

Student name: _____

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

1) The property of water demonstrated by a water strider, as it remains on top of the water, is that water molecules are held together by ionic bonds.

1) _____

- ☐ true
- ☐ false

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.03.01 Explain how the structure of water affects its chemical properties.

Section : 02.03

Topic : Properties of Water

Bloom's : 1. Remember

Gradable : automatic

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

2) _____

- ☐ true
- ☐ false

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.03.01 Explain how the structure of water affects its chemical properties.

Section : 02.03

Topic : Properties of Water

Bloom's : 1. Remember

Gradable : automatic

3) Cohesion is a property of water in which water molecules tend to stick together.

3) _____

- ☐ true
- ☐ false

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Learning Outcome : 02.03.01 Explain how the structure of water affects its chemical properties.

Section : 02.02

Section : 02.03

Topic : Properties of Water

Bloom's : 1. Remember

Topic : Chemical Bonds

Gradable : automatic

4) A peptide bond is a covalent bond formed between the amino group of one amino acid and the R group of another amino acid.

4) _____

- ☐ true
- ☐ false

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Proteins

Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Topic : Chemical Bonds

Gradable : automatic

5) A substance in which other substances dissolve is called a solute.

5) _____

- ☐ true
- ☐ false

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.03.01 Explain how the structure of water affects its chemical properties.

Section : 02.03

Topic : Properties of Water

Bloom's : 1. Remember

Topic : Chemical Bonds

Gradable : automatic

6) Vegetable oil is an unsaturated fat from multiple plant sources. Because it is unsaturated, it is composed of at least

6) _____

- ☐ true

one pair of double-bonded carbons.

Question Details

Bloom's : 2. Understand

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Lipids

Accessibility : Keyboard
Navigation

Topic : Chemical Bonds

Gradable : automatic

7) Of the 20 amino acids in all organisms, essential amino acids are obtained by food consumption.

7) _____

- ☐ true
- ☐ false

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Proteins

Accessibility : Keyboard
Navigation

Bloom's : 1. Remember

Gradable : automatic

8) If a protein is denatured, its structure has been changed enough to make the protein nonfunctional.

8) _____

- ☐ true
- ☐ false

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Proteins

Accessibility : Keyboard
Navigation

Bloom's : 1. Remember

Gradable : automatic

9) Proteins store the genetic information of the cell and transmit it to the next generation.

9) _____

- ☐ true
- ☐ false

Question Details

Bloom's : 2. Understand

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Proteins

Topic : Nucleic Acids

Accessibility : Keyboard Navigation

Gradable : automatic

CHECK ALL THE APPLY. Choose all options that best completes the statement or answers the question.

10) Algal phytoplankton are single-celled aquatic organisms that perform photosynthesis like plants. In a lake, summer growth of phytoplankton can change the water pH from pH 7.2 to 6.2. Select all of the following that are TRUE about this change.

10) _____

A) The water at pH 6.2 is a stronger acid solution than before the phytoplankton growth.

B) The lake water solution changed from slightly acidic to slightly basic in pH.

C) The water at pH 6.2 has 10 times the hydrogen (H⁺) concentration as before the phytoplankton growth.

D) The growth of phytoplankton changed the pH of

the water.

E) The water at pH 6.2 has twice the hydrogen (H⁺) concentration than before the phytoplankton growth.

Question Details

Bloom's : 2. Understand

Accessibility : Keyboard Navigation

Learning Outcome : 02.04.01 Explain how acids and bases affect pH.

Section : 02.04

Topic : Acids and Bases

Gradable : automatic

11) Select all of the following that correctly describe differences between DNA and RNA.

11) _____

A) DNA has a sugar-phosphate backbone, while RNA has a glycerol-phosphate backbone.

B) DNA is a long double-stranded molecule, while RNA is a shorter single-stranded molecule.

C) DNA and RNA are different in that RNA has uracil instead of thymine.

D) DNA is a

molecule that stores genetic information, while RNA is a molecule that stores energy.

E) DNA contains the sugar deoxyribose, while RNA

contains the sugar ribose.

Question Details

Bloom's : 2. Understand

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Nucleic Acids

Accessibility : Keyboard

Navigation

Gradable : automatic

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

12) 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

12) _____

A) bulk elements.

B) trace elements.

C) isotopes.

D) buffers.

E) essential elements.

Question Details

Bloom's : 2. Understand

Learning Outcome : 02.01.01 Identify the most important elements in living organisms.

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.01

Section : 02.05

Topic : Carbohydrates

Topic : Lipids

Topic : Proteins

Topic : Nucleic Acids

Accessibility : Keyboard

Navigation

Gradable : automatic

13) In the 1700s, a French scientist, Antoine Lavoisier, gained new experimental information by reacting a metal and an acid. His observation of the results seemed to show that much of the metal had been lost in the chemical

reaction. Upon weighing the products, the total amounts of materials had not changed during the reaction.

