

Latest Sonography Principles and Instrumentation practice test & SPI troytec pdf

ARDMS SONOGRAPHY PRINCIPLES AND INSTRUMENTATION PRACTICE TEST -CCI REVIEW 2023

WHICH FREQUENCY IS BEST TO EVALUATE STRUCTURES LYING 1 TO 2 CM FROM THE TRANSDUCER? - Answer- 8-MHZ

WHICH ULTRASOUND PARAMETER DIRECTLY AFFECTS AN ULTRASOUND BEAM'S INTENSITY? - Answer- OUTPUT POWER

WHICH PARAMETER IS MOST LIKELY TO AFFECT SPATIAL RESOLUTION? - Answer- DEPTH OF VISUALIZATION

WHICH TERM DESCRIBES THE AVERAGING TOGETHER OF SCAN LINES FROM MULTIPLE ANGLES TO CREAT ONE IMAGE? - Answer- SPATIAL COMPOUNDING

ACCORDING TO ALARA (AS LOW AS REASONABLY ACHIEVABLE) GUIDELINES, WHICH PARAMETER SHOULD BE MINIMIZED? - Answer- TRANSMIT POWER

WHICH IMAGING MODE REQUIRES A BROADBAND TRANSDUCER? - Answer- CONTINUOUS WAVE DOPPLER

WHAT AFFECTS THE BEAM WIDTH IN THE NEAR FIELD? - Answer- TRANSDUCER APERTURE

WHICH CONTROL IMPROVES THE EFFECTS OF ATTENUATION? - Answer- A. DYNAMIC RANGE
B. PULSE INVERSION
C. MULTIPLE FOCAL ZONES
D. TIME-GAIN COMPENSATION

WHICH TERM DESCRIBES BLOOD FLOW CHANGES IN RESPONSE TO RESPIRATION? - Answer- A. PHASIC
B. PARABOLIC
C. SPONTANEOUS
D. PULSATILE

WHEN USING A 5 MHz TRANSDUCER, IN WHICH TISSUE IS THE ULTRASOUND WAVELENGTH SHORTEST? - Answer- FAT

WHICH VARIABLE CAN CAUSE AN ACOUSTIC SHADOW ARIFACT? - Answer- SMALL ACOUSTIC IMPEDANCE MISMATCH

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ARDMS SPI Exam Syllabus Topics:

| Topic | Details |
|---------|---|
| Topic 1 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> • 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 3 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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. |

>> SPI Mock Exam <<

SPI Certification, SPI Interactive Questions

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ARDMS Sonography Principles and Instrumentation Sample Questions (Q97-Q102):

NEW QUESTION # 97

What does compression affect in the ultrasound image?

- A. The shades of gray displayed
- B. The number of lines displayed
- C. The temporal resolution
- D. The elevational resolution

Answer: A

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Compression reduces the dynamic range of the returning echoes, which alters how many shades of gray are displayed. It compresses the range of signal amplitudes to fit into the grayscale display range.

According to sonography instrumentation reference:

"Compression alters the dynamic range, adjusting how many shades of gray are displayed to optimize image contrast." Therefore, the correct answer is B: The shades of gray displayed.

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NEW QUESTION # 98

Which spectral Doppler finding can occur when using a low pulse repetition frequency setting?

- A. Aliasing
- B. Range ambiguity
- C. Spectral broadening
- D. Dropout

Answer: A

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Low PRF reduces the Nyquist limit, making the system more susceptible to aliasing when Doppler shift frequencies exceed this limit.

Principles and Instrumentation state:

"Aliasing occurs when Doppler shifts exceed half the PRF (Nyquist limit). Lowering PRF increases aliasing susceptibility."

* Spectral broadening (A) results from turbulence or poor angle.

* Range ambiguity (B) occurs at high PRF.

* Dropout (D) refers to signal loss, not aliasing.

Therefore, the correct answer is C: Aliasing.

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NEW QUESTION # 99

Which is a method to reduce noise?

- A. Increase persistence
- B. Decrease beam width
- C. Increase frequency
- D. Decrease depth

Answer: A

Explanation:

Persistence is a form of temporal averaging where consecutive frames are averaged to reduce random noise, resulting in a smoother image. Increasing persistence effectively reduces noise by averaging out transient noise artifacts while preserving the true signal. This improves image quality, although it may also reduce the temporal resolution, making it less suitable for rapidly moving structures.

