Nester's Microbiology A Human Perspective 9th edition Anderson Test Bank

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Nester's Microbiology, 9e **(Anderson)**
Chapter 2 The Molecules of Life

1) In addition to investigations with bacteria that led to Pasteur being considered the Father of Microbiology, he also
A) found that some molecules can exist as stereoisomers AND created aspartame.
B) created aspartame AND separated organic acids using a microscope.
C) found that some molecules can exist as stereoisomers AND separated organic acids using a microscope.
D) separated organic acids using a microscope AND discovered polarized light.
E) discovered polarized light AND found that some molecules can exist as stereoisomers.

Answer: C
Section: 02.01
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.01 Describe the general structure of an atom and its isotopes.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

2) The negatively charged component of the atom is the
A) proton.
B) electron.
C) neutron.
D) nucleus.
E) valence.

Answer: B
Section: 02.01
Topic: Chemistry
Bloom's: 1. Remember
Learning Outcome: 02.01 Describe the general structure of an atom and its isotopes.
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3) The part of the atom that is most involved in chemical reactivity is the
A) proton.
B) neutron.
C) electron.
D) nucleus.
E) ion.

Answer: C
Section: 02.01
Topic: Chemistry
Bloom's: 2. Understand
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4) Electrons
A) are found in the area outside the nucleus known as the cloud.
B) may gain energy but do not lose energy.
C) cannot move from one shell to another within the cloud.
D) are located farthest from the nucleus and have the least energy.
E) are positively charged particles in an atom.

Answer: A
Section: 02.01
Topic: Chemistry
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ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

5) The atomic number for an atom of a specific element is equal to (Check all that apply)
A) the number of electrons in a single atom of that element.
B) the number of electrons plus neutrons in a single atom of that element.
C) the number of protons in a single atom of that element.
D) the number of neutrons and protons in a single atom of that element.
E) the position of an ion on the periodic table.

Answer: A, C
Section: 02.01
Topic: Chemistry
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6) Sharing of electrons between 2 atoms forms a(n)
A) hydrogen bond.
B) ionic bond.
C) covalence bond.
D) atomic bond.
E) covalent bond.

Answer: E
Section: 02.02
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.03 Compare and contrast ionic bonds, covalent bonds, and hydrogen bonds.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

7) If electrons are gained or lost in the formation of a bond, the bond is a(n) _____ bond.
A) ionic
B) covalent
C) hydrogen
D) nonpolar
E) intermediate

Answer: A
Section: 02.02
Topic: Chemistry
Bloom's: 2. Understand
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8) Charged atoms are called
A) ions.
B) neutrons.
C) molecules.
D) polymers.
E) atoms.

Answer: A
Section: 02.02
Topic: Chemistry
Bloom's: 1. Remember
Learning Outcome: 02.03 Compare and contrast ionic bonds, covalent bonds, and hydrogen bonds.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

9) Water
A) is a polar molecule.
B) is referred to as a universal solvent.
C) makes up over 70% of an organism.
D) is often a product or reactant in chemical reactions.
E) All of the answer choices are correct.

Answer: E
Section: 02.03
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.05 Describe the properties of water, and explain why it is so important in biological systems.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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10) pH
A) is a measure of the hydrogen ion concentration in a solution.
B) is measured using a scale from 5 to 8.
C) is measured using a linear (not logarithmic) scale.
D) is an abbreviation for "power of helium."
E) is a measure of the OH^+ concentration of a solute.

Answer: A
Section: 02.03
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.06 Explain the concept of pH, and how the pH of a solution relates to its acidity.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

11) The subunits (building blocks) of proteins are
A) nucleotides.
B) phospholipids.
C) amino acids.
D) carbohydrates.
E) monosaccharides.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 1. Remember
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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12) If the side chains of amino acids contain carboxyl (-COOH) groups, they
A) contribute a positive charge to the amino acid at pH 10 AND are considered acidic amino acids.
B) contribute a negative charge to the amino acid at pH 10 AND are considered nucleic acids.
C) contribute a positive charge to the amino acid at pH 10 AND are considered nucleic acids.
D) contribute a negative charge to the amino acid at pH 10 AND are considered acidic amino acids.
E) contribute a negative charge to the amino acid at pH 10 AND are considered acidic monosaccharides.

Answer: D
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
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13) Amino acids that contain many methyl (-CH_3) groups
A) are considered hydrophilic.
B) are nonpolar.
C) carry a positive charge.
D) carry a negative charge.
E) are considered hydrophilic AND carry a positive charge.

