

# Latest SPI Exam Simulator & Free PDF 2026 ARDMS Sonography Principles and Instrumentation Realistic Valid Test Experience

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## SPI Practice Exam Questions and Answers 100% Correct (ARDMS practice tests) | Latest Update 2024-2025

Which term describes blood flow changes in response to respiration?

- A. Phasic
- B. Parabolic
- C. Spontaneous
- D. Pulsatile - ANSWER  Phasic

What is demonstrated in this image produced by a linear array to placed on a uniform tissue-mimicking phantom?

- A. Time gain compensation not set properly.
- B. System has low dynamic range.
- C. Transducer crystals are damaged.
- D. Focus control is malfunctioning. - ANSWER  Transducer crystals are damaged

What is dynamic aperture?

- A. Aperture that varies with transmit frequency
- B. Aperture that decreases as a function of time
- C. Aperture that increases with increasing focal length

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## ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	<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 2	<ul style="list-style-type: none"> <li>• <b>Perform Ultrasound Examinations:</b> 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>• <b>4D and contrast imaging concepts, identify and correct artifacts, and follow confidentiality and privacy standards throughout the scanning process.</b></li> </ul>
Topic 3	<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>
Topic 4	<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 5	<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>

## ARDMS Sonography Principles and Instrumentation Sample Questions (Q97-Q102):

### NEW QUESTION # 97

Which resolution capability is most affected by spatial pulse length?

- A. Temporal
- B. Lateral
- C. Axial
- D. Elevational

**Answer: C**

Explanation:

Axial resolution refers to the ability to distinguish two structures that are close to each other along the path of the ultrasound beam. Spatial pulse length (SPL) is the distance over which one pulse occurs, and it directly affects axial resolution. Shorter SPL improves axial resolution because it allows better differentiation of closely spaced structures.

The axial resolution is improved by increasing the frequency of the transducer, which shortens the wavelength and hence the SPL.  
Reference:

ARDMS Sonography Principles and Instrumentation guidelines on resolution parameters and their impact on image quality.

### NEW QUESTION # 98

Which type of resolution does damping improve?

- A. Temporal
- B. Contrast
- C. Lateral
- **D. Axial**

**Answer: D**

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Damping reduces the number of cycles per pulse, shortening pulse duration and spatial pulse length, which directly improves axial resolution.

Principles and Instrumentation:

"Axial resolution improves with shorter spatial pulse length, achieved by damping, which limits ringing of the transducer." Lateral resolution (A) depends on beam width.

Contrast resolution (B) relates to dynamic range.

Temporal resolution (C) is tied to frame rate.

Therefore, the correct answer is D: Axial.

### NEW QUESTION # 99

Which spectral Doppler finding can occur when using a low pulse repetition frequency setting?

- **A. Aliasing**
- B. Range ambiguity
- C. Dropout
- D. Spectral broadening

**Answer: A**

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Low PRF reduces the Nyquist limit, making the system more susceptible to aliasing when Doppler shift frequencies exceed this limit.

Principles and Instrumentation state:

"Aliasing occurs when Doppler shifts exceed half the PRF (Nyquist limit). Lowering PRF increases aliasing susceptibility."

\* Spectral broadening (A) results from turbulence or poor angle.

\* Range ambiguity (B) occurs at high PRF.

\* Dropout (D) refers to signal loss, not aliasing.

Therefore, the correct answer is C: Aliasing.

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### NEW QUESTION # 100

At what Doppler angle to flow is the maximum Doppler shift frequency acquired?

