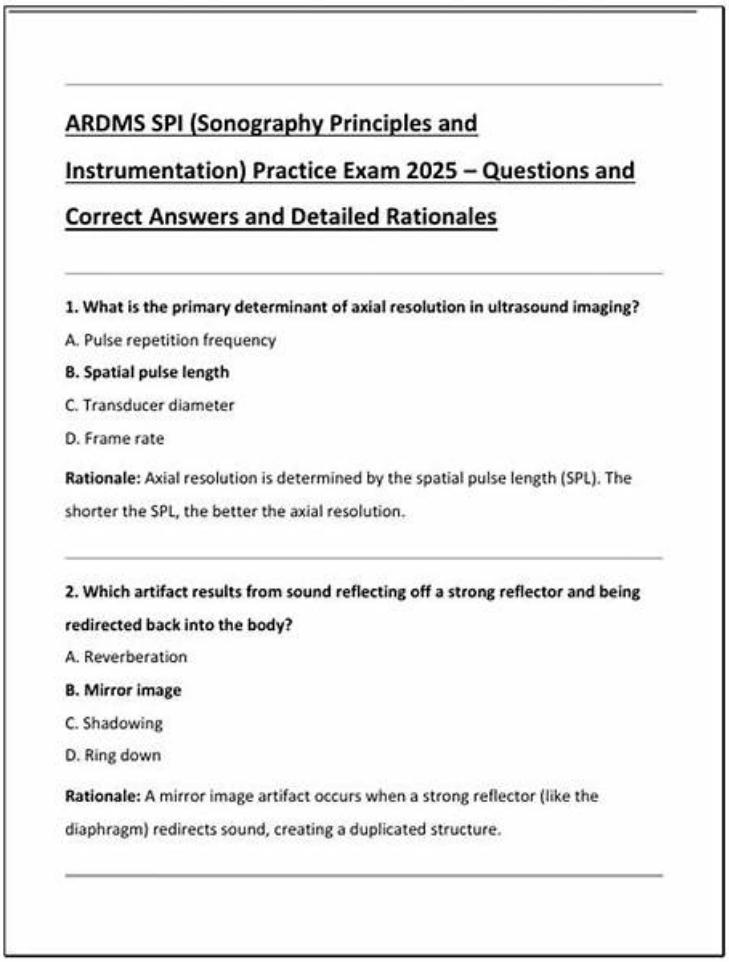

ARDMS SPI (Sonography Principles and Instrumentation) Practice Exam 2025 – Questions and Correct Answers and Detailed Rationales

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	• 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.

Topic 2	• 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 3	• 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 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	• 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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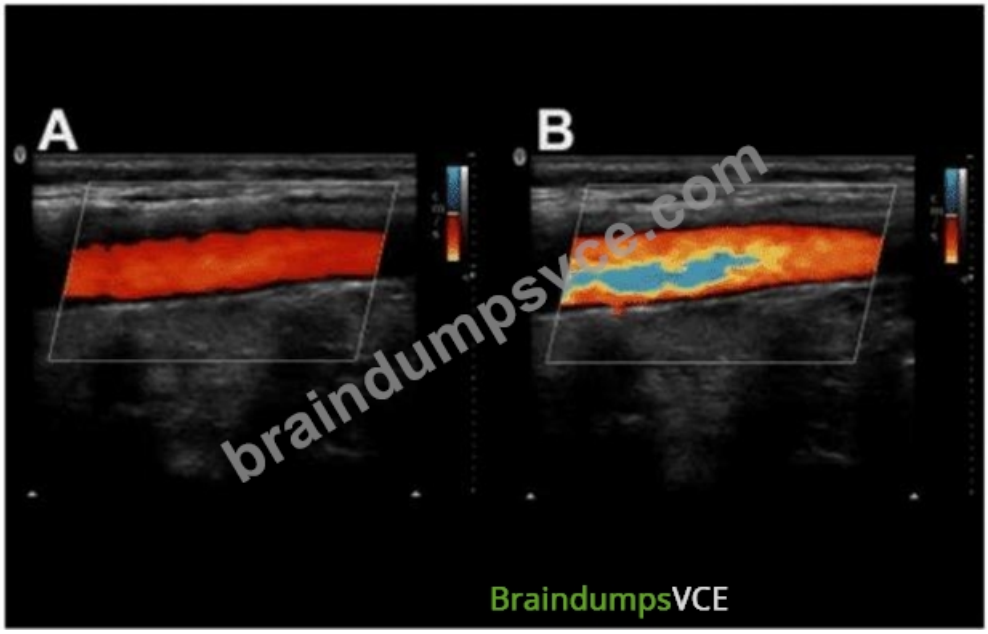
ARDMS Sonography Principles and Instrumentation Sample Questions (Q201-Q206):

NEW QUESTION # 201
Which color control adjustment caused the change from image A to image B?
A close-up of a medical image Description automatically generated



- A. Velocity scale
- B. Color packet size
- C. Map
- D. Wall filter

Answer: A

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
In image A, the vessel shows uniform color filling without aliasing. In image B, multiple color bands are present, indicating color aliasing - where the flow velocities exceeded the Nyquist limit due to a lower velocity scale (PRF).
According to sonography Principles and Instrumentation:
"Aliasing in color Doppler appears when the Doppler shift exceeds the Nyquist limit. Reducing the velocity scale increases the likelihood of aliasing."
* Changing the map (A) would modify the color hues but not introduce aliasing.
* Wall filter (C) affects low-velocity signals but not aliasing.
* Color packet size (D) affects frame rate and sensitivity, not aliasing directly.
Therefore, the correct answer is B: Velocity scale.
-

NEW QUESTION # 202
What is the benefit of using a wall filter?

