Biology The Essentials 3rd edition Hoefnagels Test Bank

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Biology: The Essentials, 3e **(Hoefnagels)**
Chapter 2 The Chemistry of Life

1) The most abundant bulk elements that make up the vast majority of living organisms are
A) carbon, hydrogen, oxygen, and calcium.
B) carbon, oxygen, iron, and chlorine.
C) carbon, hydrogen, iron, and calcium.
D) carbon, hydrogen, oxygen, and nitrogen.
E) carbon, oxygen, sulfur, and calcium.

Answer: D
Explanation: These four bulk elements are required for making the macromolecules which compose all living things. Please see section 2.1
Section: 02.01
Topic: Atoms; Chemical Bonds
Bloom's: 1. Remember
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.; 02.00.01 Explain the relationship between chemistry and biology.
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2) The atomic number of an atom or element is the number of
A) neutrons in the nucleus.
B) electrons in the nucleus.
C) protons in the nucleus.
D) neutrons in the orbitals.
E) protons in the orbitals.

Answer: C
Explanation: The atomic number is unique to each element. Please see section 2.1B for more information.
Section: 02.01
Topic: Atoms
Bloom's: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.
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3) An ion could be
A) an atom that has gained electrons.
B) an atom that has a positive charge.
C) an atom that has lost electrons.
D) an atom that has a negative charge.
E) All answers are correct.

Answer: E
Explanation: Ions can be positively or negatively charged due to the gain or loss of electrons. Please see section 2.1 for more information.
Section: 02.01
Topic: Atoms
Bloom's: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.
Accessibility: Keyboard Navigation

4) If you were told to sort cards into boxes after a lab on elements, you would put into a slot labelled "Mass Number" any card with text that included the total number of
A) protons, neutrons, and electrons of an atom.
B) protons and electrons of an atom.
C) protons and neutrons of an atom.
D) neutrons and electrons of an atom.
E) protons of an atom.

Answer: C
Explanation: Mass number is the total number of protons and neutrons in the nucleus of an atom. Please see section 2.1 for more information.
Section: 02.01
Topic: Atoms
Bloom's: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.
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5) Isotopes of the same element are different from one another in that
A) they have a different number of protons.
B) they have a different number of neutrons.
C) they have a different number of electrons.
D) they are a different element.
E) only one of the isotopes is matter.

Answer: B
Explanation: Isotopes of the same element behave similarly in chemical reactions since they have the same number of outer shell electrons. Please see section 2.1 for more information.
Section: 02.01
Topic: Atoms
Bloom's: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.
Accessibility: Keyboard Navigation

6) For most atoms, the outermost electron shell would be full if it contained
A) one electron.
B) four electrons.
C) eight electrons.
D) sixteen electrons.

Answer: C
Explanation: For elements other than hydrogen and helium, the maximum number of outer shell electrons is eight. Please see sections 2.1 and 2.2 for more information.
Section: 02.01; 02.02
Topic: Atoms
Bloom's: 3. Apply
Learning Outcome: 02.01.02 Describe the structure of atoms.; 02.02.02 Differentiate between atoms and molecules.
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7) If an atom exists in nature with a valence shell that is full, then it is
A) highly reactive.
B) chemically unstable.
C) highly likely to combine with other atoms.
D) found only in a gas form.
E) inert.

Answer: E
Explanation: Atoms are most stable when their valence shells are full. Please see sections 2.1 and 2.2 for more information.
Section: 02.01; 02.02
Topic: Atoms; Chemical Reactions
Bloom's: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.; 02.02.01 Compare and contrast the different types of bonds.
Accessibility: Keyboard Navigation

8) In a covalent bond
A) atoms share electrons.
B) atoms of opposite charges attract each other.
C) atoms share protons.
D) atoms share neutrons.
E) atoms are repelled by each other.

Answer: A
Explanation: Sharing electrons leads to strong covalent bonds. Please see section 2.2 for more information.
Section: 02.02
Topic: Chemical Bonds
Bloom's: 1. Remember
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
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9) An ionic bond is a bond in which
A) atoms share electrons.
B) atoms share protons.
C) atoms of opposite charges attract each other.
D) atoms share neutrons.
E) atoms are repelled by each other.