Answer: B
Section: 02.04
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14) D-amino acids are associated with
A) radioactive isotopes.
B) bacterial cell walls.
C) plant proteins.
D) human proteins.
E) all proteins.

Answer: B
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Topic: Chemistry
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Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

15) The most important feature of a protein is its
A) secondary structure.
B) side group.
C) shape.
D) electric charge.
E) size.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

16) Alpha helices and beta pleated sheets form a protein's
A) primary structure.
B) secondary structure.
C) tertiary structure.
D) quaternary structure.
E) multi-structure.

Answer: B
Section: 02.04
Topic: Chemistry
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17) Acidic or basic amino acids are
A) insoluble in water.
B) readily soluble in water.
C) unable to form ions.
D) considered hydrophobic.
E) unable to form peptide bonds.

Answer: B
Section: 02.04
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ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

18) The N terminal in a protein
A) is the end characterized by a free carboxyl group.
B) is the end characterized by a free amino group.
C) is typically found in the middle of a protein.
D) is the part of a protein that is bound to another protein.
E) is indicated with an "R."

Answer: B
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

19) Select the FALSE statement regarding protein denaturation.
A) Denaturation can occur due to certain chemicals.
B) Denaturation can occur due to pH changes.
C) Denaturation can occur due to high temperature.
D) Denaturation may cause the protein to no longer function.
E) Denaturation cannot be reversed.

Answer: E
Section: 02.04
Topic: Chemistry
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20) Select the FALSE statement regarding carbohydrates.
A) They may be part of the structure of bacteria.
B) They may serve as a source of food.
C) They contain carbon, hydrogen, and oxygen in a 1:2:1 ratio.
D) They may be bonded to proteins to form glycoproteins.
E) Cholesterol and ergosterol are examples of carbohydrates.

Answer: E
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

21) Carbohydrates
A) form only ring structures.
B) form only linear structures.
C) may interconvert between ring and linear structures.
D) contain both ring and linear portions within the same molecule.
E) are all structural isomers of each other.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.08 Describe the characteristics of the different types of carbohydrates.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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22) Structural isomers
A) contain the same number of atoms/elements, but in different arrangements AND may be referred to as the -D and -P forms.
B) are exemplified by glucose and galactose AND are formed by different arrangements of the -COOH groups
C) contain the same number of atoms/elements, but in different arrangements AND are exemplified by glucose and galactose.
D) are formed by different arrangements of the -COOH groups AND may be referred to as the -D and -L forms.
E) may be referred to as the -D and -P forms AND are exemplified by glucose and fructose.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.08 Describe the characteristics of the different types of carbohydrates.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

23) What type of bond holds one strand of DNA to the complementary strand of DNA?
A) Covalent
B) Hydrogen
C) Disulfide
D) Ionic
E) Peptide

Answer: B
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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24) The sugars found in nucleic acids contain
A) 3 carbon atoms.
B) 5 carbon atoms.
C) 7 carbon atoms.
D) 9 carbon atoms.
E) either 5 or 7 carbon atoms.

Answer: B
Section: 02.04
Topic: Chemistry
Bloom's: 1. Remember
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

25) Which of the following are found in RNA but not in DNA?
A) Adenine AND ribose
B) Ribose AND thymine
C) Ribose AND uracil
D) Thymine AND uracil
E) Uracil AND deoxyribose

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
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26) Which shows the incorrect complementary base pairing?
A) A:T
B) G:C
C) G:T
D) A:U
E) A:T, G:C, AND A:U

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
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27) The components of fats are fatty acids and
A) amino acids.
B) nucleotides.
C) phosphate.
D) glycerol.
E) cholesterol.

Answer: D
Section: 02.04
Topic: Chemistry
Bloom's: 1. Remember
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28) In general, when saturated fats are compared to unsaturated fats (assuming the same number of carbon atoms in the molecule),
A) they have about the same melting temperature.
B) saturated fats have a lower melting temperature.
C) unsaturated fats have a lower melting temperature.
D) unsaturated fats have a higher melting temperature.
E) saturated fats are more liquid at room temperature.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

29) If you placed a DNA molecule in a vertical orientation, then from top to bottom, the two parallel strands are both oriented in the same, 5′ to 3′, direction.

Answer: FALSE
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

30) RNA is a long double-stranded helix containing ribose and uracil.

Answer: FALSE
Section: 02.04
Topic: Chemistry
Bloom's: 1. Remember
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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31) Lipids, like nucleic acids and proteins, are made of chains of similar subunits.

