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ARDMS SPI EXAM STUDY GUIDE 2026 – COMPLETE CONCEPT REVIEW & PRACTICE MATERIALS (LATEST EDITION)

1. Q: What is the acoustic variable that represents the density of a medium's particles?
A: Pressure ✓✓
2. Q: What type of wave is sound?
A: Mechanical, longitudinal wave ✓✓
3. Q: What is the relationship between frequency and period?
A: Period = 1/Frequency ✓✓
4. Q: What is the typical speed of sound in soft tissue?
A: 1540 m/s ✓✓
5. Q: What determines the speed of sound in a medium?
A: Density and stiffness (bulk modulus) ✓✓
6. Q: Define wavelength.
A: Distance a wave travels in one cycle ✓✓
7. Q: What is the formula for wavelength?
A: Wavelength = Speed/Frequency ✓✓
8. Q: What is attenuation?
A: Decrease in intensity as sound travels through tissue ✓✓
9. Q: What are the three components of attenuation?
A: Absorption, scattering, reflection ✓✓
10. Q: What is the attenuation coefficient for soft tissue at 1 MHz?
A: Approximately 0.5 dB/cm/MHz ✓✓
11. Q: What is the half-value layer thickness?
A: Distance sound travels to reduce intensity by half ✓✓
12. Q: What law describes reflection at an interface?
A: Snell's Law ✓✓

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ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	<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.

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

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ARDMS Sonography Principles and Instrumentation Sample Questions (Q169-Q174):

NEW QUESTION # 169

Which pulsed-wave Doppler adjustment would be appropriate to correct the aliasing seen in this image?

- A. Increase the Doppler pulse repetition frequency.
- B. Decrease the Doppler pulse repetition frequency.
- C. Decrease the spectral Doppler gain.
- D. Increase the spectral Doppler gain.

Answer: A

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Aliasing occurs in pulsed-wave Doppler imaging when the Doppler shift frequency exceeds the Nyquist limit (which is half the pulse repetition frequency, PRF). This results in a wrap-around of the Doppler signal, which appears as a reversal of flow direction (aliasing artifact).

According to standard Principles and Instrumentation references in sonography:

"To eliminate aliasing, the Doppler PRF (scale) should be increased. Increasing the PRF raises the Nyquist limit and therefore allows for higher measurable velocities without aliasing." The correct adjustment to correct this aliasing artifact is C: Increase the Doppler pulse repetition frequency.

This effectively increases the Nyquist limit and resolves the wrap-around aliasing appearance.

Options A and B (adjusting the spectral Doppler gain) would only change the appearance of the Doppler waveform (i.e., its amplitude and brightness) but would not affect aliasing. Option D (decreasing the PRF) would actually worsen the aliasing by lowering the Nyquist limit.

Therefore, the correct choice is to increase the Doppler PRF.

NEW QUESTION # 170

Why is a higher frequency transducer a better choice for imaging superficial structures?

- A. Decreased attenuation
- **B. Improved axial resolution**
- C. Increased pulse repetition period
- D. Longer spatial pulse length

Answer: B

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Higher frequency transducers provide better axial resolution due to their shorter wavelengths and spatial pulse lengths. This allows finer detail when imaging superficial structures where penetration is not a concern.

According to sonography instrumentation reference:

"Higher frequencies result in shorter pulse lengths, improving axial resolution and making them ideal for superficial imaging."

Therefore, the correct answer is B: Improved axial resolution.

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NEW QUESTION # 171

Which transducer was most likely used to create this image?

□

- **A. Curvilinear**
- B. Endocavity
- C. Phased array
- D. Linear array

Answer: A

Explanation:

The image shown is typical of an abdominal ultrasound, which commonly utilizes a curvilinear transducer. Curvilinear transducers have a wider field of view at depth, making them ideal for imaging large structures within the abdomen. These transducers emit a curved beam, allowing for better penetration and a broader field of view, which is necessary for comprehensive abdominal examinations. The curvature of the image, the wide field of view, and the depth of penetration all suggest the use of a curvilinear transducer.

Reference:

American Registry for Diagnostic Medical Sonography (ARDMS). Sonography Principles and Instrumentation (SPI) Examination Review Guide.

NEW QUESTION # 172

What is an advantage of using pulsed wave Doppler as compared to using continuous wave Doppler?

- A. Higher echo sensitivity
- **B. Ability to select sample depth**
- C. Decreased display of aliasing
- D. Improved temporal resolution

Answer: B

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

The key advantage of pulsed wave Doppler is range resolution, meaning the operator can select a specific depth (sample volume) for

measuring velocities. Continuous wave Doppler does not provide this capability, as it samples velocities along the entire beam path. According to sonography instrumentation reference:
"Pulsed wave Doppler allows selection of sample volume depth, providing range resolution which continuous wave Doppler lacks."
Therefore, the correct answer is B: Ability to select sample depth.

NEW QUESTION # 173

What is the function of M-mode?

- A. Create 3D images
- B. Visualize internal organs
- C. Measure movement
- D. Monitor blood flow

Answer: C

Explanation:

M-mode (Motion mode) is used in ultrasound to measure and display the movement of structures over time.

This mode is particularly useful in cardiac imaging to assess the motion of heart walls and valves.

M-mode provides a one-dimensional view of the motion of tissues and is often used in conjunction with 2D imaging for a comprehensive assessment.

It is essential in evaluating the dynamic function of organs, especially in cardiology, where precise measurements of cardiac structures' movement are crucial. Reference:

ARDMS Sonography Principles and Instrumentation guidelines on modes of ultrasound imaging and their clinical applications.

NEW QUESTION # 174

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