

Chapter 02: Fluid, Electrolyte, and Acid-Base Imbalances

Test Bank

MULTIPLE CHOICE

1. Choose the correct proportion of water to body weight to be expected in a healthy male adult's body:
 - a. 30%
 - b. 45%
 - c. 60%
 - d. 70%

ANS: C

2. Choose the correct proportion of blood (to body weight) in an adult male's body:
 - a. 30%
 - b. 20%
 - c. 10%
 - d. 4%

ANS: D

3. Insensible fluid loss refers to water lost through:
 - a. perspiration only.
 - b. feces only.
 - c. perspiration and expiration.
 - d. urine and feces.

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ANS: C

4. When the osmotic pressure of the blood is elevated above normal, water would shift from the:
 - a. blood into the cells.
 - b. interstitial compartment into the cells.
 - c. interstitial compartment into the blood.
 - d. cells into the interstitial compartment.

ANS: C

5. Which of the following would result from a deficit of plasma proteins?
 - a. Increased osmotic pressure
 - b. Decreased osmotic pressure
 - c. Increased hydrostatic pressure
 - d. Decreased hydrostatic pressure

ANS: B

6. Which of the following would cause edema?
 - a. Decreased capillary hydrostatic pressure
 - b. Increased capillary osmotic pressure
 - c. Decreased capillary permeability
 - d. Increased capillary permeability

ANS: D

7. Which of the following would likely be related to an elevated hematocrit reading?
- Fluid excess
 - Fluid deficit
 - Increased sodium level
 - Decreased erythrocytes

ANS: B

8. Which of the following is a typical sign of dehydration?
- Rapid, strong pulse
 - Low hematocrit
 - Increased urine output
 - Rough oral mucosa

ANS: D

9. Which of the following terms refers to a combination of decreased circulating blood volume combined with excess fluid in a body cavity?
- Dehydration
 - Third-spacing
 - Hypovolemia
 - Water retention

ANS: B

10. Which of the following is the primary cation in the extracellular fluid?
- Sodium
 - Potassium
 - Calcium
 - Iron

ANS: A

11. Which of the following is a common cause of hyponatremia?
- Loss of the thirst mechanism
 - Excessive sweating
 - Excessive aldosterone secretion
 - Prolonged period of rapid, deep respirations

ANS: B

12. Which of the following is a common effect of both hypokalemia and hyperkalemia?
- Skeletal muscle twitch and cramps
 - Oliguria
 - Elevated serum pH
 - Cardiac arrhythmias

ANS: D

13. Choose the correct effect of increased parathyroid hormone.

- a. Increased movement of calcium ions into the bones
- b. Increased activation of vitamin D
- c. Increased absorption of calcium from the digestive tract
- d. Decreased reabsorption of calcium in the kidneys

ANS: C

14. Which of the following results from hypocalcemia?

1. Low serum phosphate levels
 2. Nausea and constipation
 3. Skeletal muscle twitch and spasms
 4. Weak cardiac contractions
- a. 1, 2
 - b. 1, 4
 - c. 2, 3
 - d. 3, 4

ANS: D

15. Which of the following causes tetany?

- a. Increased permeability of nerve membranes due to low serum calcium
- b. Excess calcium ions in skeletal muscle due to excess parathyroid hormone (PTH)
- c. Excess calcium ions inside somatic nerves as a result of neoplasms
- d. Increased stimulation of the nerves in the cerebral cortex

ANS: A

16. In which of the following processes is phosphate ion NOT a major component?

- a. Bone metabolism
- b. Metabolic processes involving adenosine triphosphate (ATP)
- c. Blood clotting
- d. Acid-base balance

ANS: C

17. Which of the following would be considered normal serum pH?

- a. 4.5-8
- b. 7.0
- c. 7.4
- d. 8

ANS: C

18. When many excess hydrogen ions accumulate in the blood, what happens to serum pH? The pH:

- a. decreases.
- b. increases.
- c. remains constant.
- d. varies based on metabolism.