Answer: FALSE
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
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ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

32) Steroids are simple lipids.

Answer: TRUE
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

33) Water-soluble substances easily pass through the phospholipid bilayer of a cell membrane.

Answer: FALSE
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
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34) The positively charged component of the atom is the
A) electron.
B) neutron.
C) proton.
D) cation.
E) anion.

Answer: C
Section: 02.01
Topic: Chemistry
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Learning Outcome: 02.01 Describe the general structure of an atom and its isotopes.
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35) The uncharged component of the atom is the
A) electron.
B) proton.
C) neutron.
D) proline.
E) neulon.

Answer: C
Section: 02.01
Topic: Chemistry
Bloom's: 1. Remember
Learning Outcome: 02.01 Describe the general structure of an atom and its isotopes.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

36) What determines the chemical and physical properties of an atom of an element?
A) Atomic number
B) Neutrons
C) Atomic weight
D) Electrons
E) Atomic size

Answer: A
Section: 02.01
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.01 Describe the general structure of an atom and its isotopes.
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37) The atom, as a whole, is uncharged because
A) the number of protons equals the number of neutrons.
B) the number of electrons equals the number of neutrons.
C) neutrons neutralize the charges.
D) the number of protons equals the number of electrons.
E) the number of protons exceeds the number of electrons.

Answer: D
Section: 02.01
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.01 Describe the general structure of an atom and its isotopes.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

38) The mass number of an atom is equal to
A) the number of electrons.
B) the number of electrons plus neutrons.
C) the number of neutrons and protons.
D) the number of protons.
E) the number of electron shells.

Answer: C
Section: 02.01
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.01 Describe the general structure of an atom and its isotopes.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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39) If electrons are shared unequally, a(n) _____ bond is formed.
A) weak
B) polar
C) nonpolar
D) ionic
E) hydrogen

Answer: B
Section: 02.02
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.03 Compare and contrast ionic bonds, covalent bonds, and hydrogen bonds.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

40) Atoms that gain electrons become
A) positively charged.
B) negatively charged.
C) neutral.
D) lighter.
E) elements.

Answer: B
Section: 02.02
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.02 Describe the importance of valence electrons.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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41) Which of these bonds are weak individually but are much stronger as a group?
A) Covalent AND hydrogen
B) Ionic AND covalent
C) Neutron AND ionic
D) Hydrogen AND neutron
E) Ionic AND hydrogen

Answer: E
Section: 02.02
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.03 Compare and contrast ionic bonds, covalent bonds, and hydrogen bonds.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

42) The most important molecule(s) in the world is (are)
A) water.
B) protein.
C) carbohydrates.
D) nucleic acids.
E) nitrogen.

Answer: A
Section: 02.03
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.08 Describe the characteristics of the different types of carbohydrates.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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43) Adenosine triphosphate contains
A) adenosine, deoxyribose, and three phosphates.
B) adenosine, ribose, and three phosphates.
C) a pyrimidine base, ribose, and three phosphates.
D) a purine base, deoxyribose, and two phosphates.
E) a pyrimidine base, deoxyribose, and three phosphates.

Answer: B
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

44) How many different amino acids are there to choose from when assembling a protein?
A) 5
B) 10
C) 20
D) 25
E) 64

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 1. Remember
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45) L-amino acids occur in proteins and are designated
A) unnatural.
B) left-handed.
C) rare.
D) right-handed.
E) non-biological.

Answer: B
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46) Amino acids in proteins are linked to one another by peptide bonds between the
A) methyl group of one amino acid and a side group of another amino acid.
B) carbon atoms of two adjacent amino acids.
C) carboxyl group of one amino acid and the amino group of another.
D) nitrogen atom and carboxyl ion.
E) phosphate group and nitrogenous base.

Answer: C
Section: 02.04
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47) The primary structure in a protein refers to
A) the helical folding of a protein.
B) the sequence of amino acids.
C) two or more polypeptides linked to one another.
D) the initial folding of a protein.
E) the beta-pleated sheets in a protein.

Answer: B
Section: 02.04
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48) Side chains are important to proteins because they
A) help determine protein shape AND are a source of energy for hydration reactions in the cell.
B) help determine the degree of solubility of the protein in water.
C) are a source of energy for hydration reactions in the cell.
D) form the peptide bonds that link amino acids to one another.
E) help determine protein shape AND help determine the degree of solubility of the protein in water.

