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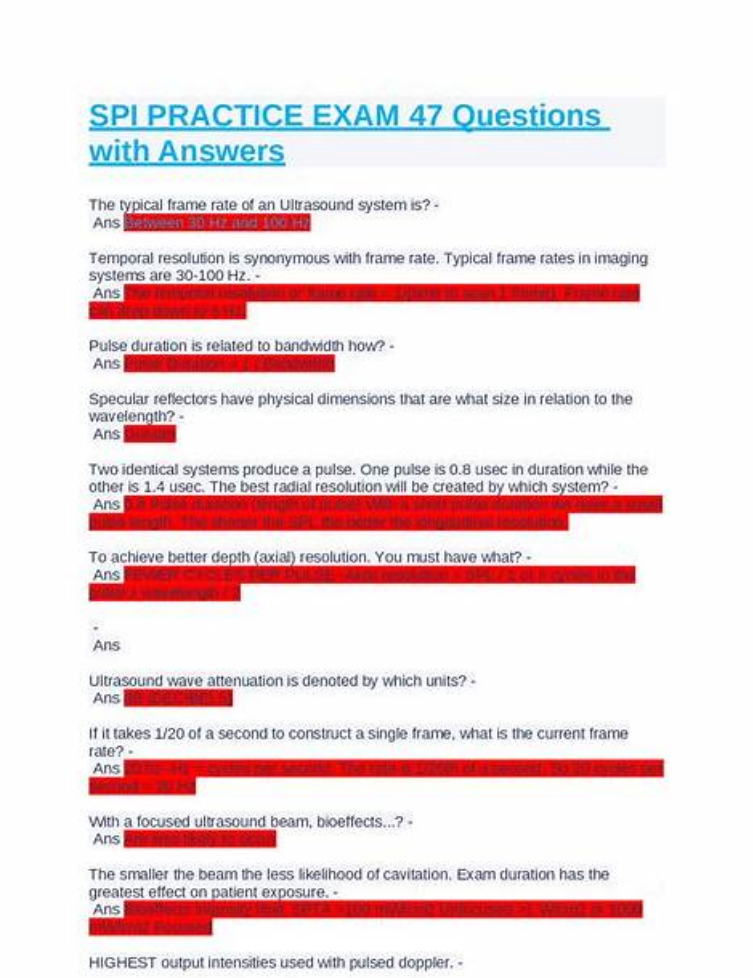
SPI PRACTICE EXAM 47 Questions with Answers

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	• 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 2	• 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	• 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	• 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	• 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.

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n modern society, whether to obtain SPI certification has become a standard to test the level of personal knowledge. Many well-known companies require the SPI certification at the time of recruitment. Whether you're a student or a white-collar worker, you're probably trying to get the certification in order to get more job opportunities or wages. If you are one of them, our SPI Exam Guide will effectively give you a leg up.

ARDMS Sonography Principles and Instrumentation Sample Questions (Q152-Q157):

NEW QUESTION # 152
What is the primary determining factor of the fundamental frequency for pulsed wave transducers?

- A. Element thickness
- B. Crystal diameter
- C. Transducer type
- D. Propagation speed

Answer: A

Explanation:
The fundamental frequency of a pulsed wave transducer is primarily determined by the thickness of the piezoelectric element. The frequency is inversely proportional to the thickness of the element - thinner elements produce higher frequencies, while thicker elements produce lower frequencies. This relationship is derived from the formula#=#2#f=2dv, where#fis the frequency,#vis the propagation speed of sound in the piezoelectric material, and#dis the thickness of the element.
References:ARDMS Sonography Principles and Instrumentation, Chapter on Transducer Technology.

NEW QUESTION # 153

If the speed of sound in a medium is less than the average speed of sound in soft tissue, where will the echo be placed on an image?

- A. Too shallow
- B. Too deep
- C. Laterally
- D. Not visualized

Answer: B

Explanation:
The placement of an echo on an ultrasound image is dependent on the assumption that the speed of sound in soft tissue is 1540 m/s. If the speed of sound in the medium is less than this assumed speed, the ultrasound system will interpret the returning echo as taking longer to return than it actually does. This causes the system to place the echo deeper in the image than its actual position. Therefore, the echo will be displayed "too deep" in the image.
References:
ARDMS Sonography Principles & Instrumentation Guidelines
Kremkau FW. Sonography Principles and Instruments. 9th ed. Philadelphia, PA: Elsevier; 2016.

NEW QUESTION # 154
Which resolution capability is most affected by spatial pulse length?

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

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 # 155
Penetration can be improved by decreasing which setting?

- A. Frequency
- B. Output power
- C. Gain
- D. Sector width

Answer: A

Explanation:
In ultrasound imaging, penetration refers to the ability of the ultrasound beam to travel deeper into the tissue.
Lower frequency transducers produce sound waves with longer wavelengths, which are less attenuated by the tissues and therefore can penetrate deeper into the body. Conversely, higher frequency transducers produce sound waves with shorter wavelengths that provide better resolution but are more quickly attenuated, resulting in less penetration. Therefore, decreasing the frequency of the transducer improves penetration, allowing for better visualization of deeper structures.
American Registry for Diagnostic Medical Sonography (ARDMS). Sonography Principles and Instrumentation (SPI) Examination Review Guide.

NEW QUESTION # 156
Which technique averages image frames over time to reduce noise?

- A. Persistence
- B. Demodulation
- C. Compression
- D. Time gain compensation

Answer: A

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
Persistence is a post-processing technique that averages multiple consecutive image frames to reduce random noise and improve image smoothness. This is especially useful for reducing speckle and enhancing the clarity of stationary or slow-moving structures.
According to official sonography Principles and Instrumentation documentation:
"Persistence uses frame averaging, combining data from several sequential frames to reduce noise, enhance image quality, and stabilize the appearance of stationary structures."
* Demodulation (A) is part of signal processing that extracts the Doppler frequency shift.
* Compression (C) alters the dynamic range of the image but does not reduce noise through frame averaging.
* Time gain compensation (D) adjusts amplification at various depths to equalize brightness but does not perform frame averaging.
Therefore, the correct answer is B: Persistence.

NEW QUESTION # 157

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