Answer: C
Explanation: Ionic bonds involve ions and transferred electrons. Please see section 2.2 for more information.
Section: 02.02
Topic: Chemical Bonds
Bloom's: 1. Remember
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Accessibility: Keyboard Navigation

10) Which statement about a bond between sodium and chlorine is incorrect?
A) Na is the chemical symbol for sodium.
B) Chlorine donates an electron.
C) Chlorine becomes negatively charged.
D) Sodium becomes positively charged.
E) The bond that is formed is a strong bond.

Answer: B
Explanation: In this bond, chlorine gains an electron and sodium loses one. Please see section 2.2 for more information.
Section: 02.02
Topic: Chemical Bonds
Bloom's: 1. Remember
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
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11) In the example of ionic bond formation between sodium and chlorine
A) Na is the chemical symbol for chlorine.
B) sodium accepts an electron.
C) chlorine accepts an electron.
D) chlorine becomes positively charged.
E) both sodium and chlorine accept electrons.

Answer: C
Explanation: In forming the bond in sodium chloride, sodium donates an electron which chlorine accepts. Please see section 2.2 for more information.
Section: 02.02
Topic: Chemical Bonds
Bloom's: 2. Understand
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Accessibility: Keyboard Navigation

12) If a covalent bond is polar
A) electrons are not shared by atoms.
B) protons are shared by atoms.
C) it will not form in living organisms.
D) the electronegativity of atoms is unequal in their pull on electrons.
E) the bond is weak in strength.

Answer: D
Explanation: When bonded atoms pull unequally on electrons, the resulting covalent bond is polar, with a net partial charge on each atom. Please see section 2.2 for more information.
Section: 02.02
Topic: Chemical Bonds
Bloom's: 2. Understand
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
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13) A hydrogen bond
A) is generally a strong bond.
B) does not occur in living organisms.
C) does not require electron transfer.
D) forms between atoms having the same electronegativity.
E) is a specialized type of covalent bond.

Answer: C
Explanation: Hydrogen bonds form between adjacent water molecules due to the polar nature of their covalent bonds. Please see section 2.2 for more information.
Section: 02.02
Topic: Chemical Bonds
Bloom's: 1. Remember
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Accessibility: Keyboard Navigation

14) Evaporation is
A) the conversion of a liquid into a vapor.
B) the conversion of a solid into a vapor.
C) the conversion of a vapor into a liquid.
D) the conversion of a vapor into a solid.
E) All answers are correct.

Answer: A
Explanation: Liquids evaporate as their molecules obtain enough energy to escape from solution into the atmosphere. Please see section 2.3 for more information.
Section: 02.03
Topic: Chemical Bonds; Properties of Water
Bloom's: 1. Remember
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
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15) A friend who is not taking your Biology course fills a cup with ice and then a drink. The friend asks you why the ice in the cup is floating, and you are able to say that
A) the molecules are closer together in ice than in liquid water.
B) the molecules are farther apart in ice than in liquid water.
C) ice is denser than liquid water.
D) convection currents caused by temperature differences push upwards on the ice.
E) water vapor is less dense than liquid water.

Answer: B
Explanation: Water is less dense when frozen than when liquid due to the structure of ice that results because of hydrogen bonding. Please see section 2.3 for more information.
Section: 02.03
Topic: Properties of Water
Bloom's: 2. Understand
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Accessibility: Keyboard Navigation

16) In a chemical equation
A) the reactants are on the right of the yields arrow.
B) reactants and products are on both sides of the yields arrow.
C) the products are on the left of the yields arrow.
D) the reactants are on the left of the yields arrow.
E) the number of atoms of each element may differ on the two sides of the yields arrow.

Answer: D
Explanation: A chemical reaction shows the progress from reactants to products. Please see section 2.3 for more information.
Section: 02.03
Topic: Chemical Reactions; Properties of Water
Bloom's: 1. Remember
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
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17) An acid
A) has a value above 7 on the pH scale.
B) is a chemical that takes hydrogen ions from a solution.
C) has a value of 7 on the pH scale.
D) is a chemical that adds hydrogen ions to a solution.
E) All answers are correct.

