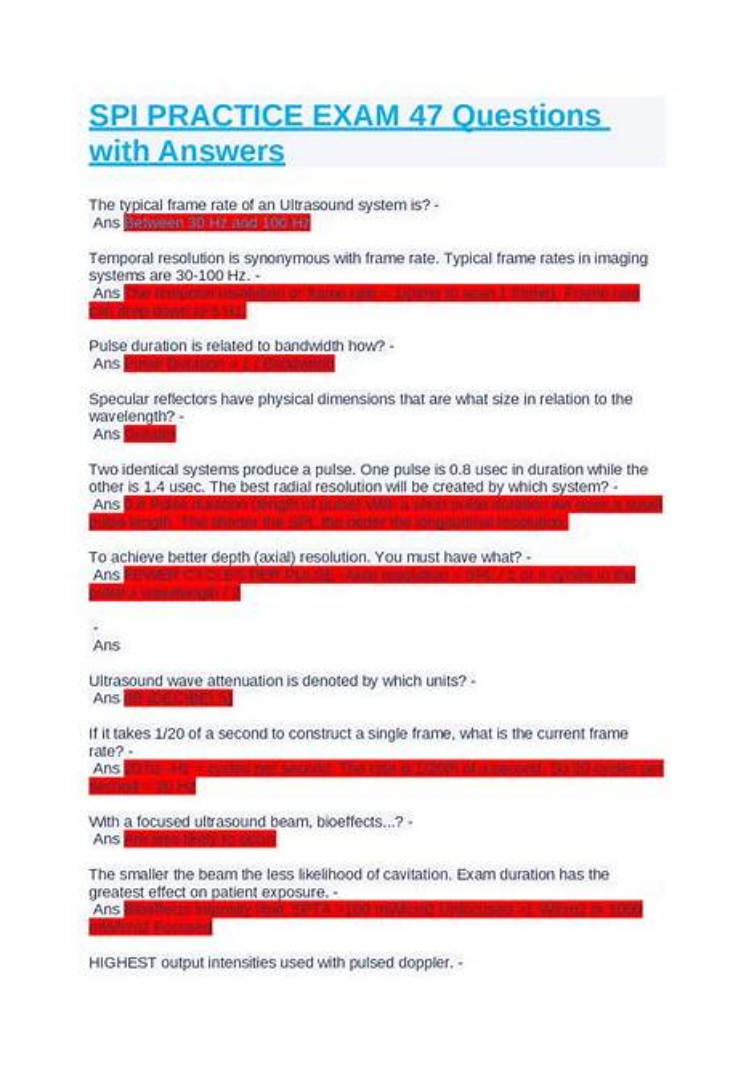
SPI Official Practice Test | SPI Actual Test Answers



SPI PRACTICE EXAM 47 Questions with Answers

The typical frame rate of an Ultrasound system is? -
Ans between 30 Hz and 100 Hz

Temporal resolution is synonymous with frame rate. Typical frame rates in imaging systems are 30-100 Hz. -
Ans

Pulse duration is related to bandwidth how? -
Ans

Specular reflectors have physical dimensions that are what size in relation to the wavelength? -
Ans

Two identical systems produce a pulse. One pulse is 0.8 usec in duration while the other is 1.4 usec. The best radial resolution will be created by which system? -
Ans

To achieve better depth (axial) resolution. You must have what? -
Ans

-
Ans

Ultrasound wave attenuation is denoted by which units? -
Ans

If it takes 1/20 of a second to construct a single frame, what is the current frame rate? -
Ans

With a focused ultrasound beam, bioeffects...? -
Ans

The smaller the beam the less likelihood of cavitation. Exam duration has the greatest effect on patient exposure. -
Ans

HIGHEST output intensities used with pulsed doppler. -

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ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	• 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	• 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 3	• 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 4	• 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 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.

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ARDMS Sonography Principles and Instrumentation Sample Questions (Q129-Q134):

NEW QUESTION # 129
What is the effect on the Doppler spectral waveform when sampling a vessel at a greater depth?

- A. Increased signal strength
- B. Higher Doppler shifts
- C. Higher velocity measurements
- D. Increased aliasing

Answer: D

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
At greater depths, pulse repetition frequency (PRF) is automatically reduced due to longer pulse travel times, lowering the Nyquist limit and increasing the likelihood of aliasing.
Principles and Instrumentation state:
"As sample depth increases, PRF decreases, lowering the Nyquist limit and increasing the risk of aliasing in pulsed-wave Doppler."
* Doppler shift depends on flow velocity and angle, not depth.

* Actual velocity measurements do not increase with depth.
* Signal strength typically decreases (not increases) due to attenuation.
Therefore, the correct answer is A: Increased aliasing.

NEW QUESTION # 130
What is true regarding the display for color Doppler?

- A. A positive shift is always above the baseline
- B. A negative shift is always venous flow
- C. A positive shift is always red
- D. A negative shift always requires using a lower wall filter

Answer: A

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
In color Doppler, frequency shifts can be displayed either above or below the baseline in spectral Doppler. In spectral Doppler, a positive shift is displayed above the baseline by default (unless inverted). In color Doppler, red/blue assignments depend on color map orientation.
Principles and Instrumentation state:
"A positive Doppler shift (flow toward the transducer) is displayed above the baseline in spectral Doppler."
* Red color (B) does not always correspond to positive shift; it depends on color map.
* Negative shift (C) does not always indicate venous flow.
* Wall filter settings (D) affect low-velocity signals, not shift direction.
Therefore, the correct answer is A: A positive shift is always above the baseline.
-

NEW QUESTION # 131
The calipers in this image measure which performance characteristic of a system?

- A. Depth measurement accuracy
- B. Axial resolution
- C. Lateral resolution
- D. Dynamic range

Answer: A

Explanation:
The calipers shown in the image are used to measure the depth of structures within the ultrasound image. This performance characteristic, known as depth measurement accuracy, assesses how accurately the ultrasound system can measure the distance from the transducer to a specific point within the body. Accurate depth measurements are crucial for diagnostic purposes, ensuring that anatomical and pathological structures are correctly identified and evaluated.
Reference:
American Registry for Diagnostic Medical Sonography (ARDMS) Sonography Principles and Instrumentation study materials.
Textbook of Diagnostic Sonography by Hagen-Ansert, S. L. (latest edition).

NEW QUESTION # 132
What is the effect of an increased aperture in a linear array transducer?

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

Answer: D

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 # 133
Which will affect the gray-scale of a 2-D image?

- A. Doppler gain
- B. Depth of field
- C. Dynamic range
- D. Pulse repetition frequency (PRF)

Answer: C

Explanation:
Dynamic range in ultrasound imaging affects the number of gray shades displayed in a 2-D image. Adjusting the dynamic range changes how echo signals are mapped to grayscale. A higher dynamic range means more shades of gray are displayed, providing a more detailed and softer image, which is useful for differentiating subtle tissue textures. Conversely, a lower dynamic range increases contrast by displaying fewer shades of gray, making the image appear more black and white. This adjustment is crucial for optimizing image quality based on the specific diagnostic needs.
Reference:
American Registry for Diagnostic Medical Sonography (ARDMS). Sonography Principles and Instrumentation (SPI) Examination Review Guide.

NEW QUESTION # 134
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