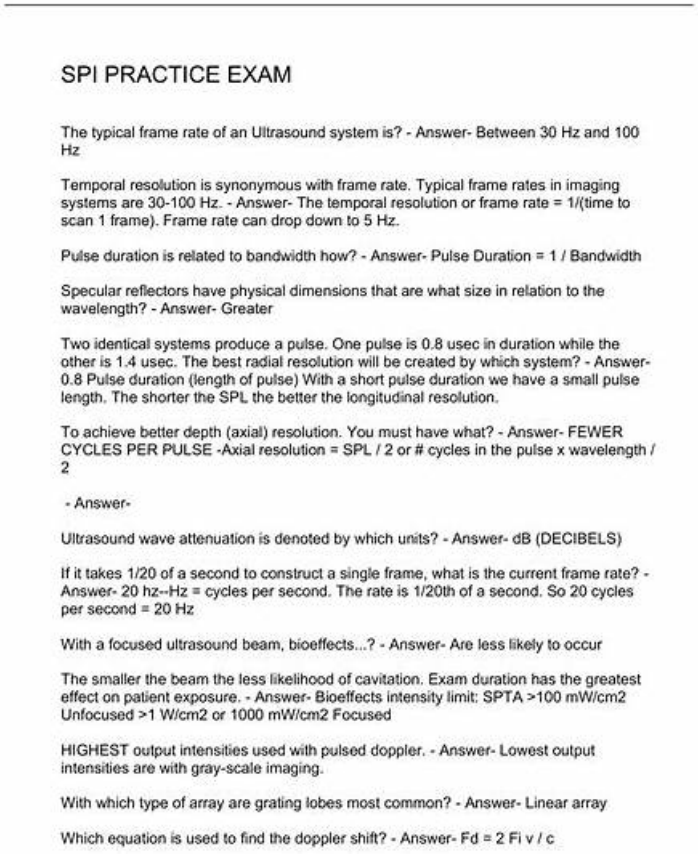
Exam SPI Blueprint & Valid SPI Test Answers



SPI PRACTICE EXAM

The typical frame rate of an Ultrasound system is? - Answer- Between 30 Hz and 100 Hz

Temporal resolution is synonymous with frame rate. Typical frame rates in imaging systems are 30-100 Hz. - Answer- The temporal resolution or frame rate = 1/(time to scan 1 frame). Frame rate can drop down to 5 Hz.

Pulse duration is related to bandwidth how? - Answer- Pulse Duration = 1 / Bandwidth

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

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? - Answer- 0.8 Pulse duration (length of pulse) With a short pulse duration we have a small pulse length. The shorter the SPL the better the longitudinal resolution.

To achieve better depth (axial) resolution. You must have what? - Answer- FEWER CYCLES PER PULSE -Axial resolution = SPL / 2 or # cycles in the pulse x wavelength / 2

- Answer-

Ultrasound wave attenuation is denoted by which units? - Answer- dB (DECIBELS)

If it takes 1/20 of a second to construct a single frame, what is the current frame rate? - Answer- 20 hz--Hz = cycles per second. The rate is 1/20th of a second. So 20 cycles per second = 20 Hz

With a focused ultrasound beam, bioeffects...? - Answer- Are less likely to occur

The smaller the beam the less likelihood of cavitation. Exam duration has the greatest effect on patient exposure. - Answer- Bioeffects intensity limit: SPTA >100 mW/cm2 Unfocused >1 W/cm2 or 1000 mW/cm2 Focused

HIGHEST output intensities used with pulsed doppler. - Answer- Lowest output intensities are with gray-scale imaging.

With which type of array are grating lobes most common? - Answer- Linear array

Which equation is used to find the doppler shift? - Answer- Fd = 2 Fi v / c

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The field of ARDMS is growing rapidly and you need the ARDMS SPI certification to advance your career in it. But clearing the SPI test is not an easy task. Applicants often don't have enough time to study for the SPI Exam. They are in desperate need of real ARDMS SPI exam questions which can help them prepare for the SPI test successfully in a short time.

ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	• 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 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	• 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 4	• 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 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.

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ARDMS Sonography Principles and Instrumentation Sample Questions (Q68-Q73):

NEW QUESTION # 68
During a color Doppler scan, which angle to flow would most likely result in no color being visualized?