Reference:

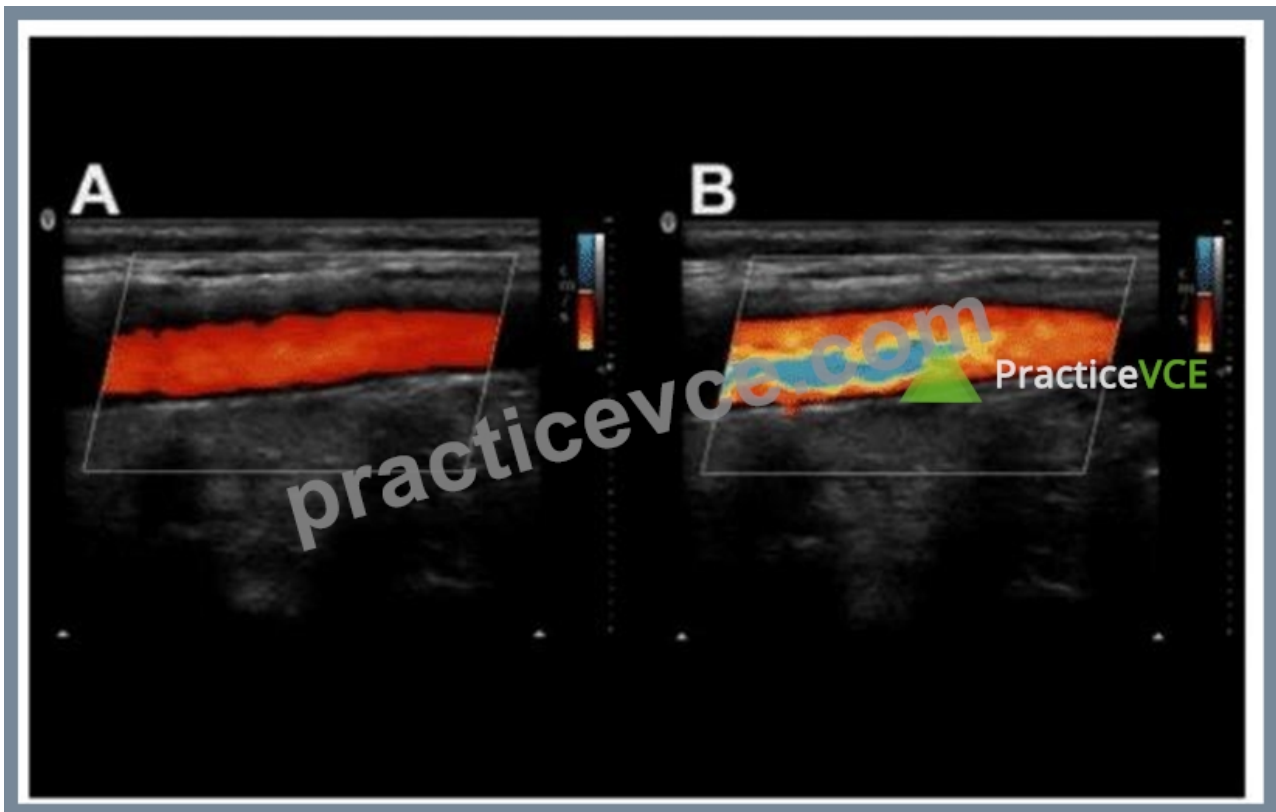
ARDMS Sonography Principles & Instrumentation Guidelines

Hedrick WR, Hykes DL, Starchman DE. Ultrasound Physics and Instrumentation. 4th ed. Philadelphia, PA: Elsevier Saunders; 2005.

NEW QUESTION # 100

Which color control adjustment caused the change from image A to image B?

A close-up of a medical image Description automatically generated



- A. Color packet size
- B. Map
- C. Wall filter
- D. Velocity scale

Answer: D

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

In image A, the vessel shows uniform color filling without aliasing. In image B, multiple color bands are present, indicating color aliasing - where the flow velocities exceeded the Nyquist limit due to a lower velocity scale (PRF).

According to sonography Principles and Instrumentation:

"Aliasing in color Doppler appears when the Doppler shift exceeds the Nyquist limit. Reducing the velocity scale increases the likelihood of aliasing."

* Changing the map (A) would modify the color hues but not introduce aliasing.

* Wall filter (C) affects low-velocity signals but not aliasing.

* Color packet size (D) affects frame rate and sensitivity, not aliasing directly.

Therefore, the correct answer is B: Velocity scale.

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NEW QUESTION # 101

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

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

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.

Reference:

"Ultrasound Physics and Instrumentation" by Frank Miele

ARDMS Sonography Principles and Instrumentation study materials

NEW QUESTION # 102

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