- A. 30 degrees
- **B. 0 degrees**
- C. 60 degrees
- D. 90 degrees

**Answer: B**

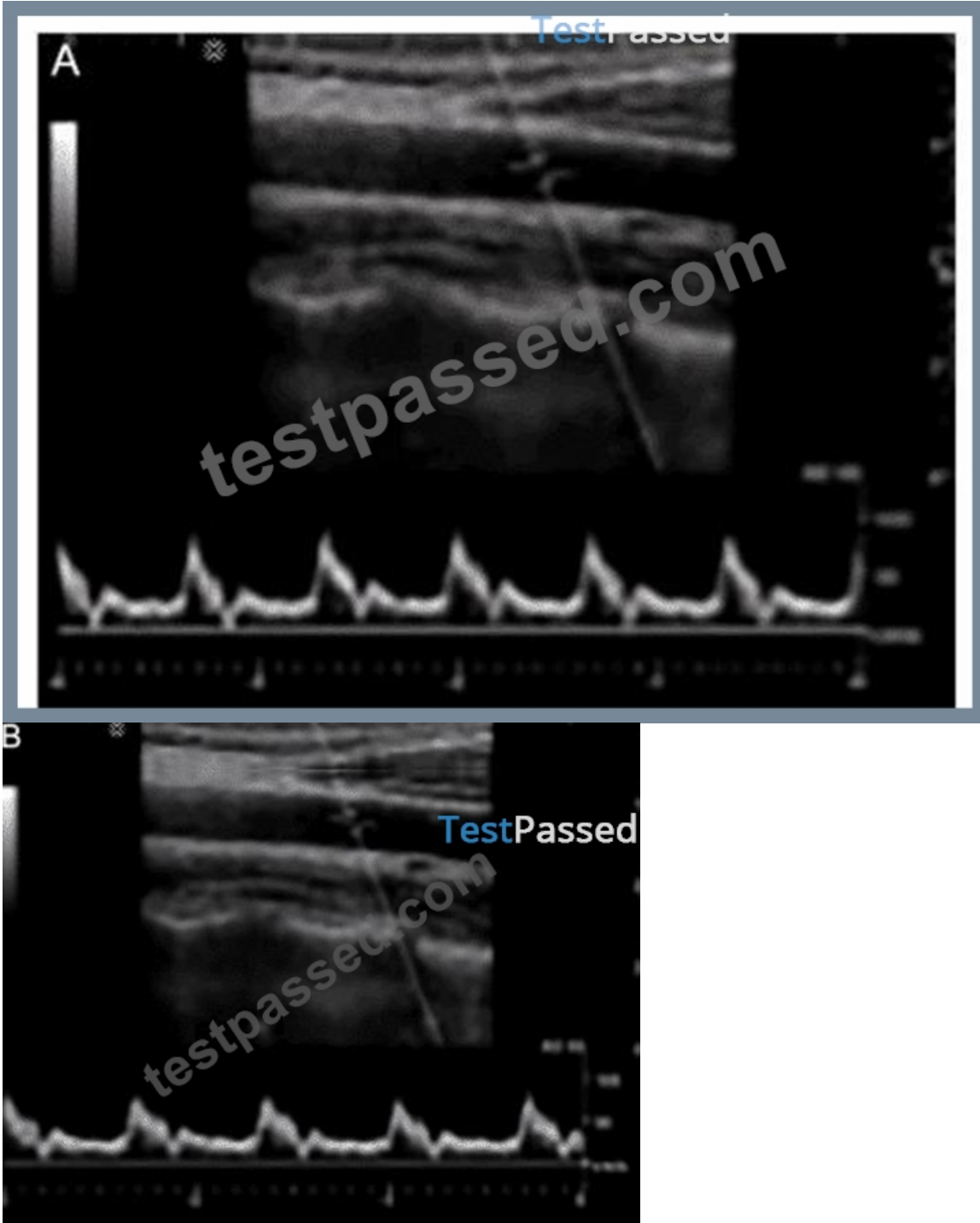
Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

The Doppler equation shows that the frequency shift is proportional to the cosine of the Doppler angle. The maximum value of cosine ( $\cos 0^\circ = 1$ ) occurs at 0 degrees - meaning the beam is parallel to flow. At this angle, the full velocity component is measured. According to sonography instrumentation reference: "The maximum Doppler shift is obtained when the ultrasound beam is parallel (0 degrees) to blood flow." Therefore, the correct answer is D: 0 degrees.

**NEW QUESTION # 101**

Which change was made after acquiring image A to produce image B?



- A. Decreased wall filter
- B. Increased spectral gain
- C. Increased sweep speed
- D. Decreased pulse repetition frequency

**Answer: D**

**Explanation:**

- \* Increased Sweep Speed: This affects the display of the waveform over time but does not impact the appearance of the spectral Doppler signal in the way shown.
- \* Decreased Pulse Repetition Frequency (PRF): Lowering the PRF can lead to aliasing, which is evident as the waveform wrapping around in the spectral display from image A to image B. This makes the velocity appear higher than it actually is.
- \* Decreased Wall Filter: This adjustment primarily affects the elimination of low-frequency Doppler signals but does not typically cause the kind of changes seen in the images.
- \* Increased Spectral Gain: Increasing the gain would result in a brighter spectral display but not the wrapping of the signal as seen.

**References:**

"Understanding Ultrasound Physics" by Sidney K. Edelman  
ARDMS Sonography Principles and Instrumentation study materials

**NEW QUESTION # 102**

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