ANS: A

19. What is the slowest but most effective control for acid-base balance?

- a. Respiratory system
- b. Buffer systems in the blood
- c. Kidneys
- d. Brain

ANS: C

20. Which of the following is essential in order to maintain serum pH within normal range?
- a. Carbonic acid and bicarbonate ion must be present in equal quantities.
 - b. All excess carbonic acid must be excreted by the kidneys.
 - c. The concentration of bicarbonate ion must remain constant.
 - d. The ratio of carbonic acid to bicarbonate ion must be 1:20.

ANS: D

21. Which is the correct effect on the body of abnormally slow respirations?
- a. Increased carbonic acid
 - b. Decreased carbonic acid
 - c. Increased bicarbonate ion
 - d. Decreased bicarbonate ion

ANS: A

22. Which condition is likely to cause metabolic acidosis?
- a. Slow, shallow respirations
 - b. Prolonged diarrhea
 - c. Mild vomiting
 - d. Excessive fluid in the body

ANS: B

23. What would a serum pH of 7.33 in a patient with kidney disease indicate?
- a. Metabolic alkalosis
 - b. Metabolic acidosis
 - c. Respiratory alkalosis
 - d. Respiratory acidosis

ANS: B

24. Which serum value indicates decompensated metabolic acidosis?
- a. pH is below normal range
 - b. pH is above normal range
 - c. Bicarbonate level decreases
 - d. Bicarbonate level increases

ANS: A

25. What is the effect on blood serum when excessive lactic acid accumulates in the body?
- a. Bicarbonate ion levels decrease
 - b. Bicarbonate ion levels increase
 - c. Carbonic acid levels increase
 - d. pH increases

ANS: A

26. The direct effects of acidosis are manifested primarily in the functioning of the:
- Digestive system
 - Urinary system
 - Nervous system
 - Respiratory system

ANS: C

27. Compensation mechanisms in the body for dehydration would include:
- increased antidiuretic hormone (ADH).
 - decreased aldosterone.
 - slow, strong heart contraction.
 - peripheral vasodilation.

ANS: A

28. Which acid-base imbalance results from impaired expiration due to emphysema?
- Metabolic acidosis
 - Metabolic alkalosis
 - Respiratory acidosis
 - Respiratory alkalosis

ANS: C

29. In patients with impaired expiration associated with emphysema, effective compensation for the acid-base imbalance would be:
- increased rate and depth of respiration.
 - decreased rate and depth of respiration.
 - increased urine pH and decreased serum bicarbonate.
 - decreased urine pH and increased serum bicarbonate.

ANS: D

30. An anxiety attack often causes hyperventilation leading to:
- increased PCO_2 .
 - decreased PCO_2 .
 - respiratory acidosis.
 - metabolic acidosis.

ANS: B

31. One of the factors involved in the increased need for water in infants is:
- proportionally smaller body surface area.
 - higher metabolic rate.
 - smaller respiratory capacity.
 - greater surface area of exposed mucous membranes.

ANS: B

32. Compensation for respiratory system depression due to anesthesia and sedation would be:
- decreased reabsorption of bicarbonate ions in the kidneys.

- b. increased secretion of hydrogen ions into the filtrate.
- c. increased respiratory rate and depth.
- d. increased renin secretion.

ANS: B

33. A prolonged state of metabolic acidosis often leads to:
- a. hypokalemia.
 - b. hyperkalemia.
 - c. hyponatremia.
 - d. hypercalcemia.

ANS: B

34. Strenuous physical exercise on a hot day is likely to result in:
- a. hypokalemia.
 - b. hypernatremia.
 - c. hyperchloremia.
 - d. hypovolemia.