Answer: E
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

49) A protein
A) can form any number of equally functional shapes.
B) may need help from chaperones to assume the correct shape.
C) consists of a chain of hydroxyl acids AND is always polar.
D) is always polar AND may need help from chaperones to assume the correct shape.
E) assumes any number of equally functional shapes AND may need help from chaperones to assume the correct shape.

Answer: B
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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50) Weak bonds are important for the _____ structure of proteins.
A) primary AND secondary
B) primary, secondary, AND tertiary
C) secondary, tertiary, AND quaternary
D) primary, tertiary, AND quaternary
E) quaternary

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

51) Proteins
A) are involved in almost every important function performed by a cell AND are characterized by a 1:3:1 ratio of carbon to hydrogen to oxygen.
B) comprise more than 50% of the dry weight of a cell AND are composed of a chain of nucleotides.
C) are involved in almost every important function performed by a cell AND comprise more than 50% of the dry weight of a cell.
D) are composed of a chain of amino acids AND are characterized by a 1:3:1 ratio of carbon to hydrogen and oxygen.
E) are characterized by a 1:2:1 ratio of carbon to hydrogen to oxygen AND are composed of a chain of nucleotides.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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52) The carbohydrate(s) found in nucleic acids is (are)
A) ribose OR deoxyribose.
B) ribose OR glucose.
C) glucose OR galactose.
D) galactose OR deoxyribose.
E) deoxyribose only.

Answer: A
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

53) The -OH group in a carbohydrate
A) may be found above or below the plane of the ring.
B) is involved in the formation of stereoisomers.
C) is involved when linking monosaccharides together.
D) is involved in the formation of stereoisomers AND may be found above or below the plane of the ring.
E) All of the answer choices are correct.

Answer: E
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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54) Dehydration reactions are involved in
A) the formation of polypeptides AND the formation of monosaccharides.
B) the formation of polysaccharides AND the formation of nucleotides.
C) the formation of polypeptides AND the formation of polysaccharides.
D) the formation of monosaccharides AND the formation of amino acids.
E) the formation of polypeptides AND the formation of nucleotides.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.08 Describe the characteristics of the different types of carbohydrates.; 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

55) Which statement is true of nucleotides?
A) They are the building blocks of DNA.
B) There are 20 naturally occurring nucleotides.
C) They are joined together by peptide bonds.
D) They are double-stranded.
E) All of the answer choices are correct.

Answer: A
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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56) The purines of DNA are
A) adenine and guanine.
B) thymine and adenine.
C) serine and threonine.
D) thymine and uracil.
E) thymine, adenine AND uracil.

Answer: A
Section: 02.04
Topic: Chemistry
Bloom's: 1. Remember
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

57) The end of the nucleic acid chain to which more nucleotides are added during DNA synthesis is always the
A) 5 prime end.
B) C terminal.
C) 3 prime end.
D) N terminal.
E) -COOH terminal.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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58) The characteristic common to all lipids is their
A) solubility in organic solvents AND hydrophilic nature.
B) solubility in organic solvents AND hydrophobic nature.
C) hydrophilic nature AND large size.
D) large size AND solubility in water.
E) hydrophobic nature AND solubility in water.

Answer: B
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

59) Which is NOT true of lipids?
A) They are a major structural element of all cell membranes.
B) They control the movement of molecules into and out of a cell.
C) They separate a cell from its environment.
D) Examples include steroids and phospholipids.
E) They are a homogeneous group of molecules.

Answer: E
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

60) As DNA is always double-stranded, RNA is always single-stranded.

Answer: FALSE
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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61) Lipids are polar, hydrophilic molecules.

Answer: FALSE
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

62) Simple lipids contain carbon, hydrogen, and oxygen in a 1:2:1 ratio.

Answer: FALSE
Section: 02.04
Topic: Chemistry
Bloom's: 1. Remember
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

63) Phospholipids are polar molecules.

Answer: TRUE
Section: 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

64) Unsaturated fats have lower melting points than saturated fats.

Answer: TRUE
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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65) Microorganisms use hydrogen bonds to attach themselves to the surfaces that they live on. Many of them lose hold of the surface because of the weak nature of these bonds and end up dying or being washed away. Why don't microbes just use covalent bonds instead?
A) Covalent bonds depend on completely giving up or completely accepting an electron to form the bond. This isn't possible for many microbes without dramatically altering their basic molecular composition.
B) Covalent bonds typically require enzymes to form/break, whereas hydrogen bonds don't. If covalent bonds were used, it would require much more energy and molecules to be contributed from the cell. Hydrogen bonds don't have these requirements.
C) Bacteria grow in very moist environments, where water is freely available. Water is a supply of hydrogen atoms, so it makes sense for the bacteria to simply use hydrogen bonds for attachment.
D) All the answer choices are correct.
E) None of the answer choices is correct.

