

Human Body in Health and Illness 7th edition
Herlihy Test Bank

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Chapter 02: Basic Chemistry
Herlihy: The Human Body in Health and Illness, 7th Edition

MULTIPLE CHOICE

1. Which of the following is located in the orbits surrounding the nucleus?
- Isotopes
 - Protons
 - Electrons
 - Neutrons

ANS: C PTS: 1

2. Which of the following is a measurement of hydrogen ion concentration $[H^+]$?
- Atomic number
 - Atomic mass
 - Isotope
 - pH

ANS: D PTS: 1

3. The sharing of electrons is referred to as:
- covalent bonding.
 - ionic bonding.
 - radioactive decay.
 - isotope formation.

ANS: A PTS: 1

4. Which element must be present for a substance to be classified as organic?
- Iodine
 - Iron
 - Carbon
 - Calcium

ANS: C PTS: 1

5. A cation is a(n):
- positively charged ion.
 - electrolyte.
 - isotope.
 - ion that has an atomic mass of 2.

ANS: A PTS: 1

6. Which of the following is an anion?
- Sodium ion
 - Potassium ion
 - Chloride ion
 - Calcium ion

ANS: C PTS: 1

7. What kind of ion would have 8 protons in its nucleus and 9 electrons in its orbits?
- Cation
 - Electrolyte
 - Acid
 - Anion

ANS: D PTS: 1

8. Which of the following is true of an anion?
- An anion always ionizes to form electrolytes.
 - An anion always has an atomic mass of 15.
 - An anion carries a negative charge.
 - A hydrogen ion is an anion.

ANS: C PTS: 1

9. NaCl, table salt, is called a(n):
- anion.
 - electrolyte.
 - cation.
 - ion.

ANS: B PTS: 1

10. Which process refers to the dissociation of NaCl into Na^+ and Cl^- ?
- Radioactivity
 - Ionization
 - Covalent bonding
 - Hydrogen bonding

ANS: B PTS: 1

11. Which of the following is descriptive of the chemical reaction in the previous question?
- Cation + anion $\rightarrow$ electrolyte
 - Electrolyte $\rightarrow$ cation + anion
 - Electrolyte + anion $\rightarrow$ cation
 - Neutralization of an acid by a base

ANS: B PTS: 1

12. Which of the following is an anion?
- NaCl
 - KCl
 - H_2SO_4
 - HCO_3^-

ANS: D PTS: 1

13. Bases can be classified as being:
- acidic or alkaline.
 - weak or strong.

- c. neutral or biased.
- d. reactive or passive.

ANS: B PTS: 1

14. Which of the following represents bicarbonate, an anion that is important in acid–base regulation?
- a. HCl
 - b. $\text{Ca}(\text{OH})_2$
 - c. HCO_3^-
 - d. KCl

ANS: C PTS: 1

15. Which compound is the universal solvent?
- a. Carbon dioxide
 - b. Oxygen
 - c. ATP
 - d. Water

ANS: D PTS: 1

16. $[\text{H}^+]$ refers to:
- a. an isotope of hydrogen.
 - b. heavy hydrogen.
 - c. hydrogen bonding.
 - d. hydrogen ion concentration.

ANS: D PTS: 1

17. Which compound is a waste product of cellular metabolism?
- a. Oxygen
 - b. Carbon dioxide
 - c. Catalyst
 - d. ATP

ANS: B PTS: 1

18. Which of the following increases the speed of a chemical reaction but is itself not used up in the chemical reaction?
- a. An isotope
 - b. A cation
 - c. A catalyst
 - d. ATP

ANS: C PTS: 1

19. What is the energy-transferring molecule?
- a. H^+
 - b. ATP
 - c. Ca^{2+}
 - d. NaCl

ANS: B PTS: 1

20. Which of the following acts as a catalyst?

- a. An acid
- b. An enzyme
- c. A buffer
- d. ATP

ANS: B PTS: 1

21. Fe^{2+} is formed when iron:

- a. gains 2 protons.
- b. gains 2 electrons.
- c. loses 2 protons.
- d. loses 2 electrons.

