

100% Pass ARDMS - SPI - Sonography Principles and Instrumentation Pass-Sure Test Engine



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ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	<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.
Topic 2	<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 3	<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 4	<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 • 4D and contrast imaging concepts, identify and correct artifacts, and follow confidentiality and privacy standards throughout the scanning process.
Topic 5	<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.

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ARDMS Sonography Principles and Instrumentation Sample Questions (Q71-Q76):

NEW QUESTION # 71

What is the primary interaction that occurs when sound waves encounter a smooth, flat surface?

- A. Interference
- **B. Reflection**
- C. Attenuation
- D. Diffraction

Answer: B

Explanation:

When sound waves encounter a smooth, flat surface, the primary interaction is reflection. This means the sound waves bounce back towards the transducer, producing echoes that are used to create the ultrasound image. Reflection is most effective when the surface is smooth and perpendicular to the sound beam, allowing for the maximum return of sound waves to the transducer.

Reference:

ARDMS Sonography Principles and Instrumentation guidelines

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

NEW QUESTION # 72

Which factor does a string phantom evaluate?

- A. Slice thickness
- **B. Flow velocity**
- C. Two-dimensional resolution
- D. Intensity values

Answer: B

Explanation:

A string phantom is designed to evaluate the accuracy of Doppler ultrasound systems, specifically in measuring flow velocity. It

consists of a moving string or filament that mimics blood flow within a vessel. By using this phantom, sonographers can assess how accurately the ultrasound system can detect and measure the speed of the moving target. This helps in calibrating and verifying the performance of Doppler systems, ensuring they provide accurate flow velocity readings in clinical practice.

Reference:

American Registry for Diagnostic Medical Sonography (ARDMS) Sonography Principles and Instrumentation study materials.
Textbook of Diagnostic Sonography by Hagen-Ansert, S. L. (latest edition).

NEW QUESTION # 73

Which is a method to reduce noise?

- A. Increase frequency
- B. Increase persistence
- C. Decrease beam width
- D. Decrease depth

Answer: B

Explanation:

Persistence is a form of temporal averaging where consecutive frames are averaged to reduce random noise, resulting in a smoother image. Increasing persistence effectively reduces noise by averaging out transient noise artifacts while preserving the true signal. This improves image quality, although it may also reduce the temporal resolution, making it less suitable for rapidly moving structures.

Reference:

ARDMS Sonography Principles & Instrumentation Guidelines

Hedrick WR, Hykes DL, Starchman DE. Ultrasound Physics and Instrumentation. 4th ed. Philadelphia, PA: Elsevier Saunders; 2005.

NEW QUESTION # 74

What is the result of increased transducer damping?

- A. Narrow beam width
- B. Increased sensitivity
- C. Longer pulse length
- D. Improved axial resolution

Answer: D

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Damping material is applied to the back of the piezoelectric crystal to absorb energy and shorten the pulse duration. Shorter pulse durations reduce spatial pulse length, which directly improves axial resolution by enabling better separation of structures along the beam path.

According to sonography instrumentation reference:

"Greater transducer damping results in shorter pulse duration and improved axial resolution but reduces sensitivity." Therefore, the correct answer is D: Improved axial resolution.

NEW QUESTION # 75

Which change was made after acquiring image A to produce image B?

□

- A. Increased sweep speed
- B. Decreased wall filter
- C. Increased spectral gain
- D. Decreased pulse repetition frequency

Answer: D

Explanation:

* Increased Sweep Speed: This affects the display of the waveform over time but does not impact the appearance of the spectral

Doppler signal in the way shown.

* Decreased Pulse Repetition Frequency (PRF): Lowering the PRF can lead to aliasing, which is evident as the waveform wrapping around in the spectral display from image A to image B. This makes the velocity appear higher than it actually is.

* Decreased Wall Filter: This adjustment primarily affects the elimination of low-frequency Doppler signals but does not typically cause the kind of changes seen in the images.

* Increased Spectral Gain: Increasing the gain would result in a brighter spectral display but not the wrapping of the signal as seen.

References:

"Understanding Ultrasound Physics" by Sidney K. Edelman

ARDMS Sonography Principles and Instrumentation study materials

NEW QUESTION # 76

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