Answer: B
Section: 02.02
Topic: Chemistry
Bloom's: 5. Evaluate
Learning Outcome: 02.03 Compare and contrast ionic bonds, covalent bonds, and hydrogen bonds.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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66) A biologist determined the amounts of several amino acids in two separate samples of pure protein. His data showed that Protein A contained 7% leucine, 12% alanine, 4% histidine, 2% cysteine, and 5% glycine. Interestingly, Protein B had the same percentages of the same amino acids. He concluded from this data that Proteins A and B are the same protein. Based on this information and his conclusion, determine which of the following is the correct statement regarding his findings:
A) He is correct; the proteins have the same percentages of each amino acid, so they are identical protein molecules.
B) He is incorrect; there is no information about the amino acids sequence (which dictates the overall structure of a protein), so the two proteins could be very different in shape.
C) He is correct; although there is no information on the amino acid sequence in each protein, the order of the amino acids is irrelevant. It's only the total number of each molecule that is important to structure.
D) He is incorrect; he hasn't accounted at all for the effects of pH on the composition of the protein and its effects on the individual amino acids.
E) He is partly correct; the percentage of the listed amino acids is the same in each protein, but Protein A is hydrophobic and Protein B is hydrophilic.

Answer: B
Section: 02.04
Topic: Chemistry
Bloom's: 5. Evaluate
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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Dan is a body builder. He decides that he is going to change his diet in an effort to increase his muscle mass. Dan tells you that he plans to eat vegetables and proteins but no fats or carbohydrates, because cells do not naturally contain these molecules and do not need them. You advise Dan that his new diet is not a good choice, and that he would do better to follow a well balanced diet that incorporates healthy amounts of proteins, fats AND carbohydrates.

67) You tell Dan that while many of his cell components do indeed contain amino acids, carbohydrates and lipids are also essential for cells. Which of the following components contain both amino acids AND lipids?
A) Cytoplasmic membrane
B) Nucleic acids
C) Enzymes
D) Peptidoglycan
E) Ribosomes

Answer: A
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.; 02.10 Describe the factors that affect protein structure and function.; 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.; 03.08 Describe the structure and chemistry of the cytoplasmic membrane, focusing on how it relates to membrane permeability.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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68) Dan tells you that he knows proteins are needed to build muscle mass but that he doesn't quite understand the role of proteins in a cell. He tells you five things he believes proteins are needed for in cell function, but he is mistaken on one of these. Which of the following statements regarding the role of proteins in cells is INCORRECT?
A) Proteins are involved in transporting molecules into or out of cells.
B) Proteins are involved in movement of certain cells.
C) Proteins provide structural support in cells (cytoskeleton).
D) Proteins are a major component of starch.
E) Proteins catalyze chemical reactions within cells.

Answer: D
Section: 02.04
Topic: Chemistry
Bloom's: 4. Analyze
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.; 02.10 Describe the factors that affect protein structure and function.; 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.; 03.08 Describe the structure and chemistry of the cytoplasmic membrane, focusing on how it relates to membrane permeability.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

69) Dan tells you that he believes that proteins are the primary source of energy for his cells because proteins are easily digested. You tell him that this is

Answer: FALSE
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.10 Describe the factors that affect protein structure and function.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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70) Dan asks you how his cells are able to use complex molecules such as proteins. You explain to him that proteins are macromolecules composed of _____ and that proteins can be broken down by _____, a type of reaction in which the addition of _____ breaks covalent bonds between subunits.
A) water; hydrolysis; amino acids
B) amino acid; hydrolysis; water
C) monosaccharides; hydrolysis; water
D) amino acids; dehydration synthesis; water
E) monosaccharides; dehydration synthesis; water

Answer: B
Section: 02.04
Topic: Chemistry
Bloom's: 4. Analyze
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

71) Dan is confused about the reason you advise him that in fact a healthy diet includes fats. He tells you that all fats are bad fats. You correct him, telling him that lipids are essential for cells. Which of the following is NOT true of lipids?
A) Lipids are an essential component of the cytoplasmic membrane.
B) Cholesterol provides rigidity to eukaryote cell membranes.
C) Lipids are composed of identical subunits.
D) The most common simple lipids in nature are the triglycerides.
E) Oils contain unsaturated fatty acids.

