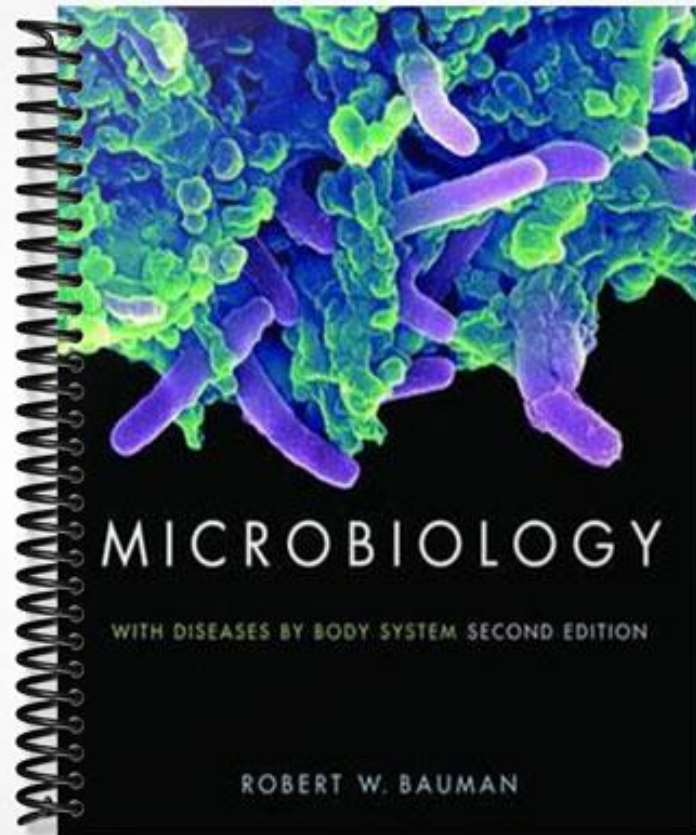


**TEST BANK**



**MICROBIOLOGY**

WITH DISEASES BY BODY SYSTEM SECOND EDITION

ROBERT W. BAUMAN

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 1) Which of the following is an uncharged particle found in the nucleus of an atom and which has no electrical charge? 1) \_\_\_\_\_
- A) electron
  - B) element
  - C) neutron
  - D) proton
  - E) isotope
- 2) An atom of carbon that has six protons and seven neutrons is an example of a(n) 2) \_\_\_\_\_
- A) dalton.
  - B) isotope.
  - C) molecule.
  - D) radioactive isotope.
  - E) compound.
- 3) Which of the following describes an isotope of an atom? 3) \_\_\_\_\_
- A) It has more neutrons than protons.
  - B) The number of its protons, neutrons, and electrons are all equal.
  - C) It has more protons than electrons.
  - D) It has more electrons than protons.
  - E) It does not have any neutrons.
- 4) Which of the following are responsible for the reactivity of atoms with each other in chemical reactions? 4) \_\_\_\_\_
- A) valence electrons
  - B) atomic nuclei
  - C) protons
  - D) radioactive isotopes
  - E) neutrons
- 5) All of the following are associated with atomic structure EXCEPT: 5) \_\_\_\_\_
- A) valence.
  - B) dalton.
  - C) monomer.
  - D) neutron.
  - E) electron shell.
- 6) A calcium atom has a valence of +2. This means that calcium can 6) \_\_\_\_\_
- A) give up 2 electrons.
  - B) receive 2 electrons.
  - C) react with an atom that has a valence of -2.
  - D) Both A and C are correct.
  - E) Both B and C are correct.
- 7) The type of bond produced when atoms share electrons is a(n) 7) \_\_\_\_\_
- A) hydrogen bond.
  - B) covalent bond.
  - C) ionic bond.

D) Both A and B are correct.

E) A, B, and C are correct.

8) All of the following are true statements concerning polar covalent bonds EXCEPT: 8) \_\_\_\_\_

A) They involve unequal sharing of electrons.

B) They involve cations and anions.

C) They occur between two atoms with significantly different electronegativities.

D) They contribute to the water solubility of a molecule.

E) Water is an example of a molecule with this type of bond.

9) All of the following are characteristics of a carbon atom that makes it useful to life EXCEPT: 9) \_\_\_\_\_

A) it can serve as a four-way "intersection" in a molecule.

B) it can form very long molecular chains.

C) it is used in the formation of important molecules such as proteins.

D) it can share electrons with other atoms.

E) it has three naturally occurring isotopes.

10) All of the following are associated with ionic bonds EXCEPT: 10) \_\_\_\_\_

A) cations.

B) radioactivity.

C) salts.

D) anions.

E) electrolytes.