Answer: D
Explanation: Acids have low pH's, with more protons in solution. Please see section 2.4 for more information.
Section: 02.04
Topic: Acids and Bases
Bloom's: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Accessibility: Keyboard Navigation

18) A base
A) has a value of 7 on the pH scale.
B) is a chemical that adds hydrogen ions to a solution.
C) is a chemical that absorbs hydrogen ions from a solution.
D) has a value below 7 on the pH scale.

Answer: C
Explanation: Bases take up hydrogen ions and raise pH. Please see section 2.4 for more information.
Section: 02.04
Topic: Acids and Bases
Bloom's: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Accessibility: Keyboard Navigation

19) A substance with a pH of 2 is
A) neutral.
B) a weak acid.
C) a weak base.
D) a strong base.
E) a strong acid.

Answer: E
Explanation: Strong acids have low pH's, well below the neutral pH of 7. Please see section 2.4 for more information.
Section: 02.04
Topic: Acids and Bases
Bloom's: 2. Understand
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
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20) As part of an exam, you are given a powder to analyze. When you perform various tests, you find that it contains a single chemical that changes the pH of neutral water to a pH of 6. You would conclude that the chemical is a
A) weak acid.
B) neutral.
C) weak base.
D) strong acid.
E) strong base.

Answer: A
Explanation: Weak acids change pH by lowering it, but not by a large amount. Please see section 2.4 for more information.
Section: 02.04
Topic: Acids and Bases
Bloom's: 2. Understand
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Accessibility: Keyboard Navigation

21) A substance with a pH of 7 is
A) a weak acid.
B) a weak base.
C) neutral.
D) a strong acid.
E) a strong base.

Answer: C
Explanation: A pH of 7 means that there is no net excess of hydrogen or hydroxyl ions in solution. Please see section 2.4 for more information.
Section: 02.04
Topic: Acids and Bases
Bloom's: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
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22) As part of a lab exam, you are given a vial of orange crystals. When you add them to pure, neutral pH water, the pH changes to 13. Other tests show that the crystals consist of a single chemical. You could conclude the chemical is
A) a weak acid.
B) a weak base.
C) neutral.
D) a strong acid.
E) a strong base.

Answer: E
Explanation: Strong bases make pH swing much higher, away from 7. Please see section 2.4 for more information.
Section: 02.04
Topic: Acids and Bases
Bloom's: 2. Understand
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Accessibility: Keyboard Navigation

23) Organic molecules are defined as chemical compounds that contain
A) hydrophilic solutions.
B) isotopes of carbon.
C) ionically bonded atoms.
D) strong hydrogen bonds.
E) carbon and hydrogen.

Answer: E
Explanation: Organic molecules, while they may include other elements, by definition must contain hydrogen and carbon. Please see section 2.5 for more information.
Section: 02.05
Topic: Proteins; Carbohydrates; Lipids; Nucleic Acids
Bloom's: 1. Remember
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.
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24) The four major groups of organic compounds are
A) fats, waxes, carbohydrates, and amino acids.
B) carbohydrates, lipids, steroids, and monosaccharides.
C) lipids, fats, waxes, and steroids.
D) carbohydrates, lipids, proteins, and nucleic acids.
E) carbohydrates, proteins, amino acids, and nucleic acids.

Answer: D
Explanation: All living things are made of carbohydrates, lipids, nucleic acids, and proteins. Please see section 2.5 for more information.
Section: 02.05
Topic: Proteins; Carbohydrates; Lipids; Nucleic Acids
Bloom's: 1. Remember
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.; 02.05.01 Explain the relationship between monomers and polymers.; 02.00.01 Explain the relationship between chemistry and biology.
Accessibility: Keyboard Navigation

25) You are asked to help prepare a lab and need to label some beakers. In one, you are told, there are sugars polymerizing into a large polymer, so you prepare a label that mentions
A) hydrolysis.
B) reproduction.
C) dehydration synthesis.
D) translation.
E) transcription.

Answer: C
Explanation: Monomers are turned into polymers in living systems by the removal of water, dehydration. Please see section 2.5 for more information.
Section: 02.05
Topic: Molecules; Chemical Bonds
Bloom's: 3. Apply
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.; 02.00.01 Explain the relationship between chemistry and biology.
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26) A process by which cells break polymers down into smaller units is
A) hydrolysis.
B) dehydration synthesis.
C) reproduction.
D) hydrolysis and dehydration synthesis.
E) unrelated to chemical bonds.

