STUDY GUIDE
for
Pathophysiology of Shock

1. Electrolytes are defined as substances that

    a. dissociate in water and are capable of conducting electrical current
    b. generate electrical current when combined with water
    c. are negatively charged until combined with water
    d. all of the above
    e. none of the above

2. Cations are defined as

    a. electrolytes able to pass freely across a semipermeable membrane
    b. positively charged ions
    c. negatively charged ions
    d. all of the above
    e. none of the above

3. Anions are defined as

    a. electrolytes able to pass freely across a semipermeable membrane
    b. positively charged ions
    c. negatively charged ions
    d. all of the above
    e. none of the above

4. The chief extracellular ion is

    a. sodium
    b. potassium
    c. calcium
    d. chloride
    e. magnesium

5. The chief intracellular ion is
    a. sodium
    b. potassium
    c. calcium
    d. chloride
    e. magnesium
6. The principal buffer of the body is

a. K^+
b. HCO_3^-
c. HPO_3^-
d. $CaCl_2$
e. HPO_2^+

7. Which of the following electrolytes are positively charged ions?

a. sodium, potassium, chloride
b. chloride bicarbonate, phosphate
c. sodium, potassium, calcium
d. sodium, chloride, phosphate
e. chloride, bicarbonate, magnesium

8. Which of the following electrolytes are negatively charged?
a. sodium, potassium, chloride
b. chloride bicarbonate, phosphate
c. sodium, potassium, calcium
d. sodium, chloride, phosphate
e. chloride, bicarbonate, magnesium

9. Fluid with osmotic pressure equal to normal body fluid is called
a. homeotonic
b. hypertonic
c. isotonic
d. hypotonic
e. homeostatic

10. Fluid with osmotic pressure less than that of normal body fluid is called
a. homeotonic
b. hypertonic
c. isotonic
d. hypotonic
e. homeostatic

11. Fluid with osmotic pressure greater than that of normal body fluid is called
a. homeotonic
b. hypertonic
c. isotonic
d. hypotonic
e. homeostatic

12. Water will move across a semipermeable membrane

a. in the direction of least resistance

b. from an isotonic solution to a homeotonic solution
c. from a homeostatic solution to an isotonic solution
d. from an area of higher solute concentration to that of lower solute concentration
e. from an area of lower solute concentration to that of higher solute concentration

13. Sodium will move across a semipermeable membrane

a. in the direction of least resistance
b. from an isotonic solution to a homeotonic solution
c. from a homeostatic solution to an isotonic solution
d. from an area of higher solute concentration to that of lower solute concentration
e. from an area of lower solute concentration to that of higher solute concentration

14. Movement of a solute across a semipermeable membrane is called
a. osmosis
b. simple transfer
c. diaphoresis
d. diffusion
e. effusion

15. Movement of a solvent across a semipermeable membrane is called
a. osmosis
b. simple transfer
c. diaphoresis
d. diffusion
e. effusion

16. Electrolytes move across a semipermeable membrane using
a. osmosis
b. simple transfer
c. diaphoresis
d. diffusion
e. effusion

17. Water will move across a semipermeable membrane using
a. osmosis
b. simple transfer
c. diaphoresis
d. diffusion
e. effusion

18. Which of the following statements regarding active transport is false?

a. energy is required to accomplish active transport.
b. active transport is slower than diffusion or osmosis
c. larger molecules can be moved across semipermeable membranes with active

transport
d. molecules can move toward areas of higher concentration with active transport
e. proteins are moved across semipermeable membranes with active transport

19. Facilitated diffusion

a. employs "helper proteins" to cross the cell membrane
b. may require energy to occur
c. is a selective process, occurring only with certain molecules
d. all of the above
e. none of the above

20. An iron-based compound called _____ is contained within the red blood cells and is responsible for the transportation of oxygen to the cells.

