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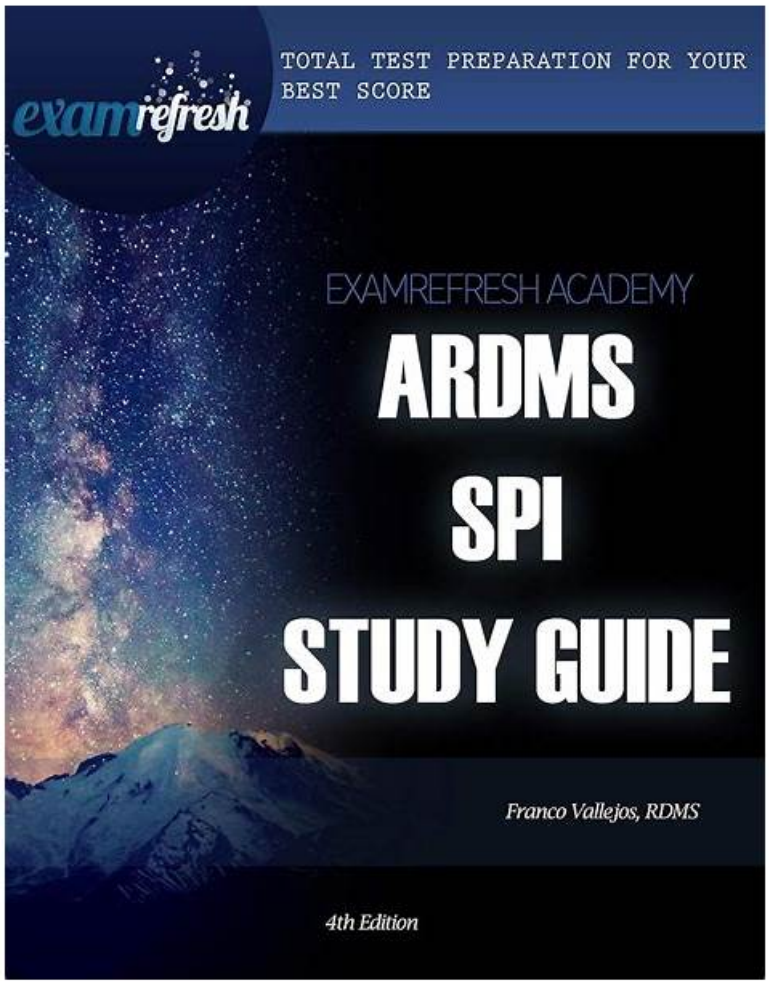

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ARDMS SPI Exam Syllabus Topics:

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	• 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	• 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 5	• 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.

ARDMS Sonography Principles and Instrumentation Sample Questions (Q184-Q189):

NEW QUESTION # 184
Which change should be made to lower the mechanical index (MI)?

- A. Increasing gain
- B. Decreasing output power
- C. Activating tissue harmonics
- D. Lowering transducer frequency

Answer: B

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
Mechanical Index (MI) is proportional to the peak negative pressure and inversely proportional to the square root of frequency. Lowering output power directly decreases the peak pressure, thus reducing MI.
Principles and Instrumentation state:
"Mechanical index decreases with lower output power, reducing the risk of mechanical bioeffects such as cavitation." Lowering frequency (A) increases MI.

Tissue harmonics (B) improves image quality but does not reduce MI directly.
Increasing gain (D) affects displayed brightness, not acoustic power.
Therefore, the correct answer is C: Decreasing output power.
-

NEW QUESTION # 185
Which method of sanitizing the transducer would damage piezoelectric crystals?

- A. Glutaraldehyde
- B. Bleach
- C. Autoclave
- D. Alcohol

Answer: C

Explanation:
Autoclaving involves high-pressure steam at high temperatures, which can damage the delicate piezoelectric crystals within the ultrasound transducer. These crystals are responsible for converting electrical energy into sound waves and vice versa. Exposure to the extreme conditions of an autoclave can cause thermal and mechanical damage to the crystals, rendering the transducer ineffective.
Reference:
ARDMS Sonography Principles and Instrumentation guidelines
Zagzebski, J. A. (1996). Essentials of Ultrasound Physics.

NEW QUESTION # 186
Which color control was adjusted in color bar A to produce color bar B?

- A. Map
- B. Invert
- C. Scale
- D. Baseline

Answer: C

Explanation:
The color bar on a Doppler ultrasound display indicates the range of velocities that the system can detect and display. In color bar A, the scale is set to a higher maximum velocity (64 cm/s), while in color bar B, the scale is set to a lower maximum velocity (16 cm/s). Adjusting the scale (or velocity range) changes the upper and lower limits of the velocities displayed, which affects the sensitivity of the Doppler system to detect flow velocities. Lowering the scale allows for better visualization of lower velocities, but it may also increase the likelihood of aliasing for higher velocities.
American Registry for Diagnostic Medical Sonography (ARDMS). Sonography Principles and Instrumentation (SPI) Examination Review Guide.

NEW QUESTION # 187
In addition to velocity, which factor affects acoustic impedance?