ANS: D PTS: 1

22. Which of the following is true of Na^+ ?

- a. It is an anion.
- b. It is an electrolyte.
- c. It bonds ionically with Ca^{2+} .
- d. It is a cation.

ANS: D PTS: 1

23. Which of the following carries lopsided charge?

- a. An anion
- b. A cation
- c. A polar molecule
- d. An ion

ANS: C PTS: 1

24. Which of the following illustrates antacid activity?

- a. $\text{NaCl} \rightarrow \text{Na}^+ + \text{Cl}^-$
- b. $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$
- c. $\text{Mg}(\text{OH})_2 + \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2\text{O}$
- d. $\text{KCl} \rightarrow \text{K}^+ + \text{Cl}^-$

ANS: C PTS: 1

25. Zinc, selenium, cobalt, and iodine are all:

- a. trace elements.
- b. compounds.
- c. radioactive.
- d. isotopes of hydrogen.

ANS: A PTS: 1

26. Iron can be a(n):

- a. anion.

- b. electrolyte.
- c. acid.
- d. cation.

ANS: D PTS: 1

27. Which of the following is described by this statement? One atom of oxygen bonds covalently with two atoms of hydrogen.
- a. Carbon dioxide
 - b. A tincture
 - c. Water
 - d. Neutralization of an acid with a base

ANS: C PTS: 1

28. A solution that has a pH of 6.8:
- a. has a neutral pH.
 - b. is alkaline.
 - c. is basic.
 - d. is acidic.

ANS: D PTS: 1

29. What happens when HCl is added to a solution with a pH of 7.45?
- a. The pH will be higher than 7.45.
 - b. The solution will become more alkaline.
 - c. The $[H^+]$ of the solution will increase.
 - d. The pH will be higher than 8.0.

ANS: C PTS: 1

30. Which pH is considered neutral?
- a. 7.35
 - b. 7.45
 - c. 7.00
 - d. 14.0

ANS: C PTS: 1

31. Blood has a pH range of 7.35 to 7.45 and therefore:
- a. is acidic.
 - b. is three to four times more viscous (thicker) than water.
 - c. has a pH that is similar to urine and stomach contents.
 - d. is alkaline.

ANS: D PTS: 1

32. As assessment of a patient's electrolytes is performed by collecting a sample of the patient's:
- a. saliva.
 - b. urine.
 - c. blood.
 - d. hair follicles.

ANS: C PTS: 1

33. In which of the following is the number of hydrogen ions greater?
- a. An alkaline solution
 - b. A basic solution
 - c. Blood
 - d. A solution with a pH of 6.2

ANS: D PTS: 1

34. An atom has 2 protons, 2 neutrons, and 2 electrons; it has an atomic:
- a. number of 6.
 - b. mass of 2.
 - c. mass of 4.
 - d. number of 4.

ANS: C PTS: 1

35. An atom has 1 proton, 0 neutrons, and 1 electron; its isotope has:
- a. 2 electrons and 0 neutrons.
 - b. 2 protons and 2 neutrons.
 - c. 1 proton and 1 neutron.
 - d. 2 protons and 0 neutrons.

ANS: C PTS: 1

36. An atom has 1 proton, 0 neutrons, and 1 electron. What will convert this atom to a cation?
- a. Add 1 neutron.
 - b. Add 1 proton.
 - c. Lose 1 electron.
 - d. Add 1 proton, 2 neutrons, and 1 electron.

ANS: C PTS: 1

37. The heart pushes blood into the blood vessels as chemical energy is converted to which form of energy?
- a. Thermal
 - b. Radiant
 - c. Mechanical
 - d. Nuclear

ANS: C PTS: 1

38. Which of the following best describes a solution in which water is the solvent?
- a. Colloidal suspension
 - b. Aqueous solution
 - c. Tincture
 - d. Isotope

ANS: B PTS: 1

39. Which of the following best describes a solution in which alcohol is the solvent?
- a. Tincture

- b. Alkaline
- c. Acid
- d. Aqueous

ANS: A PTS: 1

40. A combination of sugar granules and iron filings is best described as a(n):
- a. mixture.
 - b. colloidal suspension.
 - c. tincture.
 - d. isotope.