a. hemoglobin
b. erythroglobin
c. thromboglobin
d. leukoglobin

21. Red blood cells are also known as

a. hemocytes
b. erythrocytes
c. thrombocytes
d. leukocytes
e. plasma

22. White blood cells are also known as

a. hemocytes
b. erythrocytes
c. thrombocytes
d. leukocytes
e. plasma

23. Approximately 54 percent of the total body blood volume consists of

a. hemocytes
b. erythrocytes
c. thrombocytes
d. leukocytes
e. plasma

24. Approximately 45 percent of the total body blood volume consists of

a. hemocytes
b. erythrocytes
c. thrombocytes
d. leukocytes
e. plasma

25. The ____ is/are responsible for the clotting factor of blood.
a. hemocytes
b. erythrocytes
c. thrombocytes
d. leukocytes
e. plasma

26. Immunity and the combatting of infection are the responsibility of the
a. hemocytes
b. erythrocytes
c. thrombocytes
d. leukocytes
e. plasma

27. Platelets are also known as
a. hemocytes
b. erythrocytes
c. thrombocytes
d. leukocytes
e. plasma

28. The primary system of blood classification is called the
a. ABO system
b. ABC system
c. AB system
d. Rh system
e. O system

29. Blood type B contains

a. antibody A, antibody B, and no antigen
b. antigen A, antigen B, and no antibody
c. antigen B and antibody A
d. antigen A and antibody B
e. no antigen and no antibody

30. Blood type O contains

a. antibody A, antibody B, and no antigen
b. antigen A, antigen B, and no antibody
c. antigen B and antibody A
d. antigen A and antibody B
e. no antigen and no antibody

31. There are blood type systems other than the ABO system.

a. True
b. False

32. Blood type A contains
a. antibody A, antibody B, and no antigen
b. antigen A, antigen B, and no antibody
c. antigen B and antibody A
d. antigen A and antibody B
e. no antigen and no antibody

33. Blood type AB contains

a. antibody A, antibody B, and no antigen
b. antigen A, antigen B, and no antibody
c. antigen B and antibody A
d. antigen A and antibody B
e. no antigen and no antibody

34. A person with blood type ___ is called the universal donor.

a. C
b. A
c. B
d. AB
e. O

35. A person with blood type ____ is called the universal recipient.

a. C
b. A
c. B
d. AB
e. O

36. The universal donor may only receive blood from persons who have type ____ blood.

a. C

b. A
c. B
d. AB
e. O

37. A person with Rh negative blood usually does not have anti-Rh antibodies. Exposure to Rh positive blood will cause
    a. no adverse reaction to any receipt of Rh+ blood
    b. the development of anti-Rh antibodies after the initial exposure
    c. severe, perhaps fatal allergic reactions to any subsequent receipt of Rh+ blood
    d. A and B
    e. B and C

38. The best choice of fluid for a patient experiencing hemorrhagic shock is
    a. normal saline
    b. lactated ringer's solution
    c. fresh whole blood
    d. packed red cells

39. Protein containing intravenous fluids are called
    a. isotonic osmolloids
    b. colloids
    c. hypertonic osmolloids
    d. crystalloids
    e. hypotonic osmolloids

40. Intravenous fluids not containing proteins are called
    a. isotonic osmolloids
    b. colloids
    c. hypertonic osmolloids
    d. crystalloids
    e. hypotonic osmolloids

41. Prehospital intravenous fluid replacement is initiated with

    a. isotonic osmolloids
    b. colloids
    c. hypertonic osmolloids
    d. crystalloids
    e. hypotonic osmolloids

42. A greater increase in intravascular fluid can be accomplished sooner with

    a. isotonic osmolloids
    b. colloids
    c. hypertonic osmolloids

d. crystalloids
e. hypotonic osmolloids

43. 5% dextrose in water is an example of
a. isotonic osmolloids
b. colloids
c. hypertonic osmolloids
d. crystalloids
e. hypotonic osmolloids