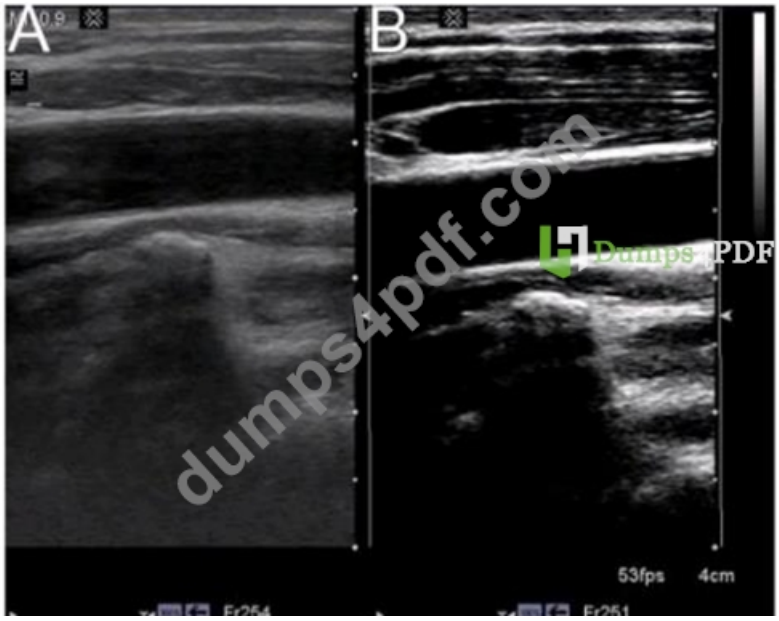
- A. 3 degrees
- B. 45 degreesC 88 degrees
- C. 175 degrees

Answer: C

Explanation:
* Color Doppler imaging is most effective when the angle between the ultrasound beam and the flow of blood is small.
* At an angle of 88 degrees, the flow of blood is nearly perpendicular to the ultrasound beam.
* When the angle is close to 90 degrees, the Doppler shift (frequency change) approaches zero, resulting in little to no color being visualized on the Doppler image.
* Thus, to obtain a color signal, the angle should be optimized to be as close to 0 degrees as possible, with 60 degrees being the practical limit for accurate Doppler measurements.References:
* ARDMS Sonography Principles and Instrumentation guidelines on Doppler angle and its effect on Doppler imaging.

NEW QUESTION # 69

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 better axial resolution.
- C. Image A demonstrates a wider scale of contrast.
- D. Image A demonstrates a shallower field of view.

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.
Reference:
ARDMS Sonography Principles and Instrumentation guidelines
Hedrick, W. R., Hykes, D. L., & Starchman, D. E. (2005). Ultrasound Physics and Instrumentation.

NEW QUESTION # 70
What is required when interrogating higher blood velocities at angles closer to zero degrees?

- A. Decreased Doppler wall filter settings
- B. Decreased Doppler scale settings
- C. Increased Doppler scale settings
- D. Increased Doppler wall filter settings

Answer: C

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
When evaluating high blood velocities, especially at angles closer to zero degrees (which produces maximum Doppler shifts), aliasing can easily occur because the Doppler frequency shift increases. To avoid aliasing, you must increase the Doppler scale (which increases the pulse repetition frequency, PRF) to accommodate these higher velocities.
According to sonography instrumentation references:
"The Doppler scale (PRF) must be increased when high velocities are anticipated to prevent aliasing, especially at optimal Doppler angles near zero degrees where maximum frequency shifts occur." Therefore, the correct answer is C: Increased Doppler scale settings.
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NEW QUESTION # 71

Which artifact causes a reflector to be improperly positioned on the display?

- A. Enhancement
- B. Speckle
- C. Range ambiguity
- D. Acoustic shadowing

Answer: C

Explanation:
* Acoustic Shadowing: This artifact occurs when a structure absorbs or reflects most of the ultrasound waves, causing a shadow behind the structure. It does not cause improper positioning of a reflector on the display.
* Speckle: This is a form of noise in ultrasound imaging that appears as granular texture. It can affect image quality but does not lead to improper positioning of reflectors.
* Enhancement: This artifact occurs when the area behind a weakly attenuating structure appears brighter.
It affects the brightness of the image but does not affect the position of reflectors.
* Range Ambiguity: This occurs when an echo is received after the next pulse has been sent out, causing the reflector to be placed at an incorrect depth on the display. This is because the system assumes the echo came from the most recent pulse.
References:
"Ultrasound Physics and Instrumentation" by Frank Miele
ARDMS Sonography Principles and Instrumentation study materials

NEW QUESTION # 72
Which will affect the gray-scale of a 2-D image?

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

Answer: A

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

NEW QUESTION # 73
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