This research resulted in the law of conservation of mass. This law also applies to biology, because the materials we are

13) _____

- A) matter
- B) energy

Question Details

Bloom's : 2. Understand

Section : 02.01

Accessibility : Keyboard Navigation

14) Water has unique properties which include its strength as a solvent; its three environmental stages of solid, liquid, and gas; and its temperature regulation. These properties are due to polar covalent bonds between oxygen and hydrogen.

14) _____

- A) oxygen being more electronegative and therefore attracting more electrons than hydrogen.
- B) hydrogen being more electronegative and therefore attracting more electrons than oxygen.
- C) hydrogen and oxygen having equal electronegative strength and therefore have equal sharing of electrons.
- D) hydrogen being an electron donor and oxygen

Question Details

Bloom's : 2. Understand

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Learning Outcome : 02.02.04 Explain the relationship between electronegativity and chemical bond form

made of are _____ that change forms, but aren't truly lost through biochemical reactions.

- C) solutions
- D) isotopes
- E) metals

Learning Outcome : 02.00.01

Explain the relationship between chemistry and biology.

Topic : Atomic Structure

Gradable : automatic

The polar covalent bonds are a result of

being an electron acceptor.

- E) there being a greater number of electrons in oxygen outermost shell than in hydrogen.

Learning Outcome : 02.03.01

Explain how the structure of water affects its chemical properties.

Section : 02.02

Section : 02.03

Topic : Properties of Water

Gradable : automatic

15) Compared to a glucose molecule, the starch molecule shown here



15) _____

- A) is used for energy storage in plant cells.
- B) can provide structure for cells that contain it.
- C) is a triglyceride and is composed of fatty acids.

- D) is composed of ribose monomers.
- E) is a disaccharide.

Question Details

Bloom's : 2. Understand

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Carbohydrates

Accessibility : Keyboard

Navigation

Gradable : automatic

16) The ring structure of glucose indicates that it is a(n)

16) _____

- A) monosaccharide.
- B) disaccharide.

- C) amino acid.
- D) nucleotide.
- E) fatty acid.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Carbohydrates

Accessibility : Keyboard

Navigation

Bloom's : 1. Remember

Gradable : automatic

17) _____

A) carbon, hydrogen, oxygen, calcium, iron, and iodine.

B) carbon, oxygen, iron, chlorine, sulfur, and phosphorus.

C) carbon, hydrogen, iron, sulfur, sodium, and calcium.

D) carbon, hydrogen, oxygen, sulfur, nitrogen, and phosphorus.

E) carbon, oxygen, sulfur, calcium, iron, and phosphorus.

Question Details

Learning Outcome : 02.01.01 Identify the most important elements in living organisms.

Section : 02.01

Accessibility : Keyboard Navigation

Topic : Atomic Structure

Bloom's : 1. Remember

Gradable : automatic

18) The atomic number of an element is the number of

18) _____

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.

Question Details

Section : 02.01

Accessibility : Keyboard Navigation

Topic : Atomic Structure

Bloom's : 1. Remember

Learning Outcome : 02.01.02

Describe the structure of atoms.

Gradable : automatic

19) Given this information from one element in the periodic table of elements, the number of neutrons plus

protons is

7
Nitrogen
N
14.0067

19) _____

- A) 14, which is approximately the same as the atomic weight.
- B) 7, which is approximately the same as the atomic weight.
- C) 14, which is also the atomic number.

D) 7, which is also the atomic number.

E) unable to be determined with the information provided.

Question Details

Section : 02.01

Accessibility : Keyboard Navigation

Topic : Atomic Structure

Bloom's : 3. Apply

Learning Outcome : 02.01.02

Describe the structure of atoms.

Gradable : automatic

20) The mass number is defined as the total number of _____ of an atom.

20) _____

- A) protons, neutrons, and electrons
- B) protons and electrons
- C) protons and neutrons

D) neutrons and electrons

E) protons

Question Details

Section : 02.01

Accessibility : Keyboard Navigation

Topic : Atomic Structure

Bloom's : 1. Remember

Learning Outcome : 02.01.02

Describe the structure of atoms.

Gradable : automatic

21) An ion is an atom that has

21) _____

- A) the same number of electrons as it does protons.
- B) a net positive charge.
- C) a different number of neutrons from the number of protons.
- D) a net negative charge.

E) a net negative or positive charge, with the number of electrons different from the number of protons.

Question Details

Bloom's : 2. Understand

Section : 02.01

Accessibility : Keyboard Navigation

Topic : Atomic Structure

Learning Outcome : 02.01.02

Describe the structure of atoms.

Gradable : automatic

22) The first energy shell of an atom has one orbital.
Therefore, it can contain a maximum of _____ electron(s).

