

## Chapter 02: Chemistry of Life

### VanMeter: Microbiology for the Healthcare Professional, 2nd Edition

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#### MULTIPLE CHOICE

1. The atomic number equals the number of
  - a. protons.
  - b. neutrons.
  - c. electrons.
  - d. protons and neutrons.

ANS: A                      REF: p. 20

2. The atomic weight is equal to the sum of
  - a. neutrons.
  - b. protons and neutrons.
  - c. neutrons and electrons.
  - d. electrons.

ANS: B                      REF: p. 20

3. The smallest units of matter are
  - a. molecules.
  - b. atoms.
  - c. protons.
  - d. compounds.

ANS: B                      REF: p. 20

4. Protons are
  - a. located in the shells.
  - b. part of the atomic nucleus.
  - c. negatively charged.
  - d. uncharged particles.

ANS: B                      REF: p. 20

5. Particles of an atom located in the outermost shell and available for chemical bonding are called
  - a. valence electrons.
  - b. isotopes.
  - c. excess electrons.
  - d. neutrons.

ANS: A                      REF: p. 21

6. Isotopes are atoms with
  - a. the same number of electrons and protons.
  - b. different numbers of protons and electrons.
  - c. the same numbers of protons but a different number of neutrons.
  - d. different numbers of electrons.

ANS: C REF: p. 21

7. A chemical bond in which electrons are equally shared is a(n)
- ionic bond.
  - polar covalent bond.
  - nonpolar covalent bond.
  - hydrogen bond.

ANS: C REF: p. 23

8. The transfer of electrons in a chemical bond represents a(n)
- ionic bond.
  - polar covalent bond.
  - nonpolar covalent bond.
  - hydrogen bond.

ANS: A REF: p. 24

9. The bond of oxygen and hydrogen between water molecules is a(n)
- ionic bond.
  - polar covalent bond.
  - nonpolar covalent bond.
  - hydrogen bond.

ANS: D REF: p. 24

10. The isotope deuterium has
- one proton.
  - one proton and one neutron.
  - one proton and two neutrons.
  - one proton and three neutrons.

ANS: B REF: p. 21

11. After filling the first shell, the outermost shell of an atom can hold up to \_\_\_\_\_ electrons.
- 2
  - 6
  - 8
  - 10

ANS: C REF: p. 23

12. The bond between sodium and chlorine atoms in sodium chloride is a(n)
- hydrogen bond.
  - ionic bond.
  - polar covalent bond.
  - nonpolar covalent bond.

ANS: B REF: p. 24

13. Sucrose is composed of

- a. glucose and galactose.
- b. glucose and fructose.
- c. fructose and maltose.
- d. glucose and maltose.

ANS: B                    REF: p. 31

14. The unit molecules (monomers) of carbohydrates are
- a. monosaccharides.
  - b. amino acids.
  - c. nucleic acids.
  - d. fatty acids.

ANS: A                    REF: p. 31

15. The bond between amino acids is a(n)
- a. ionic bond.
  - b. peptide bond.
  - c. hydrogen bond.
  - d. covalent bond.

ANS: B                    REF: p. 32

16. Glucose and fructose are examples of
- a. monosaccharides.
  - b. disaccharides.
  - c. polysaccharides.
  - d. lipids.

ANS: A                    REF: p. 31

17. Two glucose molecules form
- a. galactose.
  - b. lactose.
  - c. maltose.
  - d. fructose.

ANS: C                    REF: p. 31

18. Starch is an example of a
- a. monosaccharide.
  - b. polysaccharide.
  - c. peptide.
  - d. protein.

ANS: B                    REF: p. 31

19. Cytosine always undergoes complementary base pairing with
- a. adenine.
  - b. guanine.
  - c. thymine.
  - d. uracil.

ANS: B

REF: p. 36

20. The RNA nucleotide base that pairs with adenine of DNA is
- cytosine.
  - guanine.
  - thymine.
  - uracil.

ANS: D

REF: p. 36

### COMPLETION

1. Neutrons are \_\_\_\_\_ charged particles.

ANS: not

REF: p. 20

2. An atom with the same number of protons but a different number of neutrons is called a(n) \_\_\_\_\_.

ANS: isotope

REF: p. 21

3. A positively charged ion is a(n) \_\_\_\_\_.

ANS: cation

REF: p. 22

4. The breakdown of large molecules into smaller ones in the presence of water is called \_\_\_\_\_.

ANS: hydrolysis

REF: p. 25

5. Molecules that can absorb hydrogen ions and not change the pH of the substance are \_\_\_\_\_.

ANS: buffers

REF: p. 28

6. The formation of polymers from simpler substances is referred to as \_\_\_\_\_.

ANS: synthesis

REF: p. 25

7. When the solute concentration outside a cell is the same as the concentration inside the cell, the solution is called \_\_\_\_\_.

ANS: isotonic

REF: p. 29

8. The monomers of triglycerides are \_\_\_\_\_ and fatty acids.

ANS: glycerol

REF: p. 31

9. Lactose is composed of glucose and \_\_\_\_\_.

ANS: galactose

REF: p. 31

10. Chemically, ATP is a(n) \_\_\_\_\_.

ANS: nucleic acid

REF: p. 38

## MATCHING

*Match the description below with the correct item from this list.*

- a. Redox
  - b. Electron
  - c. Neutron
  - d. Acid
  - e. Base
  - f. Salt
  - g. Glucose
  - h. Protein
  - i. Polysaccharide
  - j. Nucleic acid
  - k. Lipid
  - l. Tritium
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- 1. Radioactive isotope
  - 2. Negatively charged particle
  - 3. Reduction–oxidation reactions
  - 4. Hydrogen ion donor
  - 5. Ammonium chloride
  - 6. Monomer
  - 7. Cellulose
  - 8. Particle with no charge
  - 9. Prostaglandin

10. Amino acid chain

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|------------|------------|
| 1. ANS: L  | REF: p. 22 |
| 2. ANS: B  | REF: p. 20 |
| 3. ANS: A  | REF: p. 25 |
| 4. ANS: D  | REF: p. 27 |
| 5. ANS: F  | REF: p. 28 |
| 6. ANS: G  | REF: p. 31 |
| 7. ANS: I  | REF: p. 31 |
| 8. ANS: C  | REF: p. 20 |
| 9. ANS: K  | REF: p. 33 |
| 10. ANS: H | REF: p. 32 |