11) Which of the following is an incorrect pairing? 11) \_\_\_\_\_

A) synthesis: endothermic

B) electrolytes: anions

C) catabolism: exothermic

D) hydrolysis: hydrogen bonds

E) dehydration: anabolism

12) When water molecules interfere with the ionic bonds of salts, this process is called 12) \_\_\_\_\_

A) dissociation.

B) denaturation.

C) dehydration.

D) detachment.

E) decomposition.

13) All of the following are properties of water EXCEPT: 13) \_\_\_\_\_

A) water is a product of dehydration synthesis.

B) many solutes will dissolve in water.

C) hydrogen bonds form the connection between water molecules.

D) water has three polar covalent bonds.

E) water has a high capacity for heat.

14) The production of carbon dioxide and water from glucose is an example of a(n) \_\_\_\_\_ reaction. 14) \_\_\_\_\_

A) exothermic

- B) decomposition
- C) catabolic
- D) Both B and C are correct.
- E) A, B, and C are correct.

- 15) The reverse of a dehydration synthesis reaction is a(n) \_\_\_\_\_ 15) \_\_\_\_\_  
reaction.
- A) exchange
  - B) metabolic
  - C) endothermic
  - D) anabolic
  - E) hydrolytic
- 16) Which pH would be alkaline? 16) \_\_\_\_\_  
A) 1.5      B) 4.0      C) 8.0      D) 7.0      E) 6.5
- 17) All of the following are characteristics of saturated fats EXCEPT: 17) \_\_\_\_\_
- A) their fatty acids pack tightly together.
  - B) they are usually solid at room temperature.
  - C) they contain at least one double bond.
  - D) they are found in animals.
  - E) they are used to store energy.
- 18) Which of the following is NOT associated with phospholipids? 18) \_\_\_\_\_
- A) fused carbon rings
  - B) glycerol
  - C) micelles
  - D) fatty acids
  - E) bilayers
- 19) All of the following are uses of carbohydrates in organisms EXCEPT: 19) \_\_\_\_\_
- A) as a long-term energy source.
  - B) as a component of cell walls.
  - C) to keep membranes flexible at low temperatures.
  - D) as a short-term energy source.
  - E) as a building block of DNA and RNA molecules.
- 20) Which of the following types of lipids can be used to keep some 20) \_\_\_\_\_  
microorganisms from drying out?
- A) saturated fats
  - B) polyunsaturated fats
  - C) steroids
  - D) waxes
  - E) unsaturated fats
- 21) Which of the following is an example of a polysaccharide? 21) \_\_\_\_\_
- A) fructose
  - B) deoxyribose
  - C) glucose
  - D) glycogen
  - E) sucrose

- 22) Which of the following is a true statement concerning cellulose? 22) \_\_\_\_\_
- A) It is a polymer of glucose.
  - B) It contains  $\alpha$ -1,4 bonds.
  - C) It is a long, unbranched molecule.
  - D) Both B and C are true.
  - E) Both A and C are true.
- 23) All of the following are components of an amino acid EXCEPT: 23) \_\_\_\_\_
- A) a pentose group.
  - B) an amino group.
  - C) a carboxyl group.
  - D) an  $\alpha$ -carbon.
  - E) an R group.
- 24) All of the following are associated with proteins EXCEPT: 24) \_\_\_\_\_
- A)  $\alpha$ -helices.
  - B) enzymes.
  - C) peptide bonds.
  - D) pyrimidines.
  - E) disulfide bridges.
- 25) Hydrogen bonds would be found in all of the following EXCEPT: 25) \_\_\_\_\_
- A) between the R groups of amino acids in proteins.
  - B) in  $\alpha$ -helices.
  - C) between water molecules.
  - D) in the DNA double helix between nucleotides.
  - E) between phosphates in ATP.
- 26) All of the following can cause disruptions in the three-dimensional structure of proteins EXCEPT: 26) \_\_\_\_\_
- A) changes in fatty acid composition.
  - B) changes in pH.
  - C) changes in salt concentration.
  - D) amino acid substitutions.
  - E) changes in temperature.
- 27) Which of the following is an example of a pyrimidine? 27) \_\_\_\_\_
- A) guanine
  - B) thymine
  - C) adenine
  - D) Both B and C are correct.
  - E) A, B, and C are correct.
- 28) All of the following bases are found in RNA molecules EXCEPT: 28) \_\_\_\_\_
- A) uracil.
  - B) guanine.
  - C) thymine.
  - D) cytosine.
  - E) adenine.
- 29) All of the following are associated with the structure of DNA molecules EXCEPT: 29) \_\_\_\_\_

- A) hydrogen bonds.
- B) pentose sugars.
- C) antiparallel strands.
- D) high-energy bonds.
- E) phosphate.