22) _____

- A) one
- B) two

- C) four
- D) eight
- E) sixteen

Question Details

Accessibility : Keyboard Navigation

Topic : Atomic Structure

Section : 02.02

Bloom's : 1. Remember

Learning Outcome : 02.02.02

Use the number of valence electrons in an atom to predict the number of b

Gradable : automatic

23) In the element neon, each atom contains eight electrons in its valence shell. The atoms of neon will be

23) _____

- A) highly reactive.
- B) not chemically stable.

C) highly likely to combine with other atoms.

- D) not inert.
- E) chemically stable.

Question Details

Section : 02.01

Accessibility : Keyboard Navigation

Topic : Atomic Structure

Section : 02.02

Bloom's : 3. Apply

Learning Outcome : 02.01.02

Describe the structure of atoms.

Learning Outcome : 02.02.02

Use the number of valence electrons in an atom to predict the number of b

Gradable : automatic

24) In a covalent bond, atoms

24) _____

- A) share electrons.
- B) of opposite charges attract each other.
- C) share protons.

- D) both become highly electronegative.
- E) lose electrons.

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Section : 02.02

Bloom's : 1. Remember

Topic : Chemical Bonds

Gradable : automatic

25) In an ionic bond,

25) _____

- A) two atoms both become strongly electronegative and attract each other.
- B) atoms attract each other by sharing electrons to fill their valence shells.
- C) atoms, having gained or lost electrons, attract one another with opposite charges.

- D) two atoms are attracted by partial positive and negative charges.
- E) two atoms are attracted by the same charges.

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and

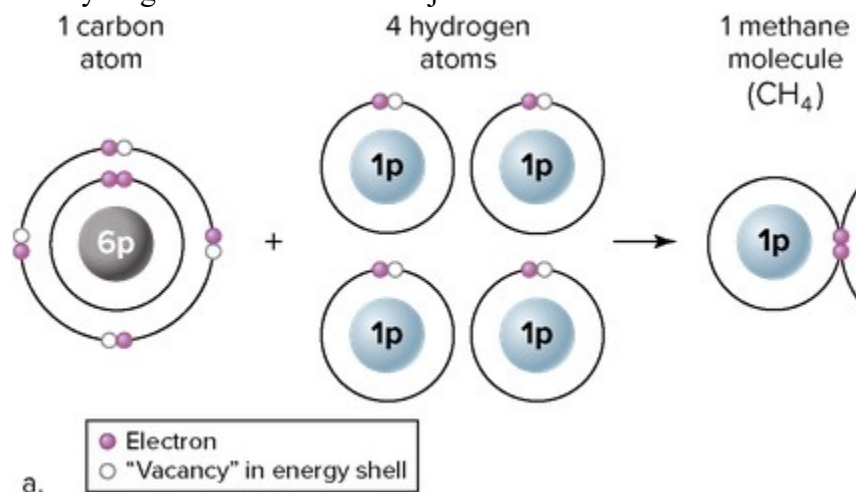
hydrogen bonds.

Section : 02.02

Bloom's : 1. Remember

Topic : Chemical Bonds
Gradable : automatic

26) Carbon and hydrogen make up many biologically important molecules. Carbon has an electronegativity of 2.55, whereas hydrogen has an electronegativity of 2.2. Based on the electronegativity difference between the atoms, the carbon and hydrogens shown here have just formed



26) _____

- A) a nonpolar covalent bond.
- B) a polar covalent bond.
- C) an ionic bond.

- D) a hydrogen bond.
- E) an element.

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Learning Outcome : 02.02.04 Explain the relationship between

electronegativity and chemical bond form

Section : 02.02

Topic : Chemical Bonds

Bloom's : 4. Analyze

Gradable : automatic

27) Which statement summarizes the distinction between nonpolar and polar covalent bonds?

27) _____

- A) Polar covalent bonds are formed when the atoms gain or lose electrons to bond and become oppositely charged

ions.

- B) The difference in electronegativity of the

atoms in a nonpolar covalent bond is very large.

C) The electrons are more evenly and symmetrically distributed in orbit among atoms in a polar covalent bond.

D) The electrons are more evenly and symmetrically

distributed in orbit among atoms in a nonpolar covalent bond.