Answer: A
Explanation: When water is added chemically to a bond between the subunits in a polymer, breaking that bond, the reaction is a hydrolysis reaction. Please see section 2.5 for more information.
Section: 02.05
Topic: Chemical Reactions; Proteins; Carbohydrates; Lipids
Bloom's: 1. Remember
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Accessibility: Keyboard Navigation

27) Imagine that you are in a study session, and your group is taking a practice quiz that members grade for one another. For the question, "A cook decides to cook only using monomers, so what chemicals could the cook use?" you would mark correct if the paper you are grading has the answer as
A) cellulose and sucrose.
B) lactose and sucrose.
C) glucose and fructose.
D) glucose and cellulose.
E) None of the answers are correct.

Answer: C
Explanation: Monosaccharides are single sugars molecules not linked to any others. Please see section 2.5 for more information.
Section: 02.05
Topic: Molecules; Carbohydrates
Bloom's: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
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28) You are asked to help solve a murder, and a note from the murderer taunting the police says that the crime was committed using a lipid. What molecule could you exclude from your search?
A) a triglyceride
B) a phospholipid
C) a wax
D) a sterol
E) a starch molecule

Answer: E
Explanation: Starch is a carbohydrate, not a lipid. Please see section 2.5 for more information.
Section: 02.05
Topic: Lipids
Bloom's: 3. Apply
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Accessibility: Keyboard Navigation

29) The primary building block (monomer) of proteins is
A) a glucose molecule.
B) a fatty acid.
C) a nucleotide.
D) an amino acid.
E) four interconnected rings.

Answer: D
Explanation: Proteins are made of amino acids linked by the removal of water. Please see section 2.5 for more information.
Section: 02.05
Topic: Molecules; Proteins
Bloom's: 1. Remember
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
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30) If asked to build a model of an amino acid, you would need parts to represent
A) three R groups and a glycerol.
B) nitrogen, carbon, and an R group.
C) multiple saccharide rings.
D) carbon and phosphorus monomers.
E) carbon and phosphorus.

Answer: B
Explanation: Amino acids have amino and carboxyl groups in common, and they vary based on the identity of their R groups. Please see section 2.5 for more information.
Section: 02.05
Topic: Proteins
Bloom's: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Accessibility: Keyboard Navigation

31) As part of a lab practical, you need to attach labels about chemical models. For the bond between amino acids, you would add a label describing that it is
A) an ionic bond in proteins.
B) a covalent bond in carbohydrates.
C) a covalent bond in proteins.
D) an ionic bond in carbohydrates.
E) a hydrogen bond in nucleic acids.

Answer: C
Explanation: Peptide bonds link successive amino acids in a protein. Please see section 2.5 for more information.
Section: 02.05
Topic: Molecules; Proteins
Bloom's: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
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32) The primary building block (monomer) of nucleic acids is
A) a nucleotide.
B) a glucose molecule.
C) a fatty acid.
D) an amino acid.
E) four interconnected carbon rings.

Answer: A
Explanation: Nucleic acids are polymers, and they are composed of a set of four nucleotides linked by the removal of water. Please see section 2.5 for more information.
Section: 02.05
Topic: Molecules; Nucleic Acids
Bloom's: 1. Remember
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.; 02.05.01 Explain the relationship between monomers and polymers.
Accessibility: Keyboard Navigation

33) Water is best described as which of the following?
A) an ion
B) a nonpolar molecule
C) an atom
D) a polar molecule
E) an element

Answer: D
Explanation: Water is a polar molecule composed of three atoms of two elements. Please see section 2.3 for more information.
Section: 02.03
Topic: Properties of Water
Bloom's: 2. Understand
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
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34) You encounter a new compound that is bright purple and smells of violets. It sticks to surfaces in a way similar to water and can replace water in the running of living cells. You might expect that this new molecule will make
A) covalent bonds.
B) ionic bonds.
C) hydrogen bonds.
D) hydrophobic bonds.
E) peptide bonds.

