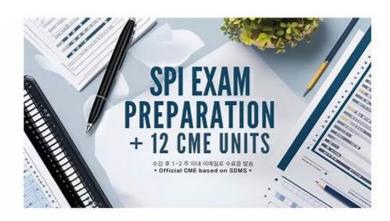
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# **ARDMS SPI Exam Syllabus Topics:**

| Topic   | Details   |
|---------|---|
| Topic 1 | 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. I 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.   |
| Торіс 2 | <ul> <li>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.</li> </ul>                                   |
| Торіс 3 | 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 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

- 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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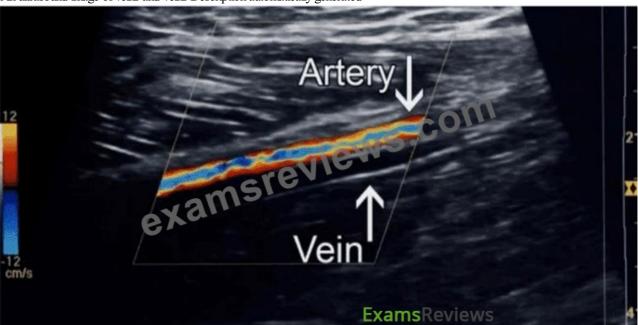
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# ARDMS Sonography Principles and Instrumentation Sample Questions (Q166-Q171):

# **NEW QUESTION # 166**

Which color Doppler setting adjustment would likely demonstrate color flow in the normal vein seen in this image? An ultrasound image of veins and veins Description automatically generated



- A. Increasing scale
- B. Increasing persistence
- C. Decreasing persistence
- D. Decreasing scale

# Answer: D

#### Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Veins generally exhibit low-velocity flow. The color scale (or velocity range) must be low enough to detect these slow flows. Decreasing the scale lowers the Nyquist limit, allowing the machine to display lower velocities that may otherwise be undetectable. Principles and Instrumentation state:

"Reducing the scale increases sensitivity to low-velocity flows such as venous flow, while high scales may suppress these signals."

Therefore, the correct answer is A: Decreasing scale.

# **NEW QUESTION #167**

Which adjustment will improve visualization of blood flow if color extends outside the boundary of the vessel walls?

- A. Increasing depth
- B. Decreasing wall filter
- C. Increasing wall filter
- D. Decreasing depth

#### Answer: C

### Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

When color "bleeds" outside vessel walls, it often results from motion artifacts or noise from slow tissue motion being displayed as flow. Increasing the wall filter eliminates low-frequency Doppler shifts caused by motion, improving color accuracy within vessel boundaries.

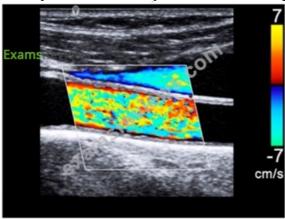
According to sonography instrumentation reference:

"Raising the wall filter eliminates low-velocity signals from vessel wall motion, reducing the appearance of color outside the vessel lumen." Therefore, the correct answer is C: Increasing wall filter.

#### \_

# **NEW QUESTION # 168**

What adjustment is needed to optimize the color in the image below?



- A. Increase wall filter
- B. Decrease persistence
- C. Increase pulse repetition frequency
- D. Decrease gain

#### Answer: C

# Explanation:

Increasing the pulse repetition frequency (PRF) helps to optimize the color Doppler imaging by reducing aliasing. Aliasing occurs when the PRF is too low to accurately sample the rapid blood flow velocities, leading to incorrect color representation.

By increasing the PRF, the system can more accurately measure higher velocities without distortion, improving the overall quality of the color Doppler image. Reference:

ARDMS Sonography Principles and Instrumentation guidelines on Doppler imaging and techniques to reduce aliasing.

# **NEW QUESTION # 169**

If the pulse repetition frequency is 3 kHz, what is the maximum Doppler shift that can be detected without aliasing?

A. 1.5 kHz

- B. 6.0 kHz
- C. 9.0 kHz
- D. 3.0 kHz

#### Answer: A

# Explanation:

The maximum Doppler shift that can be detected without aliasing is determined by the Nyquist limit, which is half of the pulse repetition frequency (PRF). If the PRF is 3 kHz, the Nyquist limit is 32=1.523kHzz=1.5kHz. Therefore, the maximum Doppler shift that can be detected without aliasing is 1.5 kHz. Aliasing occurs when the Doppler shift exceeds this limit, causing an incorrect representation of the velocity.

Reference: ARDMS Sonography Principles and Instrumentation, Chapter on Doppler Principles.

# **NEW QUESTION #170**

What method can be used to resolve aliasing artifact?

- A. Adjusting the output power
- B. Using a higher frequency transducer
- C. Decreasing the pulse repetition frequency
- D. Using continuous wave Doppler ultrasound

#### Answer: D

#### Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Continuous wave (CW) Doppler can measure very high velocities without aliasing because it does not have a Nyquist limit like pulsed-wave Doppler.

Principles and Instrumentation state:

"Aliasing is eliminated in continuous wave Doppler since it does not rely on sampling and has no upper velocity limit." Output power (A) affects signal strength, not aliasing.

Higher frequency (B) increases aliasing susceptibility.

Decreasing PRF (C) actually worsens aliasing.

Therefore, the correct answer is D: Using continuous wave Doppler ultrasound.

# **NEW QUESTION # 171**

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