ANS: A PTS: 1

41. Which of the following can neutralize H^+ ?
- a. Ca^{2+}
 - b. Na^+
 - c. OH^-
 - d. H_2O

ANS: C PTS: 1

42. Which of the following is incorrect?
- a. Mixtures: suspension, colloidal suspension, solution
 - b. Ions: Na^+ , Cl^- , Ca^{2+} , K^+
 - c. Electrolytes: $NaCl$, KCl , $CaCl_2$, HCO_3^-
 - d. Cations: Na^+ , Ca^{2+} , K^+ , H^+

ANS: C PTS: 1

43. The ionization of salt ($NaCl$):
- a. produces an acid and a base.
 - b. produces an electrolyte.
 - c. lowers pH.
 - d. produces a cation and an anion.

ANS: D PTS: 1

44. Which of the following is true of iodine and radioactive iodine?
- a. Both have the same atomic numbers.
 - b. Both have the same atomic masses.
 - c. Neither has electrons in its orbit.
 - d. Both create radiation hazards.

ANS: A PTS: 1

45. Which of the following is true of Na^+ ?
- a. Called the *sodium ion*.
 - b. Has fewer protons than electrons.
 - c. Called an *anion*.
 - d. Lowers pH.

ANS: A PTS: 1

46. Which of the following is true of Cl^- ?

- a. Is an electrolyte.
- b. Is an anion.
- c. Increases pH.
- d. Decreases pH.

ANS: B PTS: 1

47. Which of the following is most descriptive of HCl?

- a. Is called *bicarbonate*.
- b. Is an acid.
- c. Raises pH.
- d. Dissociates into Na^+ and Cl^- .

ANS: B PTS: 1

48. Water is a(n):

- a. molecule.
- b. aqueous solvent.
- c. compound.
- d. All are correct

ANS: D PTS: 1

49. An atom that has 3 protons, 4 neutrons, and 3 electrons:

- a. has an atomic mass of 7.
- b. is a cation.
- c. has an atomic number of 4.
- d. has an atomic number of 10.

ANS: A PTS: 1

50. An atom has 3 protons, 4 neutrons, and 3 electrons; another atom has 3 protons, 3 neutrons, and 3 electrons. Which of the following is most descriptive of this pair of atoms?

- a. Mixture
- b. Cation
- c. Electrolyte
- d. Isotope

ANS: D PTS: 1

51. An atom has 4 protons, 4 neutrons, and 4 electrons. It:

- a. has an atomic number of 8.
- b. is a cation.
- c. has an atomic mass of 12.
- d. has an atomic mass of 8.

ANS: D PTS: 1

52. ATP:

- a. is a buffer, removing H^+ from solution.
- b. is an energy transfer molecule.

- c. is a radioactive isotope of phosphate.
- d. ionizes to H^+ , thereby lowering pH.

ANS: B PTS: 1

53. Which of the following is most descriptive of the nucleus of the atom?
- a. Contents determine the atomic number
 - b. Contents determine the atomic mass
 - c. "Home" of the protons
 - d. All are correct

ANS: D PTS: 1

54. Which of the following is most descriptive of ionic and covalent?
- a. Types of bonding in which the electrons are shared.
 - b. Types of bonding in which the electrons are swapped.
 - c. Types of bonding.
 - d. Types of bonding found only in reactions in which H^+ is produced.

ANS: C PTS: 1

55. An electrolyte:
- a. dissociates into ions.
 - b. yields only cations.
 - c. always yields H^+ and lowers pH.
 - d. always removes H^+ and increases pH.

ANS: A PTS: 1

56. A catalyst:
- a. is an H^+ -yielding molecule.
 - b. is an acid.
 - c. is an alkali.
 - d. increases the speed of a chemical reaction.