- A. Penetration depth
- B. Attenuation coefficient
- C. Transducer frequency
- D. Tissue density

Answer: D

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
Acoustic impedance (Z) is determined by the product of tissue density (#) and propagation speed (c), expressed as:
$Z = \# \times c$
According to Principles and Instrumentation:
"Acoustic impedance is a property of the tissue, determined by its density and the speed of sound through it."
* Penetration depth (A) does not affect impedance directly.
* Attenuation coefficient (B) affects signal loss, not impedance.
* Transducer frequency (D) is independent of tissue impedance.
Therefore, the correct answer is C: Tissue density.
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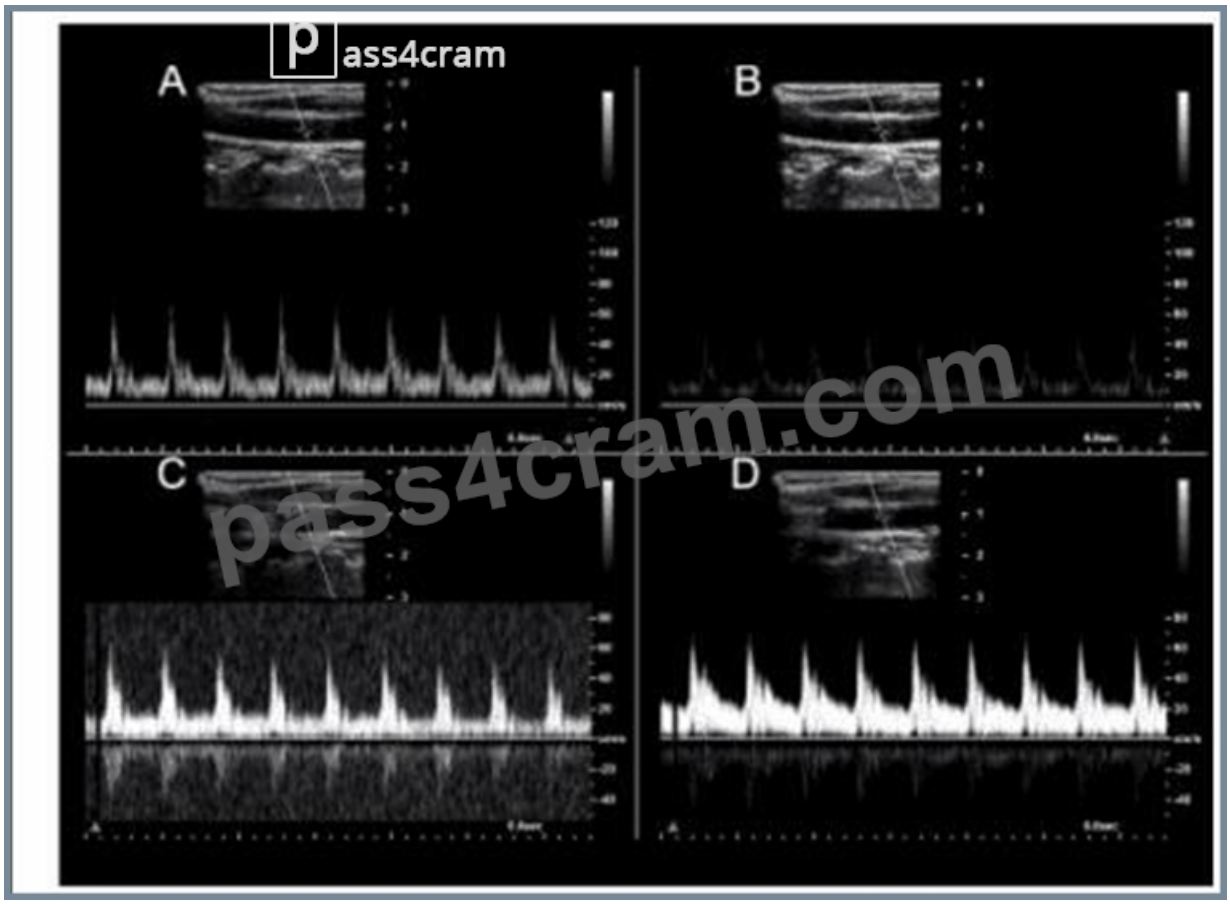
NEW QUESTION # 188
Which image demonstrates appropriate spectral Doppler gain?



- A. Option A
- B. Option D
- C. Option C
- D. Option B

Answer: D

Explanation:
Option B demonstrates appropriate spectral Doppler gain. Appropriate gain settings ensure that the Doppler signal is adequately amplified without introducing excessive noise or artifacts. In Option B, the spectral waveform is clearly visible with distinct borders, and the background noise is minimal. In contrast, other options might show either under-gained (too little signal) or over-gained (excessive noise and signal) images, making it difficult to accurately interpret the spectral Doppler information.References:
* ARDMS Sonography Principles and Instrumentation guidelines
* "Understanding Ultrasound Physics" by Sidney K. Edelman

NEW QUESTION # 189
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