Answer: C
Section: 02.04
Topic: Chemistry
Bloom's: 4. Analyze
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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72) You are a biochemist working on a molecule found in a recently discovered bacterium. You determine that the molecule is composed of a chain of similar subunits and can thus conclude that the molecule is unlikely to be a
A) lipid.
B) nucleic acid.
C) protein.
D) carbohydrate.
E) lipid or protein.

Answer: A
Section: 02.04
Topic: Chemistry
Bloom's: 3. Apply
Learning Outcome: 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

73) Which of the following pairs is mismatched?
A) RNA - ribose sugar.
B) Dehydration synthesis - water removal.
C) Sharing electrons - covalent bond.
D) Carboxyl - CH_3
E) Lipids - hydrophobic.

Answer: D
Section: 02.02; 02.03; 02.04
Topic: Chemistry
Bloom's: 4. Analyze
Learning Outcome: 02.03 Compare and contrast ionic bonds, covalent bonds, and hydrogen bonds.; 02.05 Describe the properties of water, and explain why it is so important in biological systems.; 02.09 Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.; 02.11 Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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74) Please identify the correct definition.
A) Molecules that contain carbon and hydrogen are called inorganic compounds.
B) Electrolytes are salts that conduct electricity when they are dissolved in water.
C) A compound is a molecule composed of two or more identical elements.
D) Electrons in a polar covalent bond are shared equally.
E) The starting components of a chemical reaction are called products.

Answer: B
Section: 02.02
Topic: Chemistry
Bloom's: 4. Analyze
Learning Outcome: 02.03 Compare and contrast ionic bonds, covalent bonds, and hydrogen bonds.; 02.05 Describe the properties of water, and explain why it is so important in biological systems.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

75) Which of the following is the correct order from most acidic to least acidic?
A) Stomach acid, vinegar, unpolluted rainwater, blood, drain cleaner
B) Drain cleaner, blood, unpolluted rainwater, vinegar, stomach acid
C) Unpolluted rainwater, blood, vinegar, drain cleaner, stomach acid
D) Stomach acid, drain cleaner, unpolluted rainwater, blood, vinegar
E) Vinegar, blood, unpolluted rainwater, drain cleaner, stomach acid

Answer: A
Section: 02.03
Topic: Chemistry
Bloom's: 4. Analyze
Learning Outcome: 02.06 Explain the concept of pH, and how the pH of a solution relates to its acidity.
ASM Objective: 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

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76) You are working in a laboratory, making media for growing bacteria. The recipe you are following calls for the addition of TRIS buffer. You can't find any TRIS in the lab, so you decide to leave it out of the medium. Select the FALSE statement regarding your decision.
A) The medium will likely not be useable, because bacteria live within a narrow pH range, near pH 14.
B) Maintaining the correct pH is essential for cells, because crucial molecules such as enzymes may lose function in the incorrect pH.
C) Buffers are added to solutions to stabilize the hydrogen ion concentration of that solution.
D) The acidity of the medium without buffer may change dramatically as the bacteria grow.
E) The medium will likely not be useable, because bacteria live within a narrow pH range, near neutral.

Answer: A
Section: 02.03
Topic: Chemistry
Bloom's: 4. Analyze
Learning Outcome: 02.06 Explain the concept of pH, and how the pH of a solution relates to its acidity.
ASM Objective: 03.01 Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g., nitrogen fixation, methane production, anoxygenic photosynthesis).; 03.02 The interactions of microorganisms among themselves and with their environment are determined by their metabolic abilities (e.g., quorum sensing, oxygen consumption, nitrogen transformations).

77) Which of the following statements about enzymes is FALSE?
A) Enzymes are composed of amino acids.
B) Enzymes help break covalent bonds.
C) Enzymes position reactants so covalent bonds form more easily.
D) Enzymes are essential for maintaining life.
E) Enzymes increase the temperature of a reaction.

Answer: E
Section: 02.02; 02.04
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.04 Explain the role of an enzyme in chemical reactions.

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78) Enzymes are required to break which of the following bonds?
A) Covalent
B) Ionic
C) Peptide
D) Hydrostatic
E) Polar

Answer: A
Section: 02.02
Topic: Chemistry
Bloom's: 2. Understand
Learning Outcome: 02.04 Explain the role of an enzyme in chemical reactions.

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