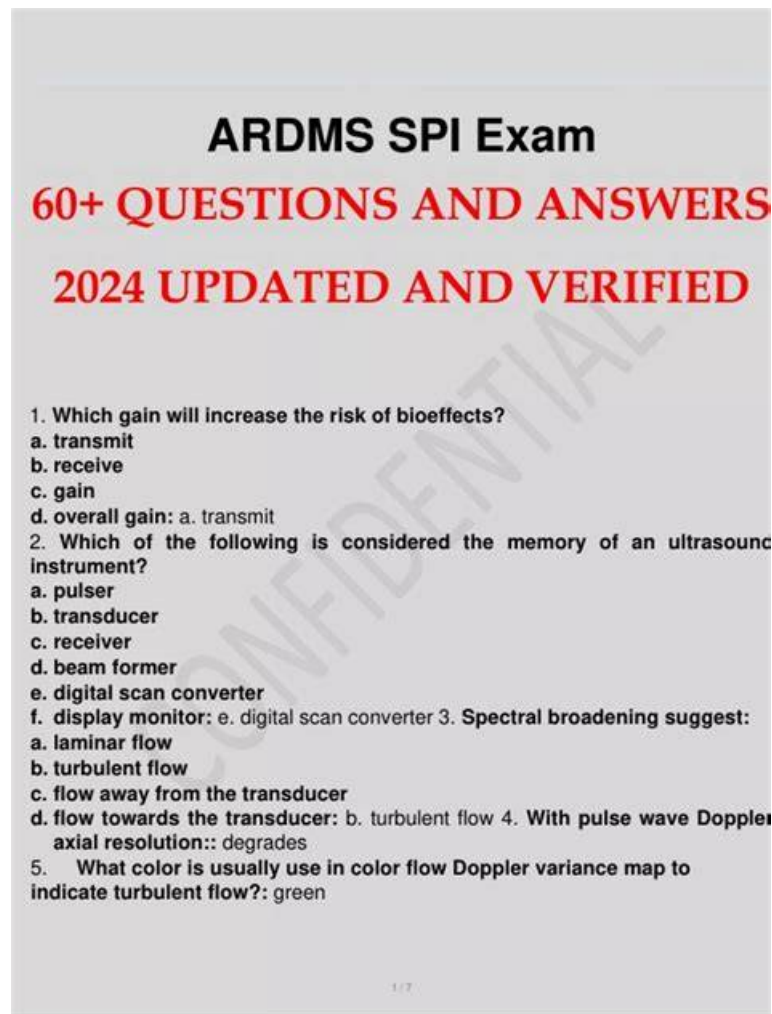


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ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	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 2	• 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 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	• 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 5	• 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.

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ARDMS Sonography Principles and Instrumentation Sample Questions (Q133-Q138):

NEW QUESTION # 133

Which resolution is degraded with multiple electronic foci?

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

Answer: A

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 # 134

Which artifact causes a reflector to be improperly positioned on the display?

- A. Speckle
- B. Acoustic shadowing
- C. Range ambiguity
- D. Enhancement

Answer: C

Explanation:

* Acoustic Shadowing: This artifact occurs when a structure absorbs or reflects most of the ultrasound waves, causing a shadow behind the structure. It does not cause improper positioning of a reflector on the display.

* Speckle: This is a form of noise in ultrasound imaging that appears as granular texture. It can affect image quality but does not lead to improper positioning of reflectors.

* Enhancement: This artifact occurs when the area behind a weakly attenuating structure appears brighter.

It affects the brightness of the image but does not affect the position of reflectors.

* Range Ambiguity: This occurs when an echo is received after the next pulse has been sent out, causing the reflector to be placed at an incorrect depth on the display. This is because the system assumes the echo came from the most recent pulse.

References:

"Ultrasound Physics and Instrumentation" by Frank Miele

ARDMS Sonography Principles and Instrumentation study materials

NEW QUESTION # 135

Which factor improves axial resolution?

- A. Narrower beamwidth
- B. Lower frequency transducer
- C. Decreased compression
- D. Shorter spatial pulse length

Answer: D

Explanation:

Axial resolution refers to the ability to distinguish two structures that are close to each other along the direction of the sound beam. It is determined by the spatial pulse length (SPL), which is the product of the number of cycles in a pulse and the wavelength. Shorter SPL means shorter pulse duration, which leads to better axial resolution. This is because shorter pulses allow for better separation of echoes from closely spaced structures.

ARDMS Sonography Principles and Instrumentation guidelines

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

NEW QUESTION # 136

Which component of a contrast agent causes a marked mismatch in impedance between the agent and blood?

- A. Solid
- B. Viscous liquid
- C. Serous liquid
- D. Gas

Answer: D

Explanation:

Contrast agents used in ultrasound imaging typically consist of microbubbles filled with gas. The significant mismatch in acoustic impedance between the gas in the microbubbles and the surrounding blood creates strong reflectors of the ultrasound waves, enhancing the echogenicity of blood and improving the visibility of blood flow and tissue perfusion. The high contrast provided by the gas-filled microbubbles makes them particularly effective as ultrasound contrast agents.

Reference:

ARDMS Sonography Principles & Instrumentation Guidelines

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