Chapter 7 Pressure measurement

Figure 7.4

1. Is this type of sensor used externally or internally?
2. What type of tip is used on the end of the catheter?
3. Pressure causes deflection of a thin metal membrane that does what?
4. The operating range of the transducer is the region where the output has what type of relationship with the input?

Figure 7.7

5. An increase of pressure at the input of the catheter causes what?
6. What part of the catheter tip has a large compliance?
7. What characteristic creates compliance of the catheter system ?
8. What characteristic creates resistance of the catheter system ?
9. What characteristic creates inertance of the catheter system ?

Figure 7.9

10. Review response curves for catheter-sensor system with and without bubble

Figure 7.11

11. Review the logarithmic decrement method

Figure 7.13

12. Review the characteristics of critically damped, underdamped, and overdamped responses

Figure 7.14

13. Review what happens with a bubble in the catheter or with a crimp in the catheter

Chapter 8 Blood Flow

Equation 8.1

14. Flow is equal to what volume relationship?
15. What creates a change in concentration?
16. Flow is equal to what concentration relationship?

Equation 8.2 Fick Technique

17. What is the flow measured?
18. What is the indicator delivered for the measurement time?
19. What is used for the ΔC measurement?

Figure 8.1

20. In the Fick method, what is the indicator?
21. How is the indicator consumption measured in the Fick method?
22. Where are the blood concentrations measured?
23. Dye dilution method has the dye injected where?
24. Dye dilution method dye concentration is measured by obtaining a sample form where?
25. In the thermodilution method, where is the indicator injected?
26. In the Thermodilution method, where is the indicator measured?
27. Which methods are an indicator dilution method? Fick, Dye, Thermal?

Indicator dilution methods p 335

28. With indicator dilution methods, a bolus of indicator is rapidly injected into a location and what is measured over time?

29. Where is the indicator measured?

30. How long is the indicator measured?

Figure 8.2 & Equation 8.5

31. The shaded area in Figure 8.2 is obtained by what method?

32. What does the total shaded area in Figure 8.2 represent?

33. Which quantity in Equation 8.5 is the amount of indicator delivered?

34. Which quantity in Equation 8.5 is the total concentration obtained over time?

35. In Figure 8.2, which peak represents the recirculation of indicator?

36. Which indicator dilution technique would have recirculation as a complication?

Dye Dilution

37. What color dye is used?

38. How is the dye is injected directly into the body?

39. How is the dye eliminated from the body?

40. How is the concentration versus time curve obtained?

41. What instrument is used to measure the concentration curve?

Thermodilution

42. How many lumens are used in the catheter?

43. What is used as the indicator?

44. Where is the indicator injected?

45. Where is the indicator dilution measured?

46. How is the resulting drop in temperature of the blood detected?

47. Why is the thermodilution technique attractive clinically?

48. Which indicator dilution technique is the newest method?

49. In thermodilution technique, what is integrated? (represented by the area under the curve in Figure 8.2)?

Figure 8.3 & 8.5 Electromagnetic flowmeter

50. When blood flows in a vessel and passes through a magnetic field, what is the result measured by a set of electrodes?

51. When an AC magnetic field is used, a transformer voltage is produced. Is this desirable or undesirable?

52. Why would an AC magnetic field be used?

53. One method used to deal with transformer voltage is to time gate the input signal – True or false?

Ultrasonic Flow Meters – Figure 8.8

54. The transducers generate piston-like movements creating what type of waves which propagate into the tissue?

55. Because the transducer has a finite diameter, it will produce what type of patterns (just like an aperture in optics)?

56. The near field beam of a transducer is contained where?

57. Equation 8.9 is the relationship for the near field distance. If the frequency goes up what happens to the wavelength?

58. If the frequency goes up, what happens to the near field distance?

59. If the diameter of the transducer is larger, what happens to the near field distance?

60. What happens with the far field beam?

Figure 8.9

61. Which probe configuration requires two transducers facing each other?

62. Which transducer configuration detects back-scattered reflected waves?

63. What in blood flow would cause back-scattered reflected waves?

Figure 8.15

64. What is the name of the device that measures changes in blood volume?

65. What is the purpose of the venous occlusion cuff ?

66. What is the purpose of the arterial occlusion cuff?

Figure 8.16

67. How is the blood flow measured?

68. What causes the initial part of the curve after occlusion takes place?

Figure 8.20

69. What is the name for the technique for monitoring blood flow?

70. Arterial pulsations fill the capillary bed and changes the volume of the vessels. What happens to th

71. The changes in light are measured by the photosensor. What waveform is produced by the sensor?

Chapter 9 Respiration

Figure 9.4

72. Review measuring flow at the mouth

Figure 9.5

73. Review and be familiar with the volume ranges of components of breathing

Lung Mechanics presentation

http://web.eng.fiu.edu/watsonh/elr4202/References/Lung Mechanics.pdf

Slides 22-24

http://www.spirxpert.com/physiological6.htm

74. Review the elements of Forced Expiration test.

75. How does the Forced Expiratory volume curve change with asthma? (restrictive disease)

76. How does the Forced Expiratory volume curve change with obstructive lung disease? (Emphysema)

Figure 9.17

77. Review the elements of a Single-Breath nitrogen-washout maneuver?

78. What is closing volume?

Chapter 14 – Electrical Safety

Figure 14.5

79. What is the concept of Macroshock

80. What is the concept Microshock

81. What is the widely accepted safety limit to prevent microshocks?

82. What is the total hazard current allowed for safety checks with medical instruments?

Figure 14.7 & 14.8

83. What is a ground fault?

84. How is an isolation transformer used?

Figure 14.9

85. Review leakage-current pathways

Figure 14.11

86. What is a ground loop?

87. How can a microshock hazard exist with a faulty electric floor polisher?