44. Plasmanate and Hetastarch are examples of
a. isotonic osmolloids
b. colloids
c. hypertonic osmolloids
d. crystalloids
e. hypotonic osmolloids

45. Lactated Ringers is an example of
a. isotonic osmolloids
b. colloids
c. hypertonic osmolloids
d. crystalloids
e. hypotonic osmolloids

46. Solutions containing higher solute concentrations than that within the cell are called
a. isotonic
b. isotonic or hypertonic
c. hypotonic
d. hypertonic or hypotonic
e. hypertonic

47. Solutions with a similar solute concentration as that within the cell are called

a. isotonic
b. isotonic or hypertonic
c. hypotonic
d. hypertonic or hypotonic
e. hypertonic

48. If a normally hydrated person receives an infusion of a/an ____ solution, fluid will shift from the extracellular to the intracellular compartments.

a. isotonic
b. isotonic or hypertonic
c. hypotonic
d. hypertonic or hypotonic

e. hypertonic

49. If a normally hydrated person receives an infusion of a/an ____ solution, fluid will shift from the intracellular to the extracellular compartments.

a. isotonic
b. isotonic or hypertonic
c. hypotonic
d. hypertonic or hypotonic
e. hypertonic

50. Infusion of solution that is ____ into a normally hydrated person will not cause a significant shift of fluid.

a. isotonic
b. isotonic or hypertonic
c. hypotonic
d. hypertonic or hypotonic
e. hypertonic

51. Solutions containing a lesser concentration of solutes than that within the cell are called

a. isotonic
b. isotonic or hypertonic
c. hypotonic
d. hypertonic or hypotonic
e. hypertonic

52. Acid-base balance refers to the concentration of

a. the chief extracellular ion of body fluids
b. the chief intracellular ion of body fluids
c. hydrogen ions in body fluids.
d. all of the above
e. none of the above

53. Which of the statements below regarding pH is true?

a. the term "pH" is used to express the hydrogen ion concentration of a fluid
b. the pH equals the negative log of the hydrogen ion concentration
c. at a pH of 7, a solution is neutral
d. all of the above
e. none of the above

54. A fluid with a pH below 7 has

a. an increased concentration of hydrogen and is called acid
b. a decreased concentration of hydrogen and is called alkaline or basic
c. an increased concentration of alkaline ions and is called alkaline or basic
d. A and C
e. none of the above

55. A fluid with a pH above 7 has
a. an increased concentration of hydrogen and is called acid
b. a decreased concentration of hydrogen and is called alkaline or basic
c. an increased concentration of alkaline ions and is called alkaline or basic
d. A and C
e. none of the above

56. Homeostasis requires a body fluid pH range of
a. 7.0 - 7.6
b. 7.25 - 7.35
c. 7.35 - 7.45
d. 7.45 - 7.55
e. 7.80 - 7.95

57. Acidosis is described as a pH
a. below that of normal pH
b. above that of normal pH
c. within that of normal pH
d. all of the above
e. none of the above

58. Alkalosis is described as a pH

a. below that of normal pH
b. above that of normal pH
c. within that of normal pH
d. all of the above
e. none of the above

59. The extreme limits of pH compatible with life are approximately ___ on the alkaline side, and ____ on the acid side.

a. 7.8/6.9
b. 6.9/7.8
c. 8.0/6.0
d. 6.0/8.0
e. 7.3/7.5

60. The body's normal pH is maintained by

a. the carbonate buffer system
b. the respiratory system
c. the renal system
d. A and B
e. A, B and C

61. The fastest-acting pH defense mechanism, responding within seconds, is

a. the carbonate buffer system
b. the respiratory system
c. the renal system
d. A and B
e. A, B and C

62. The slowest-acting pH defense mechanism, requiring hours or days, is

a. the carbonate buffer system
b. the respiratory system
c. the renal system
d. A and B
e. A, B and C

