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04/11/2024 2:54 PM

SPI Practice Test QUESTIONS AND ANSWERS

Which of the following do the source and the medium determine?

- a. duty factor
- b. frequency
- c. propagation speed
- d. axial resolution - answers✓✓d.

Axial resolution is affected by all of the following EXCEPT

- a. frequency
 - b. damping
 - c. spatial pulse length
 - d. focusing - answers✓✓d.
- Damping in a transducer

- a. reduces the number of cycles in a pulse and increases the quality factor
- b. increases the number of cycles in a pulse and increases penetration
- c. causes poor axial and lateral resolution
- d. reduces the duty factor and increases the range of transmitted frequencies - answers✓✓d.

Far zone beam divergence can be reduced on a single-element transducer by using

- a. a transducer with a smaller element diameter
- b. a higher frequency transducer
- c. a lower frequency transducer or a smaller element diameter
- d. adjustable focusing - answers✓✓b.

The area between the face of an unfocused single-element transducer and the point where the beam starts to diverge is the

- a. Fraunhofer zone
- b. refraction zone
- c. focal zone
- d. near zone - answers✓✓d.

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ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	• Apply Doppler Concepts: It discusses Doppler wall filter concepts, Doppler sample gate concepts, y color priority over gray scale concepts, and concepts related to color Doppler map. Furthermore, it discusses concepts to eliminate aliasing, continuous wave Doppler concepts, and color Doppler scale concepts.
Topic 2	• Provide Clinical Safety & Quality Assurance: This topic covers universal infection control protocols, QA check on ultrasound machine, transducer integrity, ultrasound machine integrity, and statistical parameter concepts.

Topic 3	• Manage Ultrasound Transducers: It delves into 2D array transducer concepts, 3D • 4D transducer concepts, and nonimaging transducer concepts.
Topic 4	• Optimize Sonographic Images: The topic focuses on optimization of axial resolution concepts, optimization of lateral resolution concepts, optimization of elevational resolution concepts, optimization of temporal resolution concepts, and magnification techniques.
Topic 5	• Perform Ultrasound Examinations: This topic discusses patient care, sonographic ergonomic techniques, echogenicity, reverberation, and potential bioeffects. It also discusses beam steering concepts, panoramic imaging, 3D • 4D concepts, and contrast imaging concepts.

>> Answers SPI Real Questions <<

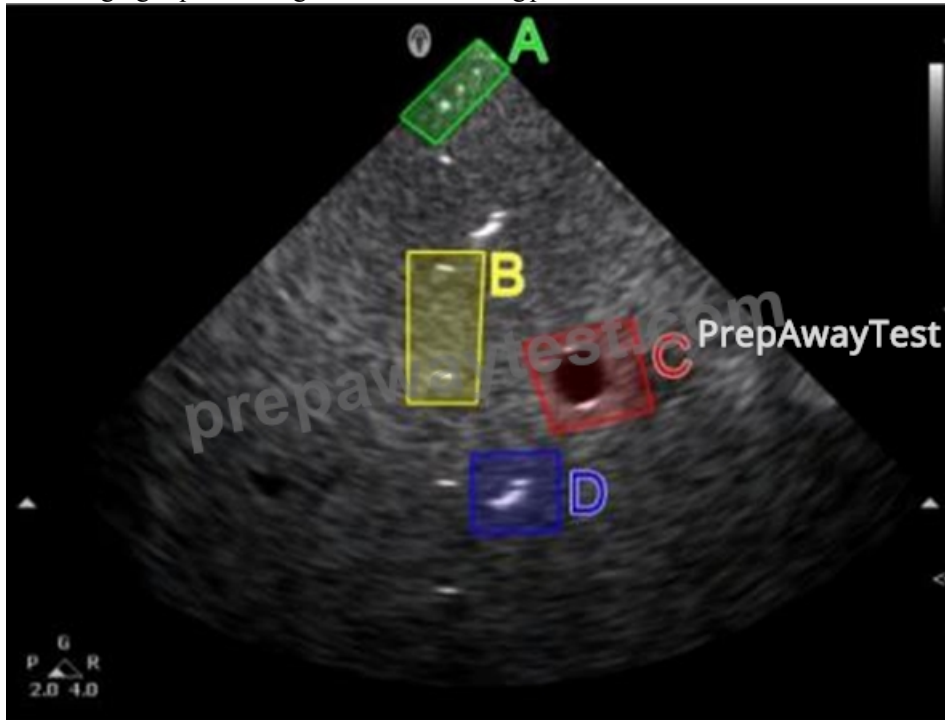
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ARDMS Sonography Principles and Instrumentation Sample Questions (Q52-Q57):

NEW QUESTION # 52

Which target group in this image of a tissue-mimicking phantom is used to evaluate axial resolution?



