

Sonography Principles and Instrumentation Examination Content Outline

(Outline Summary)

#	Domain	Percentage
1	Perform Ultrasound Examinations	23%
2	Manage Ultrasound Transducers	7%
3	Optimize Sonographic Images	26%
4	Apply Doppler Concepts	34%
5	Provide Clinical Safety & Quality Assurance	10%

(Detailed Outline)

1	Perform Ultrasound Examinations	Knowledge, Skills, and Abilities
1.A	Provide patient care (e.g., comfort, safety)	Knowledge of contrast agents
1.B	Apply sonographic ergonomic techniques	Knowledge of ergonomics
1.C	Differentiate interactions of sound and matter (e.g., echogenicity, reflection)	 Knowledge of established imaging protocols Knowledge of general patient care standards
1.D	Modify exam based on gray-scale artifacts (e.g., reverberation, shadowing)	 Knowledge of the interaction of sound and matter Knowledge of metric system of measurement
1.E	Apply knowledge of reflectors to modify scanning technique	 Knowledge of tissue density, penetration and depth
1.F	Identify potential bioeffects	Knowledge of ultrasound limitations Knowledge of
1.G	Apply beam steering concepts	confidentiality & privacy guidelines
1.H	Apply extended field of view function (e.g., panoramic imaging)	 Ability to review medical/surgical history Ability to correct imaging artifacts
1.1	Apply 3D/4D concepts	3 3
1.J	Apply contrast imaging concepts	
1.K	Manage initial patient encounter (e.g., verify ID, medical history, verify appropriateness of order)	
1.L	Analyze clinical history and previous imaging studies	
1.M	Demonstrate appropriate patient care and communication skills (e.g., privacy, confidentiality, safety)	

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1.N	Document preliminary findings and images (e.g., paper-based, digital)		
2	Manage Ultrasound Transducers	Knowledge, Skills, and Abilities	
2.A	Select transducers for the test	Knowledge of the components of a transducer	
2.B	Adjust transducer frequency	Knowledge of frequency relationship in the	
2.C	Appy 2D array transducer concepts	selection of appropriate transducer	
2.D	Apply 3D/4D transducer concepts	Ability to use different transducers	
2.E	Apply nonimaging transducer concepts		
3	Optimize Sonographic Images	Knowledge, Skills, and Abilities	
3.A	Integrate optimization of axial resolution	 Knowledge of frequency, PRF, PRP and pulse 	
	concepts	duration	
3.B	Integrate optimization of lateral resolution	Knowledge of pre- & post-processing techniques	
	concepts (e.g., transmit focus, multiple focal zones)	Knowledge of the principles of 2D imaging	
3.C	Integrate optimization of elevational resolution	Knowledge of sector widthsKnowledge of the concepts of scan lines, line	
3.0	concepts	density, frames and frame rate	
3.D	Integrate optimization of temporal resolution	Ability to optimize image beyond scan preset	
	concepts	and, as optimize mage so, and compression	
3.E	Utilize magnification techniques (i.e., pre- & post-		
	processing)		
3.F	Optimize image brightness (e.g., overall gain, TGC)		
3.G	Apply harmonic imaging concepts		
3.H	Apply PRF concepts (e.g., depth, penetration,		
2.1	frame rate)		
3.1	Apply output power concepts		
3.J	Apply duty factor concepts		
3.K	Apply dynamic range concepts (e.g.,		
3.L	compression) Apply spatial compounding concepts		
3.M	Apply knowledge related to gray scale (e.g.,		
ا۱۷۱.	colorized B-mode, frequency compounding,		
	persistence)		
3.N	Apply edge enhancement concepts		
3.0	Appy image depth concepts		
3.P	Apply M-mode concepts		
4	Apply Doppler Concepts	Knowledge, Skills, and Abilities	
4.A	Apply Doppler angle to flow concepts	Knowledge of Doppler angle	
4.B	Apply Doppler wall filter concepts	 Knowledge of Doppler effect Knowledge of Doppler shift Knowledge of hemodynamic principles 	
4.C	Apply Doppler sample gate concepts		
4.D	Apply color priority over gray scale concepts		
4.E	Apply concepts related to color Doppler map	Knowledge of low flow areasAbility to optimize image in 2D color and Doppler	
4.F	Apply concepts to eliminate aliasing	Ability to optimize image in 20 color and poppler	

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4.G	Apply continuous wave Doppler concepts	Ability to interpret Doppler colors
4.H	Apply pulsed wave Doppler concepts	Ability to identify imaging artifacts
4.1	Apply color Doppler concepts	
4.J	Apply power Doppler concepts	
4.K	Evaluate spectral Doppler waveform concepts	
4.L	Apply tissue Doppler concepts	
4.M	Apply general hemodynamic concepts (e.g., pressure gradient, resistance)	
4.N	Apply Doppler artifacts concepts	
4.0	Perform Doppler measurements (e.g., velocity)	
4.P	Apply spectral Doppler gain concepts	
4.Q	Apply spectral Doppler scale concepts	
4.R	Apply color Doppler gain concepts	
4.5	Apply color Doppler scale concepts	
5	Provide Clinical Safety & Quality Assurance	Knowledge, Skills, and Abilities
5.A	Apply universal infection control protocols	Knowledge of CDC guidelines
5.B	Document QA check on ultrasound machine	
5.C	Assess transducer integrity	
5.D	Verify ultrasound machine integrity	
5.E	Perform gray scale QA testing with tissue- mimicking phantoms	
5.F	Apply statistical parameter concepts (e.g., sensitivity, specificity)	

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