

Herlihy: The Human Body in Health and Illness, 4th Edition

Chapter 2: Basic Chemistry

Test Bank

MULTIPLE CHOICE

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

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

ANS: D
3. The sharing of electrons is referred to as
 - a. covalent bonding.
 - b. ionic bonding.
 - c. radioactive decay.
 - d. isotope formation.

ANS: A
4. Which element must be present for a substance to be classified as organic?
 - a. Iodine
 - b. Iron
 - c. Carbon
 - d. Calcium

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

ANS: A
6. Which of the following is an anion?

- a. Sodium ion
- b. Potassium ion
- c. Chloride ion
- d. Calcium ion

ANS: C

7. Which ion has 8 protons in the nucleus and 9 electrons in its orbits?
- a. Cation
 - b. Electrolyte
 - c. Acid
 - d. Anion

ANS: D

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

ANS: C

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

ANS: B

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

ANS: B

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

ANS: B

12. Which of the following is an anion?
- a. NaCl
 - b. KCl

- c. H_2SO_4
- d. HCO_3^-

ANS: D

13. 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

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

ANS: D

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

ANS: D

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

ANS: B

17. 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

18. What is the energy-transferring molecule?
- a. H^+
 - b. ATP

- c. Ca^{2+}
- d. NaCl

ANS: B

19. Which of the following acts as a catalyst?
- a. An acid
 - b. An enzyme
 - c. A buffer
 - d. ATP

ANS: B

20. The word *ferrous* refers to
- a. an acid solution.
 - b. an alkaline solution.
 - c. any cation.
 - d. iron.

ANS: D

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

ANS: D

22. Which of the following carries no net electrical charge?
- a. An anion
 - b. A cation
 - c. A polar molecule
 - d. An ion

ANS: C

23. 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

24. Zinc, selenium, cobalt, and iodine are all
- a. trace elements.
 - b. compounds.
 - c. radioactive.
 - d. isotopes of hydrogen.

ANS: A

25. Iron is a(n)
- a. anion.
 - b. electrolyte.
 - c. acid.
 - d. cation.

ANS: D

26. 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

27. 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

28. 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

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

ANS: C

30. 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

31. In which of the following is the number of hydrogen ions greater?
- a. An alkaline solution
 - b. A basic solution
 - c. Blood
 - d. Urine

ANS: D

32. 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

33. 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

34. 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 and 2 neutrons, and eliminate 1 electron.

ANS: C

35. 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

36. 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

37. Which of the following best describes a solution in which alcohol is the solvent?
- Tincture
 - Alkaline
 - Acid
 - Aqueous

ANS: A

38. A combination of sugar granules and iron filings is best described as a(n)
- mixture.
 - colloidal suspension.
 - tincture.
 - isotope.

ANS: A

39. Which of the following can neutralize H^+ ?
- Ca^{2+}
 - Na^+
 - OH^-
 - H_2O

ANS: C

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

ANS: C

41. The ionization of salt ($NaCl$)
- produces an acid and a base.
 - produces an electrolyte.
 - lowers pH.
 - produces a cation and an anion.

ANS: D

42. Which of the following is true of iodine and radioactive iodine?
- Both have the same atomic numbers.
 - Both have the same atomic masses.
 - Neither have electrons in their orbits.
 - Both create radiation hazards.

ANS: A

43. 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

44. Which of the following is true of Cl^- ?
- a. Is an electrolyte
 - b. Is an anion
 - c. Increases pH
 - d. Is an electrolyte

ANS: A

45. 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: A

46. Water is a(n)
- a. molecule.
 - b. aqueous solvent.
 - c. compound.
 - d. all of the above.

ANS: C

47. 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

48. 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

49. An atom that 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

50. 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

51. 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 of the above

ANS: D

52. 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 only found in reactions in which H^+ is produced

ANS: C

53. 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

54. 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

55. Which of the following is most descriptive of the function of an enzyme?

- a. Neutralization
- b. Ionization

- c. Catalyst
- d. pH

ANS: C

56. A patient with a blood pH of 7.28
- a. has an excess of H^+ .
 - 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

57. 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

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

ANS: C

59. 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

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

ANS: C