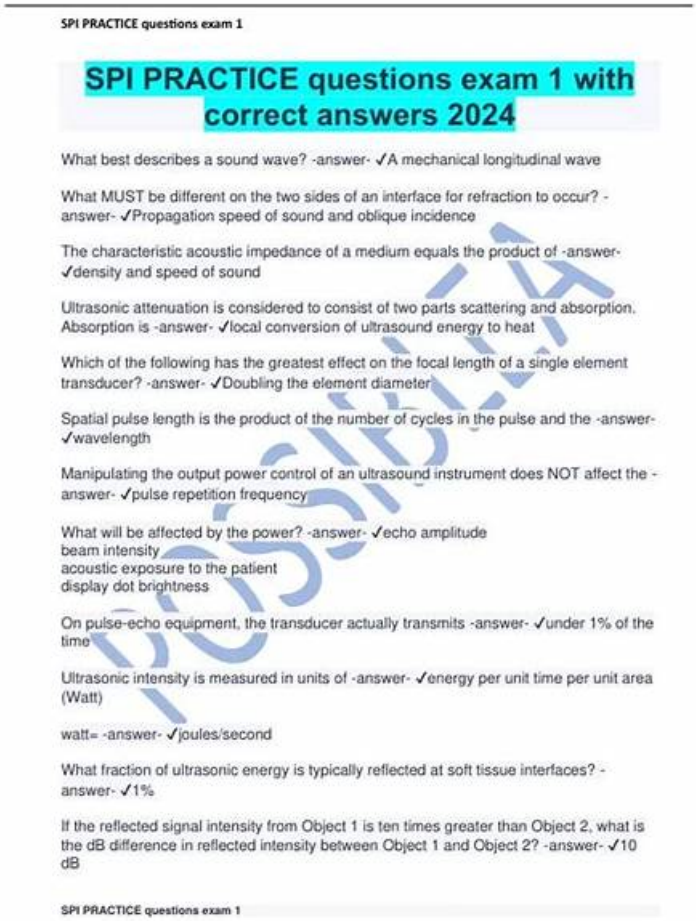
SPI Exam Topic | SPI Test Tutorials



SPI PRACTICE questions exam 1

SPI PRACTICE questions exam 1 with correct answers 2024

What best describes a sound wave? -answer- ✓A mechanical longitudinal wave

What MUST be different on the two sides of an interface for refraction to occur? -answer- ✓Propagation speed of sound and oblique incidence

The characteristic acoustic impedance of a medium equals the product of -answer- ✓density and speed of sound

Ultrasonic attenuation is considered to consist of two parts scattering and absorption. Absorption is -answer- ✓local conversion of ultrasound energy to heat

Which of the following has the greatest effect on the focal length of a single element transducer? -answer- ✓Doubling the element diameter

Spatial pulse length is the product of the number of cycles in the pulse and the -answer- ✓wavelength

Manipulating the output power control of an ultrasound instrument does NOT affect the -answer- ✓pulse repetition frequency

What will be affected by the power? -answer- ✓echo amplitude
beam intensity
acoustic exposure to the patient
display dot brightness

On pulse-echo equipment, the transducer actually transmits -answer- ✓under 1% of the time

Ultrasonic intensity is measured in units of -answer- ✓energy per unit time per unit area (Watt)

watt= -answer- ✓joules/second

What fraction of ultrasonic energy is typically reflected at soft tissue interfaces? -answer- ✓1%

If the reflected signal intensity from Object 1 is ten times greater than Object 2, what is the dB difference in reflected intensity between Object 1 and Object 2? -answer- ✓10 dB

SPI PRACTICE questions exam 1

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ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	• 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 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	• 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 4	• 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	• 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 (Q94-Q99):

NEW QUESTION # 94
What is effected by increasing the color scale?

- A. The Nyquist limit is increased
- B. More colors are displayed
- C. The color priority decreases
- D. The color box width decreases

Answer: A

Explanation:
The Nyquist limit, which is the maximum detectable velocity before aliasing occurs, is directly related to the pulse repetition frequency (PRF). Increasing the color scale on the ultrasound machine effectively increases the PRF. When the PRF is increased, the Nyquist limit is also increased, allowing for the measurement of higher velocities without aliasing.
Reference:
ARDMS Sonography Principles and Instrumentation guidelines
Kremkau, F. W. (2015). Diagnostic Ultrasound: Principles and Instruments. Elsevier.

NEW QUESTION # 95
Which statement characterizes the primary difference between image A and image B?

- A. Image A demonstrates a lower overall gain setting.
- B. Image A demonstrates a shallower field of view.
- C. Image A demonstrates a better axial resolution.
- D. Image A demonstrates a wider scale of contrast.

Answer: A

Explanation:
The primary difference between Image A and Image B is the overall gain setting. Gain controls the amplification of the received echoes. A lower gain setting results in a darker image with less overall brightness, which is evident in Image A compared to Image B. Image B appears brighter, indicating a higher gain setting that amplifies the echoes more, making the structures appear more prominently.
ARDMS Sonography Principles and Instrumentation guidelines
Hedrick, W. R., Hykes, D. L., & Starchman, D. E. (2005).Ultrasound Physics and Instrumentation.

NEW QUESTION # 96
What adjustment is needed to optimize the color in the image below?

- A. Decrease gain
- B. Increase pulse repetition frequency
- C. Decrease persistence
- D. Increase wall filter

Answer: B

Explanation:
* Increasing the pulse repetition frequency (PRF) helps to optimize the color Doppler imaging by reducing aliasing.
* Aliasing occurs when the PRF is too low to accurately sample the rapid blood flow velocities, leading to incorrect color representation.
* By increasing the PRF, the system can more accurately measure higher velocities without distortion, improving the overall quality of the color Doppler image.References:
* ARDMS Sonography Principles and Instrumentation guidelines on Doppler imaging and techniques to reduce aliasing.

NEW QUESTION # 97
What is the relationship between overall gain and image brightness?

- A. The lower the overall gain, the brighter the image
- B. The higher the overall gain, the brighter the image
- C. The higher the overall gain, the darker the image
- D. There is no relationship between overall gain and image brightness

Answer: B

Explanation:
Overall gain in ultrasound refers to the amplification of all the received echo signals. Increasing the overall gain amplifies the signals, making the entire image brighter. Conversely, decreasing the overall gain reduces the signal amplification, resulting in a darker image. Overall gain adjustment affects the entire image uniformly, unlike time gain compensation (TGC), which adjusts the gain at different depths independently.
Reference:
ARDMS Sonography Principles and Instrumentation (SPI) Exam Study Guide
"Diagnostic Ultrasound: Principles and Instruments" by Frederick W. Kremkau

NEW QUESTION # 98
Which adjustment is needed to optimize the waveform below?

- A. Decrease gain
- B. Lower baseline

- C. Increase wall filter
- D. Increase pulse repetition frequency

Answer: B

Explanation:
The waveform in the image shows spectral Doppler signals that are pushed against the upper limit of the display, indicating that the baseline is too high. Lowering the baseline allows for a better visual representation of the entire Doppler signal within the available display range. This adjustment prevents the waveform from being cut off and helps in accurately interpreting the blood flow characteristics.
Reference:
ARDMS Sonography Principles & Instrumentation Guidelines
Kremkau FW. Sonography Principles and Instruments. 9th ed. Philadelphia, PA: Elsevier; 2016.

NEW QUESTION # 99
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