ANS: D PTS: 1

57. Which of the following is most descriptive of the function of an enzyme?
- a. Neutralization
 - b. Ionization
 - c. Catalyst
 - d. pH

ANS: C PTS: 1

58. A patient with a blood pH of 7.28:
- a. has an excess of H^+ ions.
 - b. has a blood pH that is within normal limits.
 - c. is alkalotic.
 - d. has a blood pH that indicates a deficiency of acid.

ANS: A PTS: 1

59. A solution with a pH of 8:
- a. is more acidic than blood.
 - b. is more acidic than stomach contents.
 - c. has more H^+ than urine.
 - d. is more alkaline than blood.

ANS: D PTS: 1

60. The pH of urine:
- a. is always more alkaline than blood.
 - b. is always acidic.
 - c. can be acidic or alkaline.
 - d. is more acidic than stomach contents.

ANS: C PTS: 1

61. The addition of H^+ to blood:
- a. increases blood pH.
 - b. makes the blood more acidic.
 - c. makes the blood more alkaline.
 - d. changes the blood pH from 7.4 to 7.8.

ANS: B PTS: 1

62. Blood is called a *colloidal suspension* because:
- a. it has a pH of 7.4.
 - b. it is alkaline.
 - c. it consists of the suspended plasma proteins.
 - d. it consists of the sodium and chloride ions.

ANS: C PTS: 1

63. Which of the following is correct about the following reaction: $NaCl \leftrightarrow Na^+ + Cl^-$?
- a. Neutralization
 - b. Ionization
 - c. Anabolic
 - d. Irreversible

ANS: B PTS: 1

64. An atom of oxygen has an atomic number of 8. Therefore:
- a. it can share electrons with another identical atom.
 - b. it can share electrons with another oxygen atom.
 - c. it can form O_2 .
 - d. All are correct

ANS: D PTS: 1

65. An atom of oxygen shares its outer shell electrons with two hydrogen atoms thereby:
- a. forming an acid.
 - b. ionizing.
 - c. forming a molecule of water.

d. forming an anion and cation.

ANS: C PTS: 1

66. A molecule of water has a (+) charge at one and a (–) charge at the other end of the molecule. What is the best description?

- a. Radioactive
- b. Tincture
- c. Polar molecule
- d. Ionization

ANS: C PTS: 1

67. Intestinal secretions are alkaline. What can decrease its pH?

- a. The addition of H^+ in the form of HCl
- b. Drinking baking soda ($NaHCO_3$)
- c. Neutralization of gastric (stomach) HCl
- d. Drinking lots of water

ANS: A PTS: 1

68. What do the following have in common: Pb, plumbism, and plumber? All terms refer to:

- a. persons who work with pipes.
- b. toxic effects of a trace element.
- c. toxic cations.
- d. lead.

ANS: D PTS: 1

69. Which group is correct?

- a. Subatomic particles located within the nucleus: protons, neutrons, electrons
- b. Common cations: Na^+ , K^+ , HCO_3^- , NH_4^+
- c. Common molecules: O_2 , N_2 , H_2O
- d. Bases: NaOH, $NaHCO_3^-$, HCl

ANS: C PTS: 1

70. Which of the following is most descriptive of a precipitate that forms during a chemical reaction?

- a. Acid
- b. Base
- c. Solid
- d. Solution

ANS: C PTS: 1

71. In the reaction $HCl \rightarrow H^+ + Cl^-$:

- a. HCl ionizes, thereby yielding the cation (H^+) and anion (Cl^-).
- b. hydrochloric acid dissociates into an anion and cation.
- c. HCl dissociates into a hydrogen ion and chloride ion.
- d. All are correct

ANS: D PTS: 1

72. Which group is correct?
- a. Blood pH 7.50, alkaline, turns litmus paper pink
 - b. Blood pH 7.2, acidosis, turns litmus paper pink
 - c. Blood pH 7.35, normal blood pH, turns litmus paper blue
 - d. More than one of the options are true.

ANS: C

PTS: 1