Answer: C
Explanation: Water molecules' ability to make hydrogen bonds is critical for their function in cells, so any substitute for water would probably make the same bonds. Please see section 2.3 for more information.
Section: 02.03
Topic: Properties of Water
Bloom's: 4. Analyze
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Accessibility: Keyboard Navigation

35) Within a single molecule of water, _____ bonds form between oxygen and hydrogen.
A) ionic
B) covalent
C) hydrogen
D) hydrophobic
E) nuclear

Answer: B
Explanation: Internal bonds in water molecules are polar covalent bonds. Please see section 2.3 for more information.
Section: 02.03
Topic: Chemical Bonds; Properties of Water
Bloom's: 2. Understand
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
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36) What do a lemon, a toaster oven, and sand grains have in common?
A) All are composed of matter and energy.
B) All are alive.
C) All are composed of organic molecules.
D) All are acidic.
E) All are basic.

Answer: A
Explanation: All material things are made of matter and have energy in them. Please see section 2.1 for more information.
Section: 02.01
Topic: Atoms
Bloom's: 3. Apply
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.; 02.00.01 Explain the relationship between chemistry and biology.
Accessibility: Keyboard Navigation

37) You can painlessly wade into a pool, but doing a belly flop off of the high diving board hurts because of
A) water's higher density compared to the air.
B) adhesion of your molecules with the water molecules.
C) water's high boiling point.
D) a neutral pH.
E) cohesion of the water molecules.

Answer: E
Explanation: The cohesiveness of water molecules leads to tighter bonding between them than in other solvents, and thus the difficulty/pain involved in a belly flop. Please see section 2.3 for more information.
Section: 02.03
Topic: Properties of Water
Bloom's: 3. Apply
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Accessibility: Keyboard Navigation

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Scientists use carbon dating to determine the age of fossils. ^{14}C is a rare isotope of carbon that has a half life of 5730 years and decays into ^{14}N. By measuring the amount of ^{14}C remaining in a fossil, scientists can estimate when the organism died to within 60,000 years. The atomic numbers of C is 6 and of N is 7.

38) The most common isotope of carbon is ^{12}C. ^{14}C has ____ than ^{12}C.
A) more protons
B) more neutrons
C) fewer neutrons
D) fewer protons
E) more electrons

Answer: B
Explanation: Higher mass number means that more neutrons are present, for isotopes of the same element. Please see section 2.1 for more information.
Section: 02.01
Topic: Atoms
Bloom's: 3. Apply
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.; 02.01.02 Describe the structure of atoms.
Accessibility: Keyboard Navigation

39) ^{14}C and ^{14}N have the same
A) atomic number.
B) number of protons.
C) mass number.
D) number of neutrons.
E) number of electrons.

Answer: C
Explanation: Different elements can have the same mass number depending on what isotopes are being compared. Please see sections 2.1 and 2.2 for more information.
Section: 02.01; 02.02
Topic: Atoms
Bloom's: 4. Analyze
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.; 02.01.02 Describe the structure of atoms.
Accessibility: Keyboard Navigation

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40) What is an example of matter?4615
A) oxygen gas
B) energy
C) light
D) heat
E) None of the answers are correct.

Answer: A
Explanation: Light and heat are examples of energy, which is the ability to do work. On the other hand, matter is anything that takes up space, such as organisms, rocks, water, and gases. See section 2.1 for more information.
Section: 02.01
Topic: Atoms
Bloom's: 1. Remember
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.; 02.00.01 Explain the relationship between chemistry and biology.
Accessibility: Keyboard Navigation

41) Hydrogen, nitrogen, carbon, and oxygen account for 96% of the human body. These elements are
A) also the main elements in organic molecules.
B) rare in nonhuman organisms.
C) rare on Earth.
D) always bonded by hydrogen bonds.
E) All answers are correct.

Answer: A
Explanation: The human body is made, mostly, of organic compounds, so it and organic compounds share common elements. Please see section 2.1 for more information.
Section: 02.01
Topic: Atoms
Bloom's: 1. Remember
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.; 02.00.01 Explain the relationship between chemistry and biology.
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42) The polymers with the most complex and diverse three-dimensional structures are
A) saturated fats.
B) unsaturated fats.
C) proteins.
D) waxes.
E) carbohydrates.