63. The carbonate system has two components, which are

a. carbonic acid (H3CO2) and bicarbonate (HCO2)
b. carbonic acid (H2CO3) and bicarbonate (HCO3)
c. carbonic acid (HCO2) and bicarbonate (H3CO2)
d. A and B
e. A and C

64. Carbonic acid is a weak acid that constantly breaks down into

a. water and carbon dioxide
b. hydrogen and bicarbonate
c. hydrogen and carbon ions
d. A and B
e. A and C

65. Increased respirations result in
a. an increased release of CO2 and a decrease H concentration
b. a decreased release of CO2 and an increased H concentration
c. a decreased release of CO2 and a decreased H concentration
d. an increased releaser of CO2 and an increased H concentration

e. none of the above

66. Decreased respirations result in
    a. an increased release of CO2 and a decrease H concentration
    b. a decreased release of CO2 and an increased H concentration
    c. a decreased release of CO2 and a decreased H concentration
    d. an increased releaser of CO2 and an increased H concentration
    e. none of the above

67. Respiratory acidosis is caused by
    a. an increased release of CO2 and a decrease H concentration
    b. a decreased release of CO2 and an increased H concentration
    c. a decreased release of CO2 and a decreased H concentration
    d. an increased releaser of CO2 and an increased H concentration
    e. none of the above

68. Respiratory alkalosis is caused by
    a. an increased release of CO2 and a decrease H concentration
    b. a decreased release of CO2 and an increased H concentration
    c. a decreased release of CO2 and a decreased H concentration
    d. an increased releaser of CO2 and an increased H concentration
    e. none of the above

69. The kidneys regulate pH by excretion of excess

    a. hydrogen ions
    b. carbon ions
    c. bicarbonate ions
    d. A and B
    e. A and C

70. If the pH falls, the kidneys eliminate more

    a. CO2
    b. H
    c. HCO3
    d. H2CO3
    e. none of the above

71. If the pH rises, the kidneys eliminate more

    a. CO2
    b. H
    c. HCO3
    d. H2CO3
    e. none of the above

72. Anaerobic metabolism can cause

a. metabolic alkalosis
b. respiratory acidosis
c. respiratory alkalosis
d. homeostasis
e. metabolic acidosis

73. Prolonged vomiting and excessive use of diuretics can cause

a. metabolic alkalosis
b. respiratory acidosis
c. respiratory alkalosis
d. homeostasis
e. metabolic acidosis

74. Describe the following lab values:

pH	7.55
PaCO2	25
HCO3	22

a. metabolic alkalosis
b. metabolic acidosis
c. respiratory alkalosis
d. respiratory acidosis
e. normal findings

75. Describe the following lab values:

pH	6.95
PaCO2	65
HCO3	20

a. metabolic alkalosis
b. metabolic acidosis
c. respiratory alkalosis
d. respiratory acidosis
e. normal findings

76. Describe the following lab values:

pH	7.50
PaCO2	35

HCO3 35

a. metabolic alkalosis
b. metabolic acidosis
c. respiratory alkalosis
d. respiratory acidosis
e. normal findings

77. Describe the following lab values:
pH 7.25
PaCO2 35
HCO3 10

a. metabolic alkalosis
b. metabolic acidosis
c. respiratory alkalosis
d. respiratory acidosis
e. normal findings

78. Shock is defined as inadequate

a. blood pressure
b. pulse
c. respirations
d. hydration
e. cellular oxygenation

79. Which of the following statements regarding baroreceptors is false?

a. baroreceptors are located in the aortic arch and carotid arteries
b. baroreceptors are composed of nerve tissue and are designed to detect changes in blood pressure
c. when baroreceptors are stimulated by a change in blood pressure, the adrenal glands send signals to the brain to alter body functions and return the blood pressure to normal
d. if the baroreceptors note an increase in blood pressure, the brain responds by decreasing the heart rate, preload, and/or afterload
e. if the baroreceptors note a decrease in blood pressure, the brain responds by activating the sympathetic nervous system