ANS: D

35. Place the following events in the correct sequence of events when ketoacids increase in the blood of a diabetic patient. Not all options are used in the answers.
1. Serum pH decreases
 2. Serum bicarbonate decreases
 3. PCO₂ decreases
 4. Respiration decreases
 5. Respiration increases
 6. Serum pH increases
 7. Urine pH decreases
- a. 1, 3, 7, 4, 2, 6
 - b. 5, 2, 7, 3, 4, 1
 - c. 2, 1, 5, 3, 7, 6
 - d. 3, 1, 2, 5, 7, 6

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ANS: C

36. Which of the following is a manifestation of respiratory alkalosis?
- a. Bradycardia and deep rapid breathing
 - b. Drowsiness and general lethargy
 - c. Increased nervous system irritability
 - d. Decreased urine pH

ANS: C

37. Prolonged diarrhea results in:
- a. loss of fluid and bicarbonate ions, leading to metabolic acidosis.
 - b. increased fluid and serum bicarbonate ions, leading to metabolic acidosis.
 - c. loss of chloride ions only, leading to metabolic alkalosis.
 - d. surplus bicarbonate ions, leading to respiratory alkalosis.

ANS: A

38. In the initial stage, vomiting results in:
- metabolic acidosis.
 - metabolic alkalosis.
 - respiratory alkalosis.
 - None of the above

ANS: B

39. Which two ions are most important for acid-base balance in the body?
- K^+ , Na^+
 - Cl^- and HCO_3^-
 - Ca^{++} , Na^+
 - Na^+ , Cl^-

ANS: B

40. The bicarbonate-carbonic acid buffer system helps maintain serum pH. The balance of the carbonic acid and bicarbonate ion levels are controlled by the:
- liver and pancreas.
 - lungs and kidneys.
 - lungs and plasma proteins.
 - kidneys and bone marrow.

ANS: B

41. Alkalosis increases irritability and spontaneous stimulation of nerves by:
- blocking normal nerve conduction.
 - increasing the permeability of nerve membranes.
 - blocking movement of calcium ions.
 - decreasing phosphate ion levels.

ANS: B

42. Hypocalcemia causes weak cardiac contractions because:
- permeability of nerve membranes increases.
 - insufficient calcium ions are available for muscle contraction.
 - low phosphate ion levels prevent muscle contraction.
 - excessive amounts of calcium are stored in cardiac muscle.

ANS: B

43. Serum potassium levels are affected by:
- ADH.
 - aldosterone.
 - serum H^+ levels.
 - insulin levels.
- 2 only
 - 1, 2
 - 1, 3
 - 2, 3, 4

e. 1, 2, 3

ANS: D

44. Which of the following is the primary control of serum Na⁺ levels?
- ADH
 - Aldosterone
 - Serum H⁺ levels
 - serum K⁺ levels

ANS: B

45. The control center for thirst is located in the:
- kidneys.
 - thalamus.
 - medulla.
 - hypothalamus.

ANS: D

46. Which statements apply to atrial natriuretic peptide?
- It is secreted by heart muscle cells.
 - It is a hormone secreted by the kidneys.
 - It helps to control water and sodium balance.
 - It is released in response to low blood pressure.
- 1, 3
 - 1, 4
 - 2, 3
 - 2, 4

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ANS: A

47. What are the three mechanisms that control or compensate for serum pH?
- Hypothalamus, metabolic changes by digestive system, lymphatic system filtration
 - Buffer pairs in blood, change in kidney excretion rate, change in respiration rate
 - Neural feedback, increase in heart rate, decrease in calcium intake
 - Modification of water intake, increased capillary permeability, decrease in blood volume

ANS: B

48. Hypokalemia refers to a condition in which the serum has a very low level of which ion?
- Sodium
 - Phosphate
 - Calcium
 - Potassium

ANS: D

49. In the blood and extracellular fluids, hypernatremia refers to:
- a deficient sodium level.
 - an excess phosphate level.
 - an excess sodium level.

d. an excessively low phosphate level.

ANS: C

50. Increased milk and/or antacid intake can contribute to development of “milk-alkali syndrome,” which can cause which of the following?
- a. Hyponatremia
 - b. Hyperkalemia
 - c. Hypercalcemia
 - d. Hypovolemia

ANS: C