

SPI Exam Questions & Answers: Sonography Principles and Instrumentation & SPI Exam Braindumps

SPI Practice Test questions with correct answers

Which of the following do the source and the medium determine?

- a. duty factor
- b. frequency
- c. propagation speed
- d. axial resolution - Answer ✓ d.

Axial resolution is affected by all of the following EXCEPT

- a. frequency
- b. damping
- c. spatial pulse length
- d. focusing - Answer ✓ d.

Damping in a transducer

- a. reduces the number of cycles in a pulse and increases the quality factor
- b. increases the number of cycles in a pulse and increases penetration
- c. causes poor axial and lateral resolution
- d. reduces the duty factor and increases the range of transmitted frequencies - Answer ✓ d.

Far zone beam divergence can be reduced on a single-element transducer by using

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ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	<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 2	<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 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">• 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 5	<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.

ARDMS Sonography Principles and Instrumentation Sample Questions (Q146-Q151):

NEW QUESTION # 146

Which target group in this image of a tissue-mimicking phantom is used for gray-scale evaluation?

□

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

Answer: B

Explanation:

Gray-scale evaluation in a tissue-mimicking phantom involves assessing the uniformity and accuracy of the gray-scale representation of the tissues.

Option C typically contains structures designed to test the machine's ability to accurately depict varying levels of echogenicity, which is essential for proper gray-scale evaluation.

This area will have a range of echo intensities that help in determining the contrast resolution and the ability of the system to distinguish between different tissue types based on their gray-scale values. Reference:

NEW QUESTION # 147

Which action is the first step for the removal of visible contaminants from the transducer?

- A. Sterilize
- B. Pasteurize
- C. Disinfect
- **D. Clean**

Answer: D

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

The proper care and reprocessing of ultrasound transducers follow a strict hierarchy of steps. The first step is always physical cleaning, which involves removing visible debris, gel, and contaminants from the transducer surface. This must be done prior to any disinfection or sterilization process because organic material can inhibit the effectiveness of these subsequent steps.

According to sonography Principles and Instrumentation documentation:

"Cleaning is the first and essential step in reprocessing ultrasound probes. It removes gel, blood, and other organic material.

Disinfection or sterilization should never be performed before cleaning, as residual debris reduces their effectiveness." Therefore, the correct answer is C: Clean.

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NEW QUESTION # 148

What is measured with a test object containing closely spaced, highly reflective targets along the direction of beam?

- A. Specificity
- **B. Axial resolution**
- C. Lateral resolution
- D. Sensitivity

Answer: B

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Axial resolution is the system's ability to distinguish two structures located along the direction of the ultrasound beam (parallel to the beam axis). Test objects or phantoms contain closely spaced pins or reflectors along this axis to evaluate axial resolution.

Principles and Instrumentation state:

"Axial resolution is determined by the spatial pulse length and is tested using targets positioned along the beam axis."

* Sensitivity (A) relates to detection of weak echoes.

* Specificity (B) refers to diagnostic accuracy, not phantom testing.

* Lateral resolution (C) is evaluated using side-by-side (perpendicular) targets.

Therefore, the correct answer is D: Axial resolution.

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NEW QUESTION # 149

Which settings will lead to the highest temporal resolution?

- A. 45-degree sector width, 4 cm scan depth, color Doppler on
- **B. 45-degree sector width, 4 cm scan depth, color Doppler off**
- C. 60-degree sector width, 5 cm scan depth, color Doppler on
- D. 60-degree sector width, 5 cm scan depth, color Doppler off

Answer: B

Explanation:

The settings that lead to the highest temporal resolution are those that reduce the amount of information that the ultrasound system needs to process, allowing for a higher frame rate. A smaller sector width and shallower scan depth reduce the area that needs to be

imaged, enabling faster data acquisition. Turning off color Doppler further reduces processing demands, as the system no longer needs to compute and display color flow information. Therefore, a 45-degree sector width, 4 cm scan depth, and color Doppler off will provide the highest temporal resolution.

References

* ARDMS Sonography Principles and Instrumentation (SPI) Exam Study Guide

* "Diagnostic Ultrasound: Principles and Instruments" by Frederick W. Kremkau

NEW QUESTION # 150

What would increase with an increase in acoustic power?

- A. Wavelength
- B. Impedance
- C. Frequency
- **D. Thermal Index**

Answer: D

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

The thermal index (TI) indicates the potential for tissue heating due to ultrasound energy absorption. Increasing acoustic power increases the amount of energy transmitted into the body, which raises the thermal index.

According to sonography instrumentation reference:

"An increase in acoustic output power results in a corresponding increase in the thermal index, reflecting higher potential for tissue heating." Therefore, the correct answer is C: Thermal Index.

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NEW QUESTION # 151

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