

***Goulds Pathophysiology for the Health Professions
7th edition VanMeter Test Bank***

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Chapter 02: Fluid, Electrolyte, and Acid-Base Imbalances
VanMeter and Hubert: Gould's Pathophysiology for the Health Professions, 7th Edition

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. Which of the following is NOT part of the extracellular fluid compartment (ECF)?
 - a. Blood
 - b. Cytoplasm
 - c. Cerebrospinal fluid
 - d. Transcellular fluid

ANS: B

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

ANS: C

5. The osmoreceptor cells controlling the thirst mechanism are located in the
 - a. medulla oblongata.
 - b. thalamus.
 - c. epithalamus.
 - d. hypothalamus.

ANS: D

6. 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

7. Which of the following would result from a deficit of plasma proteins?
- Increased osmotic pressure
 - Decreased osmotic pressure
 - Increased hydrostatic pressure
 - Decreased hydrostatic pressure

ANS: B

8. Which of the following would cause edema?
- Decreased capillary hydrostatic pressure
 - Increased capillary osmotic pressure
 - Decreased capillary permeability
 - Increased capillary permeability

ANS: D

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

ANS: B

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

ANS: D

11. 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

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

ANS: A

13. Which of the following is a common cause of hyponatremia?

- a. Loss of the thirst mechanism
- b. Excessive sweating
- c. Excessive aldosterone secretion
- d. Prolonged period of rapid, deep respirations

ANS: B

14. Which of the following is a common effect of both hypokalemia and hyperkalemia?

- a. Skeletal muscle twitch and cramps
- b. Oliguria
- c. Elevated serum pH
- d. Cardiac arrhythmias

ANS: D

15. 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

16. 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

17. 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

18. Paresthesia is an effect of

- a. hyperkalemia.
- b. hypokalemia.
- c. hyponatremia.
- d. hypernatremia.

ANS: B

19. In which of the following processes is the 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

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

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

ANS: C

21. 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

22. 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

23. 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

24. 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

25. 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

26. 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

27. 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

28. 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

29. The direct effects of acidosis are manifested primarily in the functioning of the
- a. digestive system.
 - b. urinary system.
 - c. nervous system.
 - d. respiratory system.

ANS: C

30. Compensation mechanisms in the body for dehydration would include
- a. increased antidiuretic hormone (ADH).
 - b. decreased aldosterone.
 - c. slow, strong heart contraction.
 - d. peripheral vasodilation.

ANS: A

31. Which acid-base imbalance results from impaired expiration due to emphysema?
- a. Metabolic acidosis
 - b. Metabolic alkalosis
 - c. Respiratory acidosis
 - d. Respiratory alkalosis

ANS: C

32. In patients with impaired expiration associated with emphysema, effective compensation for the acid-base imbalance would be

- a. increased rate and depth of respiration.
- b. decreased rate and depth of respiration.
- c. increased urine pH and decreased serum bicarbonate.
- d. decreased urine pH and increased serum bicarbonate.

ANS: D

33. An anxiety attack often causes hyperventilation leading to
- a. increased PCO_2 .
 - b. decreased PCO_2 .
 - c. respiratory acidosis.
 - d. metabolic acidosis.

ANS: B

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

ANS: B

35. Compensation for respiratory system depression due to anesthesia and sedation would be
- a. 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

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

ANS: B

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

ANS: D

38. 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. PCO_2 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

ANS: C

39. 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

40. 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

41. In the initial stage, vomiting results in
- a. metabolic acidosis.
 - b. metabolic alkalosis.
 - c. respiratory alkalosis.
 - d. none of these.

ANS: B

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

ANS: B

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

ANS: B

44. Alkalosis increases irritability and spontaneous stimulation of nerves by
- a. blocking normal nerve conduction.

- b. increasing the permeability of nerve membranes.
- c. blocking movement of calcium ions.
- d. decreasing phosphate ion levels.

ANS: B

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

ANS: B

46. Serum potassium levels are affected by
- 1. ADH.
 - 2. aldosterone.
 - 3. serum H^+ levels.
 - 4. insulin levels.
- a. 2 only
 - b. 1, 2
 - c. 1, 3
 - d. 2, 3, 4
 - e. 1, 2, 3

ANS: D

47. Which of the following is the primary control of serum Na^+ levels?
- a. ADH
 - b. Aldosterone
 - c. Serum H^+ levels
 - d. Serum K^+ levels

ANS: B

48. The control center for thirst is located in the
- a. kidneys.
 - b. thalamus.
 - c. medulla.
 - d. hypothalamus.

ANS: D

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

ANS: A

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

ANS: B

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

ANS: D

52. In the blood and extracellular fluids, hypernatremia refers to
- a. a deficient sodium level.
 - b. an excess phosphate level.
 - c. an excess sodium level.
 - d. an excessively low phosphate level.

ANS: C

53. 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

54. Ingested vitamin D must be activated in the
- a. liver.
 - b. kidney.
 - c. pancreas.
 - d. lung.

ANS: B

55. Neuromuscular hyperirritability may be a cause of
- a. hypomagnesemia.
 - b. hypermagnesemia.
 - c. hypophosphatemia.
 - d. hyperphosphatemia.

ANS: A