

# Practice SPI Engine | Valid SPI Test Simulator

## 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"><li>• 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</li><li>• 4D and contrast imaging concepts, identify and correct artifacts, and follow confidentiality and privacy standards throughout the scanning process.</li></ul>

Topic 2	<ul style="list-style-type: none"> <li>• <b>Provide Clinical Safety and Quality Assurance:</b> 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.</li> </ul>
Topic 3	<ul style="list-style-type: none"> <li>• <b>Manage Ultrasound Transducers:</b> 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.</li> </ul>
Topic 4	<ul style="list-style-type: none"> <li>• <b>Apply Doppler Concepts:</b> 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.</li> </ul>
Topic 5	<ul style="list-style-type: none"> <li>• <b>Optimize Sonographic Images:</b> 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.</li> </ul>

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## ARDMS Sonography Principles and Instrumentation Sample Questions (Q35-Q40):

### NEW QUESTION # 35

Which factor improves axial resolution?

- **A. Shorter spatial pulse length**
- B. Lower frequency transducer
- C. Narrower beamwidth
- D. Decreased compression

**Answer: A**

Explanation:

Axial resolution refers to the ability to distinguish two structures that are close to each other along the direction of the sound beam. It is determined by the spatial pulse length (SPL), which is the product of the number of cycles in a pulse and the wavelength. Shorter SPL means shorter pulse duration, which leads to better axial resolution. This is because shorter pulses allow for better separation of echoes from closely spaced structures.

Reference:

ARDMS Sonography Principles and Instrumentation guidelines

Krenkau, F. W. (2015). Diagnostic Ultrasound: Principles and Instruments.

### NEW QUESTION # 36

What artifact is indicated by the arrows in the image below?

An ultrasound image of a fetus Description automatically generated



- A. Grating lobe
- B. Enhancement
- C. Ring down
- D. Refraction

**Answer: C**

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

The image shows a bright, continuous, vertical band extending from a gas-containing structure (seen at the top). This is characteristic of ring down artifact, which occurs when multiple small gas bubbles resonate and create continuous echoes below the structure.

According to sonography instrumentation reference:

"Ring down artifact results from resonance of gas bubbles, producing a continuous series of echoes distal to the source. It appears as a bright, vertical band that does not fade with depth." Therefore, the correct answer is A: Ring down.

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### NEW QUESTION # 37

What is the primary reason to use compression?

- A. Increase line density
- B. Adjust the contrast resolution
- C. Improve the axial resolution
- D. Reduce the focal region

**Answer: B**

Explanation:

Compression in ultrasound imaging adjusts the range of grayscale displayed, affecting the contrast resolution.

This function allows sonographers to enhance the differentiation between structures of varying echogenicities.

By modifying the contrast resolution, sonographers can better visualize subtle differences in tissue composition and improve the diagnostic quality of the images.

Increasing contrast resolution is particularly important in differentiating between fluid-filled cysts and solid masses. Reference:

### NEW QUESTION # 38

What is the effect of an increased aperture in a linear array transducer?

- A. Deeper focus
- B. Improved axial resolution
- C. Decreased temporal resolution
- D. Shorter near-field length

**Answer: A**

Explanation:

The aperture of a transducer is the active area that emits and receives the ultrasound waves. In a linear array transducer, increasing the aperture (using more elements for transmission and reception) results in a deeper focus because the beam is more tightly focused over a longer distance. This improves lateral resolution at greater depths, as the ultrasound beam maintains a narrower width for a longer distance. It allows for better imaging of deeper structures without sacrificing resolution.

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

### NEW QUESTION # 39

What determines the resonant frequency of a pulsed wave transducer?

- A. Element diameter and element thickness
- B. Element diameter and speed of sound in element
- C. Element thickness and speed of sound in element
- D. Element thickness and pulse repetition frequency

**Answer: C**

Explanation:

The resonant frequency of a pulsed wave transducer is determined by the thickness of the piezoelectric element and the speed of sound within that element. The resonant frequency is inversely proportional to the element thickness and directly proportional to the speed of sound in the material. Thinner elements and higher sound speeds result in higher resonant frequencies, while thicker elements and lower sound speeds result in lower resonant frequencies.

Reference:

ARDMS Sonography Principles and Instrumentation guidelines

Krenkau, F. W. (2015). Diagnostic Ultrasound: Principles and Instruments. Elsevier.

### NEW QUESTION # 40



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