80. Activation of the sympathetic nervous system produces all of the following responses except

a. increased strength of cardiac contractions
b. increased heart rate
c. peripheral arterial constriction resulting in an increased container size

d. increased peripheral vascular resistance
e. stimulation of the adrenal glands to release epinephrine and norepinephrine to further enhance the sympathetic effects

81. If the patient is taking beta blocker medications, the initial signs and symptoms of ____ will be hindered.

a. compensated shock
b. irreversible shock
c. delayed shock
d. superficial shock
e. decompensated shock

82. Which of the following statements regarding peripheral effects during shock is false?

a. during compensatory shock, increased peripheral vascular resistance is enhanced by pre- and postcapillary sphincter contraction
b. as ischemia develops, anaerobic metabolism is changed to aerobic metabolism
c. during decompensated shock, precapillary sphincters relax and open, while postcapillary sphincters remain contracted
d. during decompensated shock, capillary blood flow becomes stagnant, resulting in increased hydrogen ion production, and Rouleau formation of RBCs
e. stacking of RBCs produces an emboli threat; when irreversible shock ensues, postcapillary sphincters relax and open, releasing hydrogen ions and Rouleaux RBCs into system circulation

83. Hypovolemic shock can be caused by

a. internal or external hemorrhage or burns
b. vomiting, diarrhea, or excessive sweating
c. pancreatitis, peritonitis, or bowel obstruction
d. A and B
e. A, B, and C

84. Which of the following statements regarding neurogenic shock is false?
a. reflex peripheral vasoconstriction is absent when neurogenic shock occurs
b. reflex sympathetic cardiac stimulation is absent when neurogenic shock occurs
c. central nervous system depressant drugs may cause neurogenic shock
d. all of the above are false
e. none of the above is false

85. The best indicator of decreased cerebral perfusion from shock is the presence of

a. delayed capillary refill
b. altered level of consciousness
c. hyperventilation
d. tachycardia
e. cool, pale, clammy skin

86. Which of the following statements regarding the PASG is true?
a. is considered beneficial in the treatment of shock, despite the lack of confirmation of its mechanism of action
b. has been proved to autotransfuse up to 2 units of blood from the legs
c. has been proved to increase BP secondary to increased peripheral vascular resistance
d. A and C
e. none of the above

87. The cause of pyrogenic reaction to IV cannulation is

a. irritation and inflammation of the cannulated vein by the IV solution, needle, catheter, or infused medication
b. advancing the catheter incompletely and then withdrawing the catheter
c. infusion of air from an incompletely flushed line
d. the presence of pyrogen proteins within the IV solution or administration set
e. an antigen/antibody reaction to the IV solution

88. The cause of thrombophlebitis from IV therapy is

a. irritation and inflammation of the cannulated vein by the IV solution, needle, catheter, or infused medication
b. advancing the catheter incompletely and then withdrawing the catheter
c. infusion of air from an incompletely flushed line
d. the presence of pyrogen proteins within the IV solution or administration set
e. an antigen/antibody reaction to the IV solution

89. The cause of air embolism from IV therapy is

a. irritation and inflammation of the cannulated vein by the IV solution, needle, catheter, or infused medication
b. advancing the catheter incompletely and then withdrawing the catheter
c. infusion of air from an incompletely flushed line
d. the presence of pyrogen proteins within the IV solution or administration set
e. an antigen/antibody reaction to the IV solution

90. Signs and symptoms of a pyrogenic reaction to IV cannulation include

a. complaints of pain along the path of the vein, and erythema with edema at the puncture site

b. onset of complaints within 30 to 60 minutes of cannulation
c. complaints of fever, chills, nausea, headache, and/or backache
d. A and B
e. B and C

91. Which of the following is not a complication of IV therapy?

a. fluid overload
b. air embolism
c. infection
d. catheter shear
e. all of the above are complications

92. All of the following happens when your fluid levels drop except

a. ADH is secreted
b. kidneys reabsorb sodium
c. more urine is excreted
d. water shifts into the intravascular compartment