- A. Reduces aliasing
- B. Removes low-frequency signals
- C. Increases signal-to-noise ratio
- D. Increases velocity range

Answer: B

Explanation:
A wall filter in Doppler ultrasound is designed to remove low-frequency signals that are often caused by tissue motion, vessel wall movement, or other forms of motion artifact. These low-frequency signals can clutter the Doppler spectrum, making it difficult to accurately interpret blood flow velocities. By filtering out these unwanted low-frequency signals, the wall filter helps to enhance the clarity of the Doppler signal, allowing for more accurate measurements of blood flow velocities.
American Registry for Diagnostic Medical Sonography (ARDMS). Sonography Principles and Instrumentation (SPI) Examination Review Guide.

NEW QUESTION # 203
Which parameter indicates the potential for cavitation?

- A. Attenuation coefficient
- B. Frame rate
- C. Thermal index
- D. Mechanical index

Answer: D

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
Mechanical Index (MI) estimates the likelihood of non-thermal bioeffects such as cavitation (formation of microbubbles).
Principles and Instrumentation state:
"Mechanical Index reflects the risk of cavitation. Higher MI values increase cavitation potential." Attenuation coefficient (A) refers to energy loss.
Thermal index (C) reflects potential heating.
Frame rate (D) relates to temporal resolution.
Therefore, the correct answer is B: Mechanical index.
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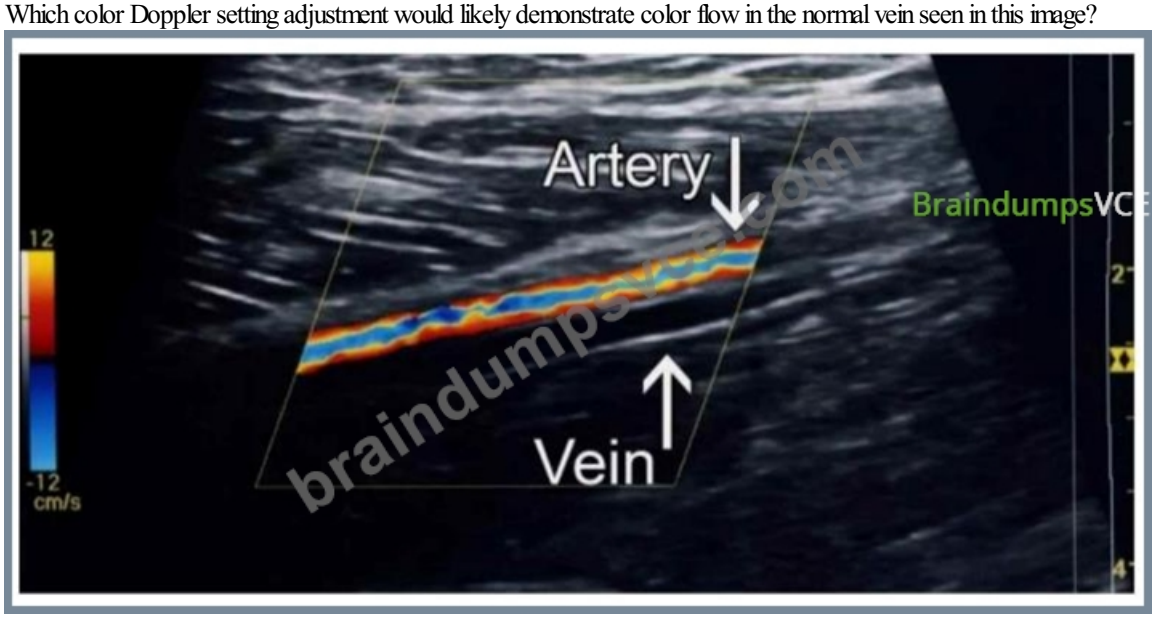
NEW QUESTION # 204
Which color Doppler setting adjustment would likely demonstrate color flow in the normal vein seen in this image?



- A. Decreasing persistence
- B. Increasing persistence
- C. Increasing scale
- D. Decreasing scale

Answer: D

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
Veins generally exhibit low-velocity flow. The color scale (or velocity range) must be low enough to detect these slow flows.
Decreasing the scale lowers the Nyquist limit, allowing the machine to display lower velocities that may otherwise be undetectable.
Principles and Instrumentation state:
"Reducing the scale increases sensitivity to low-velocity flows such as venous flow, while high scales may suppress these signals."
Therefore, the correct answer is A: Decreasing scale.

NEW QUESTION # 205
Which factor improves axial resolution?

- A. Shorter wavelength
- B. Increased aperture size
- C. Greater depth of field
- D. Wider beam

Answer: A

Explanation:
Axial resolution refers to the ability of an ultrasound system to distinguish between two structures that are close to each other along the path of the ultrasound beam. It is primarily determined by the spatial pulse length, which is the product of the wavelength and the number of cycles in a pulse. Shorter wavelengths result in shorter spatial pulse lengths, thereby improving axial resolution. This is because shorter wavelengths (which correspond to higher frequencies) allow for better differentiation between closely spaced structures along the beam's axis.
Reference:
American Registry for Diagnostic Medical Sonography (ARDMS). Sonography Principles and Instrumentation (SPI) Examination Review Guide.

NEW QUESTION # 206
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