DMSO 1040 DOPPLER Study Guide

1. What is another name for Doppler shift?
2. Relative motion between the sound source and the receiver creates a \_\_\_\_\_\_\_\_\_ change, when the source and receiver move \_\_\_\_\_\_\_\_\_\_\_ apart or \_\_\_\_\_\_\_\_\_\_\_ together.
3. There is no \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ when the distance between the source and receiver remains constant.
4. The \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ is used to measure the velocity of blood.
5. What is demodulation?
6. If the transducer F is 7.5 MHz and the reflected signal is 7.58 MHz, what is the Doppler shift?
7. A positive Doppler shift occurs when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and is represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ number.

8. A negative Doppler shift occurs when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and is represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ number.

9. What is the difference between speed and velocity?

10. Write the Doppler equation.

11. What is the relationship between velocity of blood and Doppler shift?

12. What is the relationship between propagation speed and Doppler shift?

13. Why is there a "2" in the Doppler equation?

14. What are two numerical ways to represent the Doppler shift?

15. What does the x-axis of the Doppler spectrum represent?

16. What does the x-axis of the Doppler spectrum represent?

17. What does the y-axis of the Doppler spectrum represent?

18. What is the relationship between the transmitted F and the Doppler shift?

\*19. Frequency shift is measured. Velocity is calculated. The manufacturer translates the measurement into a velocity. The velocities will be identical regardless of the transmitted F. (this is shown in the next two questions)

20. With a 7 MHz probe, blood flowing at 2.1 m/s produces a Doppler shift of 3000 Hz. What Doppler F is measured when performed with a 3.5 MHz probe?

a. 2.1 m/s b. 3000 Hz c. 6000 Hz d. 1500 Hz e. 7 MHz

21. With a 7 MHz probe, blood flowing at 2.1 m/s produces a Doppler shift of 3000 Hz. What velocity is displayed when performed with a 3.5 MHz probe?

a. 2.1 m/s b. 3000 Hz c. 6000 Hz d. 1500 Hz e. 7 MHz

22. The relationship between the direction of blood flow and the direction of the sound wave is not important in the measurement of the Doppler F. (True or False)

23. The entire velocity is measured when the blood flow is moving \_\_\_\_\_\_\_\_\_\_\_\_ to the sound beam. This means \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ toward or away from the transducer.

24. When an angle exists, the measured velocity is \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ the true velocity.

25. What compensates for the angle that exists in the Doppler equation?

26. What does this (#25) determine?

27. How do you calculate measured velocity?

28. What is the relationship between the Cos Ꝋ and the Doppler shift?

29. When the direction of flow is perpendicular to the sound beam, what occurs in terms of Doppler equation? (can it be calculated)

30. Only a portion of the true velocity is measured at angles other than \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_.

31. Explain bidirectional Doppler.

32. What is required to hear the audio of this?

33. How is the Doppler spectrum displayed graphically?

34. What is the method used to process bidirectional Doppler?

35. How many crystals does a CW Doppler require and why?

36. What are the advantages of CW Doppler?

37. Disadvantages of CW Doppler?

38. What is the difference in a dedicated CW probe and a conventional probe performing CW Doppler?

39. What is duplex imaging?

40. What is the job if the single crystal in PW Doppler?

41. What are the advantages of PW Doppler?

42. Disadvantages of PW Doppler?

43. What is the most common error associated with Doppler ultrasound?

44. Describe this error.

45. What is the Nyquist limit?

46. Write the formula for this.

47. What are two ways to avoid aliasing?

48. When the sample volume is \_\_\_\_\_\_\_\_\_\_, the PRF is low, and the Nyquist limit is \_\_\_\_\_\_\_\_. Thus the tendency to alias is \_\_\_\_\_\_\_\_\_\_\_.

49. For less aliasing, a \_\_\_\_\_\_\_\_\_\_\_\_ frequency transducer should be used.

50. How does adjusting the scale eliminate aliasing?

51. Maximizing the PRF \_\_\_\_\_\_\_\_\_\_\_\_ the Nyquist limits and \_\_\_\_\_\_\_\_\_\_\_\_ aliasing.

52. High PRF \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sensitivity.

53. How does depth of view affect the PRF thus the Nyquist limit?

54. \_\_\_\_\_\_\_\_\_\_\_\_\_ Doppler shifts occur with lower F transducers. These are \_\_\_\_\_\_\_\_\_\_\_ likely to exceed the Nyquist limit.

55. Lower F sound produces good quality \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ but lower quality \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

56. What is the advantage of the baseline shift in terms of aliasing?

57. The gray shades on the Doppler spectrum are related to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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58. Color Doppler provides information regarding \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

59. Color Doppler reports \_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_ velocities.

60. What are Doppler packets?

61. Larger packets have two advantages:

62. Larger packets have disadvantages:

63. What does Power Doppler identify?

64. Advantages of Power Doppler:

65. Disadvantages of Power Doppler:

66. What is clutter?

67. What is ghosting?

68. What can eliminate clutter and ghosting?

69. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a special form of mirror image artifact.

70. What are the causes of this artifact?

71. What is spectral analysis?

72. What two methods of spectral analysis are currently used?

73. Why is FFT so important?

74. Color Doppler utilizes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to analyze its information because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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