Answer: C
Explanation: Proteins generally have more kinds of monomers than other large polymers, so they can have a greater diversity of shapes and functions. Please see section 2.5 for more information.
Section: 02.05
Topic: Proteins
Bloom's: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Accessibility: Keyboard Navigation

43) Water is a compound.

Answer: TRUE
Explanation: Water is a compound since it contains more than one chemical element. Please see sections 2.2 and 2.3 for more information.
Section: 02.02; 02.03
Topic: Chemical Bonds; Properties of Water
Bloom's: 2. Understand
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.; 02.02.02 Differentiate between atoms and molecules.
Accessibility: Keyboard Navigation

44) Proteins are compounds because they are polymers.

Answer: FALSE
Explanation: Proteins are compounds, but because they are made of multiple elements. Please see section 2.2 for more information.
Section: 02.02
Topic: Atoms; Molecules
Bloom's: 1. Remember
Learning Outcome: 02.02.02 Differentiate between atoms and molecules.
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45) Two hydrogen atoms and an oxygen atom bonded together form
A) a molecule, but not a compound.
B) a compound, but not a molecule.
C) a molecule and a compound.
D) an atom and a molecule.
E) an atom, but not a molecule or compound.

Answer: C
Explanation: Molecules involve multiple atoms, and compounds involve multiple elements. Please see section 2.2 for more information.
Section: 02.02
Topic: Atoms; Molecules
Bloom's: 2. Understand
Learning Outcome: 02.02.02 Differentiate between atoms and molecules.
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46) Polymers are made of monomers, and both are kinds of compounds.

Answer: TRUE
Explanation: Formation of a polymer implies that several chemical elements are involved in the monomers, so both monomers and polymers must be compounds. Please see section 2.2 and 2.5 for more information.
Section: 02.02; 02.05
Topic: Atoms; Molecules
Bloom's: 3. Apply
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.; 02.02.02 Differentiate between atoms and molecules.
Accessibility: Keyboard Navigation

47) Carbon is a compound.

Answer: FALSE
Explanation: Carbon is a single element, while compounds must involve multiple elements. Please see section 2.2 for more information.
Section: 02.02
Topic: Atoms; Molecules
Bloom's: 1. Remember
Learning Outcome: 02.02.02 Differentiate between atoms and molecules.
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48) The four most abundant elements needed by the human body are carbon, hydrogen, oxygen, and nitrogen. Because these are needed in large amounts to support our cells, these are referred to as
A) bulk elements.
B) trace elements.
C) isotopes.
D) buffers.
E) essential elements.

Answer: A
Explanation: Carbohydrates, lipids, and proteins, required in reporting on nutrition labels, are organic molecules composed mainly of carbons, hydrogens, and oxygens. Please see section 2.1 for more information.
Section: 02.01
Topic: Atoms
Bloom's: 1. Remember
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.
Accessibility: Keyboard Navigation

49) If a molecule is added to a glass of water, and is easily dissolved by the water, the added molecule is described as hydrophilic.

Answer: TRUE
Explanation: In understanding water's function as a solvent, hydrophilic molecules are paired with polar molecules that can be dissolved easily by the polar water molecule. Please see section 2.3 for more information.
Section: 02.03
Topic: Chemical Bonds; Properties of Water
Bloom's: 2. Understand
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
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50) Blood is closely maintained at a pH of 7.4. A patient whose blood pH drops below 7.35 is suffering from metabolic acidosis and can go into a coma. What happens to the concentration of H^+ ions in a patient with a blood pH of 6.4?
A) H^+ concentration is decreased 10-fold.
B) H^+ concentration is decreased 2-fold.
C) H^+ concentration is increased 2-fold.
D) H^+ concentration is decreased 4-fold.
E) H^+ concentration is increased 10-fold.

Answer: E
Explanation: Without proper homeostasis of pH controls by buffers and other body functions, relatively small numerical pH changes can result in potentially deadly consequences. Please see section 2.4 for more information.
Section: 02.04
Topic: Acids and Bases
Bloom's: 3. Apply
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Accessibility: Keyboard Navigation

51) The four nitrogen bases found in RNA are
A) adenine, thymine, guanine, and uracil.
B) adenine, cytosine, guanine, and uracil.
C) adenine, thymine, cytosine, and uracil.
D) thymine, cytosine, guanine, and uracil.
E) None of the answer choices is correct.

