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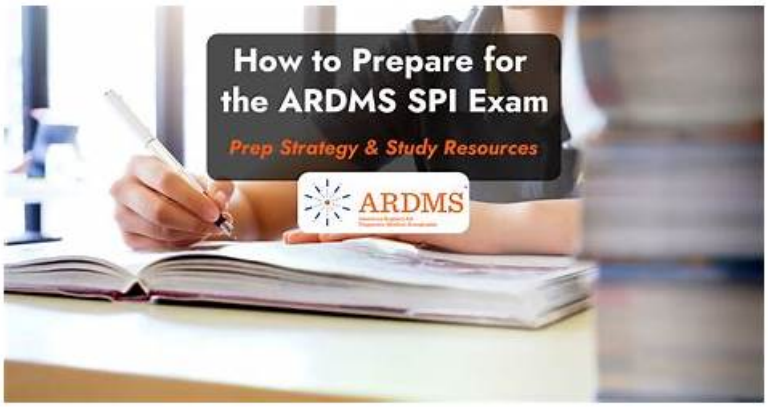

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ARDMS SPI Exam Syllabus Topics:

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	• 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 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	• 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 (Q76-Q81):

NEW QUESTION # 76
Which unfocused transducer will have the greatest divergence?

- A. 4 mm aperture, 6 MHz
- B. 6 mm aperture, 6 MHz
- C. 6 mm aperture, 4 MHz
- D. 4 mm aperture, 4 MHz

Answer: D

Explanation:
Transducer beam divergence is influenced by the aperture size and frequency. A smaller aperture and lower frequency result in greater beam divergence. Among the given options, the transducer with a 4 mm aperture and 4 MHz frequency will have the greatest divergence. This is because the smaller aperture size contributes to a wider beam spread, and the lower frequency also increases the divergence compared to higher frequencies.
Reference:
ARDMS Sonography Principles and Instrumentation guidelines
Kremkau, F. W. (2015). Diagnostic Ultrasound: Principles and Instruments. Elsevier.

NEW QUESTION # 77
What adjustment is needed to optimize the image below?

- A. Steer the box
- B. Increase wall filter
- C. Raise focal zone
- D. Decrease scale

Answer: A

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
In the displayed image, the color box is not aligned parallel to the direction of blood flow in the vessel. Color Doppler is angle-dependent; when the color box is not properly steered to align with flow, the Doppler shift is reduced, and less color filling occurs. Steer the box to align the ultrasound beam more parallel to flow to maximize Doppler shift and improve color filling.
According to sonography instrumentation reference:
"Steering the color box aligns the Doppler beam with blood flow direction, optimizing the Doppler angle and improving flow

visualization." Therefore, the correct answer is B: Steer the box.
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NEW QUESTION # 78
Which factor does a string phantom evaluate?

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

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 # 79
In this image, which characteristics of flow are represented by the upper right side of a variance mode color map?

- A. Higher velocity, turbulent with a positive Doppler shift
- B. Higher velocity, laminar with a positive Doppler shift
- C. Higher velocity, laminar with a negative Doppler shift
- D. Higher velocity, turbulent with a negative Doppler shift

Answer: A

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
In variance mode color Doppler, colors are assigned based on both flow direction (Doppler shift polarity) and flow character (laminar vs turbulent). In the image:
The vertical color bar shows standard Doppler shifts: positive shifts (toward the transducer) are displayed at the top, and negative shifts (away from the transducer) at the bottom.
The variance mode adds horizontal color variation (from left to right), where the right side indicates increasing turbulence.
Thus, the upper right portion of the color bar indicates:
Positive Doppler shift (flow toward the transducer)
High velocity
Turbulent flow
According to sonography instrumentation reference:
"In variance mode, the vertical axis represents flow direction and velocity, while the horizontal axis represents flow variance (turbulence). The upper right corner indicates high-velocity turbulent flow toward the transducer." Therefore, the correct answer is C: Higher velocity, turbulent with a positive Doppler shift.

NEW QUESTION # 80
Which adjustment would reduce the noise in the Doppler waveform in this image?

- A. Decreasing Doppler gain
- B. Decreasing velocity scale
- C. Increasing the gate size
- D. Increasing sweep speed

Answer: A

Explanation:
Noise in the Doppler waveform can often be attributed to excessive gain settings. Decreasing the Doppler gain reduces the amplification of both the signal and the noise, thus providing a clearer and more accurate Doppler waveform. Excessive gain can cause speckling and clutter, which obscure the true Doppler signals.
By reducing the gain, the noise level is minimized, resulting in a cleaner Doppler signal representation.
References:
ARDMS Sonography Principles & Instrumentation Guidelines
Hagen-Ansert SL. Textbook of Diagnostic Ultrasonography. 8th ed. St. Louis, MO: Mosby; 2017.

NEW QUESTION # 81
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