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ARDMS SPI Exam Syllabus Topics:

| Topic | Details |
|---------|--|
| Topic 1 | <ul style="list-style-type: none">• Manage Ultrasound Transducers: It delves into 2D array transducer concepts, 3D• 4D transducer concepts, and nonimaging transducer concepts. |
| Topic 2 | <ul style="list-style-type: none">• 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 3 | <ul style="list-style-type: none">• 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. |

| | |
|---------|--|
| Topic 4 | <ul style="list-style-type: none"> • 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 5 | <ul style="list-style-type: none"> • 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. |

ARDMS Sonography Principles and Instrumentation Sample Questions (Q100-Q105):

NEW QUESTION # 100

Which artifact displays reflectors more shallow than their actual position?

- A. Range ambiguity
- B. Mirror image
- C. Section thickness
- D. Ring-down

Answer: A

Explanation:

Range ambiguity artifact occurs when echoes from one pulse are received after the next pulse has been emitted, leading to the incorrect placement of echoes at shallower depths than their true location. This artifact typically happens when the PRF is set too high, causing the ultrasound system to interpret delayed echoes as coming from the current pulse rather than the previous one. This results in reflectors appearing closer to the transducer than they actually are.

Reference:

ARDMS Sonography Principles & Instrumentation Guidelines

Kremkau FW. Sonography Principles and Instruments. 9th ed. Philadelphia, PA: Elsevier; 2016.

NEW QUESTION # 101

What relates bandwidth to operating frequency?

- A. Autocorrelation
- B. Focal zone
- C. Nyquist limit
- D. Quality factor

Answer: D

Explanation:

The quality factor (Q-factor) is a dimensionless parameter that describes the efficiency of the transducer in terms of bandwidth and operating frequency. It is defined as the ratio of the operating frequency to the bandwidth. A higher Q-factor indicates a narrower bandwidth relative to the operating frequency, resulting in more precise frequency characteristics but potentially reduced axial resolution. Conversely, a lower Q-factor indicates a broader bandwidth, which improves axial resolution but may result in less precise frequency characteristics.

References:

ARDMS Sonography Principles & Instrumentation Guidelines

Kremkau FW. Sonography Principles and Instruments. 9th ed. Philadelphia, PA: Elsevier; 2016.

NEW QUESTION # 102

According to Poiseuille's law, a change in which parameter would have the greatest influence on blood flow?

- A. Pressure gradient
- B. Vessel radius
- C. Length of vessel

- D. Viscosity of the fluid

Answer: B

Explanation:

According to Poiseuille's law, the flow rate of a fluid through a vessel is directly proportional to the fourth power of the vessel's radius. Therefore, a small change in the radius of the vessel has a much larger effect on blood flow compared to changes in pressure gradient, length of the vessel, or viscosity of the fluid.

Reference:

ARDMS Sonography Principles and Instrumentation guidelines

Poiseuille's law in medical physics and hemodynamics literature.

NEW QUESTION # 103

Which technique averages image frames over time to reduce noise?

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

Answer: D

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 # 104

Which adjustment will reduce the appearance of posterior shadowing artifact?

- A. Decreasing dynamic range
- B. Decreasing the number of focal zones
- **C. Increasing spatial compounding**
- D. Increasing persistence

Answer: C

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Spatial compounding uses multiple scan angles to create an image. By combining information from different angles, it can reduce shadowing artifacts caused by highly attenuating structures.

According to sonography instrumentation reference:

"Spatial compounding reduces artifacts such as posterior shadowing by averaging images acquired from multiple insonation angles."

Therefore, the correct answer is A: Increasing spatial compounding.

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NEW QUESTION # 105

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