- A. Option C
- B. Option D
- **C. Option B**
- D. Option A

Answer: C

Explanation:

In the given image of a tissue-mimicking phantom, Option B (yellow box) is used to evaluate axial resolution. Axial resolution refers

to the ability of the ultrasound system to distinguish between two structures that are close to each other along the path of the ultrasound beam (i.e., parallel to the beam). The targets in Option B are typically aligned in such a way to test the system's capacity to differentiate between structures that are situated closely together along the beam's axis. Reference:

ARDMS Sonography Principles and Instrumentation guidelines

"Sonography: Principles and Instruments" by Joan P. Baker and Marveen Craig

NEW QUESTION # 53

What is the relationship between overall gain and image brightness?

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

Answer: D

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 # 54

What happens to the amount of attenuation if the path length is doubled?

- A. Halved
- B. Quartered
- C. Quadrupled
- **D. Doubled**

Answer: D

Explanation:

Attenuation in ultrasound is directly proportional to the path length. If the path length is doubled, the amount of attenuation is also doubled. Attenuation refers to the reduction in the amplitude and intensity of the ultrasound wave as it travels through tissue, primarily due to absorption, reflection, and scattering. The relationship is linear, so doubling the distance the sound wave travels will result in twice the amount of attenuation.

ARDMS Sonography Principles and Instrumentation guidelines

Kremkau, F. W. (2015). Diagnostic Ultrasound: Principles and Instruments. Elsevier.

NEW QUESTION # 55

Which control determines the amount of amplification occurring in the receiver?

- A. Dynamic range
- B. Output power
- C. Persistence
- **D. Overall gain**

Answer: D

Explanation:

Overall gain controls the amplification of all the received ultrasound signals uniformly. This adjustment affects the brightness of the entire image by increasing or decreasing the amplification of the echoes returning from all depths. It is a primary control for adjusting image brightness. The overall gain should be set to an appropriate level to ensure that the ultrasound image is neither too bright (over-gained) nor too dark (under-gained), allowing for optimal visualization of the anatomical structures.

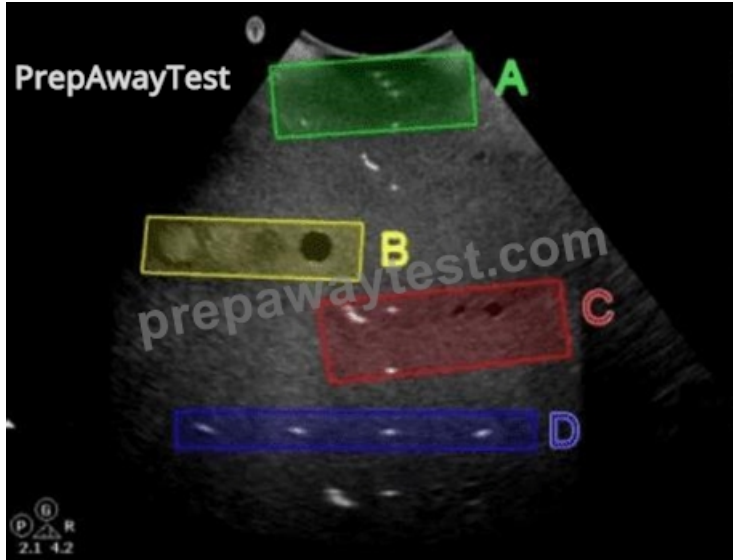
Reference:

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

NEW QUESTION # 56

Which region of this image from a sector phantom is evaluating the dead zone?

A close-up of a ultrasound Description automatically generated



- A. Region B
- B. Region C
- C. Region D
- **D. Region A**

Answer: D

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

The dead zone in ultrasound refers to the shallow area immediately beneath the transducer where no useful data can be collected due to the transducer's ring-down and the time required for the system to switch from transmit to receive mode.

In a sector phantom image, the area closest to the transducer (superficial portion) is used to evaluate the dead zone. In this image, Region A is located at the top of the image, closest to the transducer surface.

According to sonography instrumentation reference:

"The dead zone is assessed by evaluating the area immediately beneath the transducer. This area is used to test the system's near-field performance and transducer surface integrity." Therefore, the correct answer is A: Region A.

NEW QUESTION # 57

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