- 30) Which of the following would NOT normally be found as a component of a cell's nucleic acids? 30) \_\_\_\_\_
- A) adenine deoxyribonucleotides
  - B) cytosine ribonucleotides
  - C) uracil deoxyribonucleotides
  - D) adenine ribonucleotides
  - E) thymine deoxyribonucleotides
- 31) All of the following are associated with ATP molecules EXCEPT: 31) \_\_\_\_\_
- A) high-energy bonds.
  - B) a recyclable energy supply.
  - C) three phosphate groups.
  - D) used to form coenzymes.
  - E) a long-term energy supply.
- 32) All of the following statements concerning nucleic acids are true EXCEPT: 32) \_\_\_\_\_
- A) Some viruses use DNA in their genomes.
  - B) Nucleic acids have a linear "spine" composed of alternating sugars and bases.
  - C) Not all DNA is double stranded.
  - D) Nucleic acid strands are held together by hydrogen bonds between complementary bases.
  - E) Cytosine is found in all nucleic acid molecules.
- 33) Which of the following is an incorrect pairing? 33) \_\_\_\_\_
- A) secondary structure: disulfide bridges
  - B) secondary structure: beta-pleated sheets
  - C) primary structure: amino acid sequence
  - D) tertiary structure: covalent bonds
  - E) quaternary structure: two or more polypeptides
- 34) All of the following are classified as macromolecules EXCEPT: 34) \_\_\_\_\_
- A) carbohydrates.
  - B) amino acids.
  - C) nucleic acids.
  - D) proteins.
  - E) lipids.
- 35) An increase in the pH of a solution by 2 whole numbers represents a change in the number of hydrogen ions by what factor? 35) \_\_\_\_\_
- A) 2                      B) 10                      C) 1,000                      D) 20                      E) 100

**MATCHING. Choose the item in column 2 that best matches each item in column 1.**

*Match the terms on the right with the appropriate description on the left:*

- |   |                         |           |
|---|-------------------------|-----------|
| 36) Triglycerides                       | A) Fatty acids          | 36) _____ |
| 37) Some are used as hormones           | B) Steroids             | 37) _____ |
| 38) Found in the membranes of all cells | C) Polyunsaturated fats | 38) _____ |
|   | D) Waxes                |           |
|   | E) Fats                 |           |
|   | F) Phospholipids        |           |

*Match each term on the left with the appropriate term on the right:*

- |                |            |           |
|----------------|------------|-----------|
| 39) Sucrose    | A) Polymer | 39) _____ |
| 40) DNA        | B) Monomer | 40) _____ |
| 41) Pentose    |            | 41) _____ |
| 42) Amino acid |            | 42) _____ |
| 43) Glucose    |            | 43) _____ |
| 44) Nucleotide |            | 44) _____ |
| 45) Glycogen   |            | 45) _____ |

**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

- |  |           |
|--|-----------|
| 46) The smallest chemical units of matter are atoms.                                       | 46) _____ |
| 47) The side groups of amino acids can interact with each other, and with other molecules. | 47) _____ |
| 48) Monosaccharides are usually found in cyclic forms.                                     | 48) _____ |
| 49) The electron shells of atoms hold eight electrons each.                                | 49) _____ |
| 50) Hydrogen bonds are weaker than covalent bonds.   | 50) _____ |
| 51) Carbohydrates are composed of carbon, hydrogen, and oxygen.                            | 51) _____ |
| 52) Denaturation of a protein is always permanent.   | 52) _____ |
| 53) Inorganic chemicals useful to living things include water, sterols, and metal ions.    | 53) _____ |
| 54) Organisms function only within narrow pH ranges.                                       | 54) _____ |

55) Salts are produced from dehydration reactions in which acids and bases neutralize each other. 55) \_\_\_\_\_

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

56) Another name for a unit of atomic mass is a(n) \_\_\_\_\_. 56) \_\_\_\_\_

57) Matter composed of a single type of atom is called a(n) \_\_\_\_\_. 57) \_\_\_\_\_

58) Cell-surface markers composed of both carbohydrate and lipid molecules are known as \_\_\_\_\_. 58) \_\_\_\_\_

59) \_\_\_\_\_ are molecules, such as amino acids, that have identical atoms and functional groups but are mirror images of each other. 59) \_\_\_\_\_

60) In organic molecules, the letter \_\_\_\_\_ designates atoms that vary from one molecule to another within a class. 60) \_\_\_\_\_

61) A(n) \_\_\_\_\_ is a molecule that binds with hydrogen ions when it is dissolved in water. 61) \_\_\_\_\_

62) Molecules that are insoluble in water are often called \_\_\_\_\_, which literally means "water-fearing." 62) \_\_\_\_\_

63) \_\_\_\_\_ are lipids that consist primarily of four fused rings of carbon. 63) \_\_\_\_\_

64) A six-carbon sugar used for energy in cells is called a(n) \_\_\_\_\_. 64) \_\_\_\_\_