Answer: B
Explanation: For all known life, there are four nucleotides common in DNA, and the four nucleotides of RNA are similar with one substituted nucleotide. Please see section 2.5 for more information.
Section: 02.05
Topic: Nucleic Acids
Bloom's: 1. Remember
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
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52) Saturated fats have long, straight tails of fatty acids, whereas unsaturated fats from vegetables have kinks in their tails due to double bonds. These kinks prevent the fats from packing together as tightly. Hydrogenated vegetable oils, or trans fats, have hydrogens added back to the double bonds and thus behave like
A) unsaturated fats.
B) waxes.
C) carbohydrates.
D) proteins.
E) saturated fats.

Answer: E
Explanation: Hydrogenation is a technological manipulation that converts less expensive plant oils to forms that taste to us, as economic consumers, more like animal fats. Please see section 2.5 for more information.
Section: 02.05
Topic: Chemical Bonds; Lipids
Bloom's: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.; 02.00.01 Explain the relationship between chemistry and biology.
Accessibility: Keyboard Navigation

53) Which of these pairs does not correctly match a carbohydrate with its function?
A) Glycogen is the storage form of energy in animals.
B) Starch is the storage form of energy in plants.
C) Cellulose provides structural support for human hair.
D) Chitin provides an exoskeleton for insects.

Answer: C
Explanation: The majority of carbohydrate functions are related to energy and energy storage. Please see section 2.5 and table 2.4 for more information.
Section: 02.05
Topic: Molecules; Carbohydrates
Bloom's: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
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54) Proteins store the genetic information of the cell and transmit it to the next generation.

Answer: FALSE
Explanation: Although proteins have many functions, and have structures determined by the DNA genetic code, protein functions do not include storage and inheritance of genetics. Please see section 2.5 for more information.
Section: 02.05
Topic: Proteins
Bloom's: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Accessibility: Keyboard Navigation

55) If a carbohydrate polymer contains only two monomer units, such as sucrose made from glucose and fructose, it is called a(n)
A) disaccharide.
B) polysaccharide.
C) monosaccharide.
D) oligosaccharide.
E) complex carbohydrate.

Answer: A
Explanation: Whether used for storage or structure, the number and arrangement of monomers in carbohydrates change the properties most, as cells use them. Please see section 2.5 for more information.
Section: 02.05
Topic: Carbohydrates
Bloom's: 1. Remember
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.
Accessibility: Keyboard Navigation

56) Tawny crazy ants survive a fire ant's sting by having a
A) venom that detoxifies the fire ant venom.
B) more potent venom than the fire ant venom.
C) hard carapace that protects the crazy ants.
D) lipid that coats their skin.

Answer: A
Explanation: The tawny crazy ants' venom detoxifies the fire ants' venom. Please see the "Investigating Life" section.
Section: 02.04
Topic: Acids and Bases; Proteins
Bloom's: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.; 02.00.01 Explain the relationship between chemistry and biology.
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57) In the experiment investigating tawny crazy ants and fire ants, the control group included
A) tawny crazy ants with open venom glands.
B) tawny crazy ants with plugged venom glands.
C) fire ants with open venom glands.
D) fire ants with plugged venom glands.

Answer: A
Explanation: The control group consisted of tawny crazy ants with open venom glands since the scientists were testing the ability of the tawny ants' own venom to help withstand the fire ant venom. See the "Investigating Life" section.
Section: 02.00
Topic: Proteins
Bloom's: 2. Understand
Learning Outcome: 02.00.01 Explain the relationship between chemistry and biology.
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58) How does the formic acid in the venom of the tawny crazy ants protect them from the fire ant venom?
A) It deactivates enzymes in the fire ant venom.
B) It raises the pH which crystallizes the fire ant venom.
C) It melts the lipids in the fire ant venom.
D) It turns the polysaccharides in the fire ant venom into monosaccharides.

Answer: A
Explanation: The formic acid in the venom of the tawny crazy ants lowers the pH thereby deactivating the enzymes in the fire ant venom. Please see the "Investigating Life" section.
Section: 02.00
Topic: Acids and Bases; Proteins
Bloom's: 2. Understand
Learning Outcome: 02.00.01 Explain the relationship between chemistry and biology.
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