93. The chief extracellular cation that regulates fluid distribution is

a. bicarbonate
b. sodium
c. potassium
d. magnesium

94. The chief intracellular cation that aids in electrical impulse transmission is

a. magnesium
b. sodium
c. potassium
d. calcium

95. The cation that plays a major role in muscle contraction is

a. bicarbonate
b. sodium
c. potassium
d. calcium

96. A solution with the same osmolarity as blood plasma is said to be

a. hypotonic
b. hypertonic
c. isotonic

d. normotonic

97. In a fresh water drowning, what happens as water enters the pulmonary capillaries?

a. it remains in the capillaries
b. it quickly diffuses into the cells
c. it draws additional fluid into the blood vessel
d. none of the above

98. The insulin/glucose relationship is an example of

a. facilitated diffusion
b. facilitated transport
c. passive diffusion
d. active transport

99. A patient with blood infusing suddenly develops fever, chills, nausea, hives, tachycardia, and hypotension. You suspect a transfusion reaction. What should you do?

a. stop the blood infusion
b. infuse normal saline
c. monitor the patient closely and contact medical control
d. all of the above

100. After infusing a colloid solution, you should expect

a. a decrease in blood pressure
b. a fluid shift into the bloodstream
c. rapid diffusion of its solute particles into the tissues
d. an osmotic gradient toward the intracellular compartment

101. How much lactated Ringer's solution remains in the intravascular space after one hour?

a. 100%
b. 66%
c. 50%
d. 33%

102. A patient with a pH of 7.2 and a PaCO2 of 52 torr is in a state of

a. respiratory acidosis
b. respiratory alkalosis
c. metabolic acidosis
d. metabolic alkalosis

103. A probable cause of this patient's condition is

a. near drowning
b. amphetamine drug overdose
c. antacid ingestion
d. excessive vomiting

104. Immediate management of a patient in respiratory acidosis includes

a. coaching the patient to breathe slower
b. administration of sodium bicarbonate
c. positive pressure ventilation
d. none of the above

105. Management of the patient in respiratory alkalosis includes

a. hyperventilation
b. coaching and reassurance
c. breathing into a paper bag
d. administration of sodium bicarbonate

106. Which of the following factors does not affect the heart's stroke volume?

a. heart rate
b. preload
c. afterload
d. contractile force

107. Preload could be increased by all of the following except

a. increasing venous return
b. increasing contractile force
c. decreasing afterload
d. promoting venodilation

108. The greatest change to peripheral resistance occurs in the

a. aorta
b. arteries
c. arterioles
d. capillaries

109. The maximum amount of fluid that should be administered in the field is ____ liters.

a. 1
b. 2-3
c. 5
d. there is no limit

110. In which of the following situations is the PASG contraindicated?

a. intra-abdominal bleeding
b. uncontrolled lower extremity hemorrhage with shock
c. acute pulmonary edema secondary to cardiogenic shock
d. pelvic fracture

111. Peripheral vascular resistance is dependent upon

a. vessel diameter
b. fluid viscosity
c. vessel length
d. all of the above

112. Which of the following statements best illustrates the Frank-Starling mechanism?

a. the greater the afterload, the greater the stroke volume
b. the less stroke volume, the less the afterload.
c. the greater the preload, the greater the stroke volume
d. the less preload, the greater the afterload

113. The amount of resistance against which the heart must pump is called _____.

a. stroke volume
b. end-diastolic volume
c. afterload
d. preload

114. Parasympathetic stimulation results in

a. constricted pupils
b. increased heart rate
c. increased GI motility
d. A and B
e. A and C

115. All of the following are sympathetic responses except

a. dilated pupils

b. decreased heart rate
c. vasoconstriction
d. increased blood pressure
e. bronchodilation

116. Epinephrine and norepinephrine are examples of

a. sympathomimetics
b. sympatholytics
c. cholingergics
d. anticholinergics