65) A(n) \_\_\_\_\_ is any molecule that speeds up a chemical reaction. 65) \_\_\_\_\_

66) A(n) \_\_\_\_\_ is a ball-shaped structure composed of a single layer of phospholipids. 66) \_\_\_\_\_

67) A chemical reaction that traps energy within newly formed chemical bonds is a(n) \_\_\_\_\_ reaction. 67) \_\_\_\_\_

68) A(n) \_\_\_\_\_ is a substance that maintains the pH even when the amounts of acid and/or base are changing. 68) \_\_\_\_\_

69) The sum of all the chemical reactions within an organism is referred to as its \_\_\_\_\_. 69) \_\_\_\_\_

70) A(n) \_\_\_\_\_ is an atom that has a full negative charge. 70) \_\_\_\_\_

**ESSAY. Write your answer in the space provided or on a separate sheet of paper.**

71) Compare and contrast synthesis reactions with decomposition reactions.



- 72) Discuss the importance of hydrogen bonds in the chemistry of the cell.
- 73) Define and discuss the importance and impact of pH on living organisms.
- 74) Describe the chemical properties of phospholipids that account for their behavior in water.
- 75) Discuss the importance of the element phosphorus to living organisms.

- 1) C
- 2) B
- 3) A
- 4) A
- 5) C
- 6) D
- 7) B
- 8) B
- 9) E
- 10) B
- 11) D
- 12) A
- 13) D
- 14) E
- 15) E
- 16) C
- 17) C
- 18) A
- 19) C
- 20) D
- 21) D
- 22) E
- 23) A
- 24) D
- 25) E
- 26) A
- 27) B
- 28) C
- 29) D
- 30) C
- 31) E
- 32) B
- 33) A
- 34) B
- 35) E

36) E

37) B

38) F

39) A

40) A

41) B

42) B

43) B

44) B

45) A

46) TRUE

47) TRUE

- 48) TRUE
- 49) FALSE
- 50) TRUE
- 51) TRUE
- 52) FALSE
- 53) FALSE
- 54) TRUE
- 55) FALSE
- 56) dalton
- 57) element
- 58) glycolipids
- 59) Stereoisomers
- 60) R
- 61) base
- 62) hydrophobic
- 63) Steroids
- 64) hexose
- 65) catalyst
- 66) micelle
- 67) endothermic
- 68) buffer
- 69) metabolism
- 70) anion
- 71) Synthesis and decomposition reactions are often the reverse of each other. Synthesis reactions consume energy (endothermic), while decomposition reactions release energy (exothermic). Synthesis reactions often release water molecules in a process called dehydration synthesis, whereas decomposition reactions often consume water molecules in a process called hydrolysis. Finally, decomposition reactions break large macromolecules into their component monomers, which can then be used in synthesis reactions to build new macromolecules for use by the cell.
- 72) The chemistry of the cell would basically be impossible without the use of hydrogen bonds. The water in which all cellular reactions occur would not have its unique properties of cohesiveness and polarity, without hydrogen bonds. Hydrogen bonds hold the double helix of DNA together, as well as contributing to the overall shape of protein molecules. However, they are not permanent bonds like covalent bonds, so they can easily and temporarily be reversed, which is important at certain points in the cell's life cycle (such as when the time comes for DNA molecules to be duplicated).
- 73) pH is the measurement of the hydrogen ion concentration of a solution or a cell. The relationship between pH and hydrogen ions is an inverse one: as the number of hydrogen ions increases, the pH drops (acid), and as the number of ions decreases, the pH rises (basic). Most organisms have a fairly narrow range of pH in which they can exist, because changes in pH can have drastic consequences for important cellular molecules such as proteins, which in turn can have a disastrous effect on the metabolism and structure of the cell. Although every organism has this narrow range of pH in which it functions, the range can vary widely among organisms: some organisms prefer fairly acidic pH levels, while others can function only at alkaline pH levels.
- 74) Phospholipids have polar phosphate "heads" and nonpolar fatty acid "tails" that interact in different ways with water molecules. The phospholipid heads are attracted to water molecules, which are also polar, but the nonpolar tails of the phospholipid are repelled by water. As the tails try to get away from the water molecules, they congregated together, either in the interior of a ball of lipid (called a micelle) or within the interior of a double layer of phospholipids (called a bilayer). This leaves the phosphate heads "outside,"

where they can easily interact with the water molecules.

75) Phosphorus is an essential component of many organic compounds, primarily in the form of the phosphate group. This group is found in phospholipid molecules and gives them a partially polar nature that accounts for their interaction with water molecules in the formation of phospholipid membranes. Phosphate is also found in the backbone of nucleic acids, alternating with ribose or deoxyribose molecules. Finally, phosphate is a major component of ATP, which provides a chemical mechanism for trapping and transferring energy in the various chemical reactions of the cell.