Question Details

Bloom's : 2. Understand

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Learning Outcome : 02.02.04 Explain the relationship between

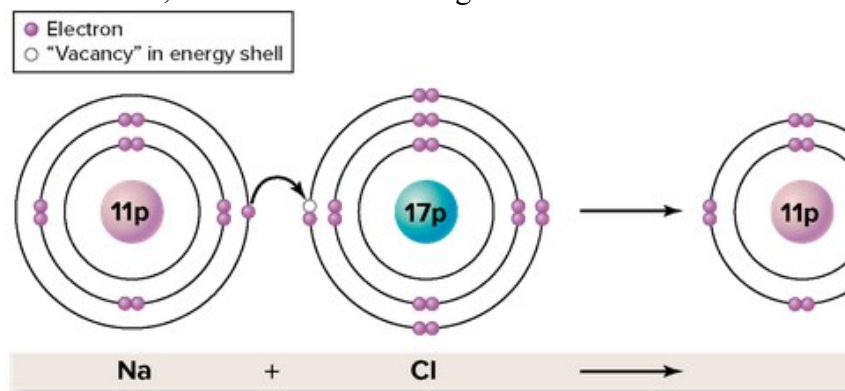
electronegativity and chemical bond form

Section : 02.02

Topic : Chemical Bonds

Gradable : automatic

28) Referring to the ionic bond formation between sodium and chlorine, which of the following is not a true statement?



28) _____

A) Na is the chemical symbol for sodium.

B) Chlorine donates an electron.

C) Sodium donates an electron.

D) Sodium becomes positively charged.

E) The bond that is formed is stronger than a hydrogen bond.

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Section : 02.02

Bloom's : 1. Remember

Topic : Chemical Bonds

Gradable : automatic

29) Water molecules

exhibit cohesive and adhesive properties. What is the chemical bond characteristic that contributes to these and other numerous important properties of water molecules?

29) _____

A) The covalent bond strengths of water molecules change with pH, temperature, or solute conditions present.

B) The covalent bonds that form water molecules transform to ionic bonds in presence of other molecules, temperature changes, or pH.

C) Hydrogen bonds form between water molecules, not requiring gain, loss, or sharing of electrons.

D) Bonds that form water are of the nonpolar covalent form.

E) Ionic bonds between water molecules create increased surface tension.

Question Details

Bloom's : 2. Understand

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Learning Outcome : 02.03.01 Explain how the structure of water affects

its chemical properties.

Section : 02.02

Section : 02.03

Topic : Chemical Bonds

Gradable : automatic

30) You can painlessly wade into a pool, but doing a belly flop off of the high diving board hurts because of

30) _____

A) water's high density.

B) adhesion in water.

C) water's high boiling point.

D) water's neutral pH.

E) cohesion in water.

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.03.01 Explain how the structure of water affects its chemical properties.

Section : 02.03

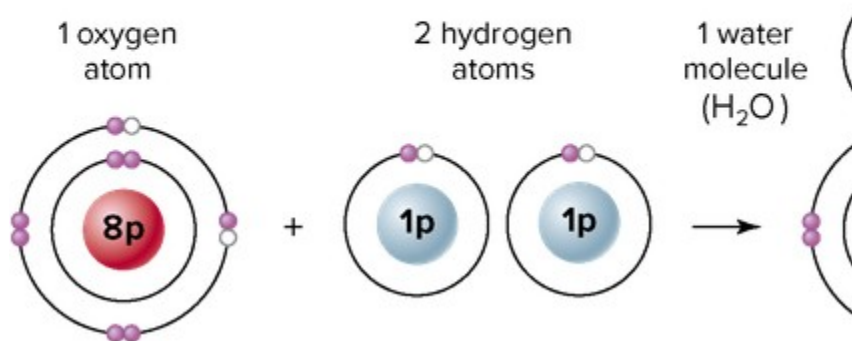
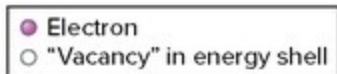
Topic : Properties of Water

Bloom's : 3. Apply

Gradable : automatic

31) Within a single molecule of water, as

shown, ____ bonds are formed between oxygen and hydrogen.



31) _____

- A) ionic
- B) covalent

- C) hydrogen
- D) hydrophobic
- E) nuclear

Question Details

Accessibility : Keyboard Navigation

Topic : Atomic Structure

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Section : 02.02

Topic : Properties of Water

Bloom's : 1. Remember

Topic : Chemical Bonds

Gradable : automatic

32) Evaporation of water is a change of water from

32) _____

- A) a liquid into a vapor.
- B) a solid into a vapor.
- C) a vapor into a liquid.

- D) a vapor into a solid.
- E) All of the answer choices are correct.

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.03.01 Explain how the structure of water affects its chemical properties.

Section : 02.03

Topic : Properties of Water

Bloom's : 1. Remember

Gradable : automatic

33) You collect and measure samples of ice and surrounding liquid water from a stream in the winter. You find that you collected the same number of water molecules in each form. The volume of the ice samples are larger than the

33) _____

- A) the hydrogen bonds between the water molecules being unstable and constantly forming and breaking that increases the volume and decreases the density of the ice.
- B) the hydrogen bonds between the water molecules being in a fixed position that increases the volume and

liquid water samples. This is a result of

- decreases the density of the ice.
- C) the covalent bonds between the water molecules being unstable and constantly forming and

breaking that increases the volume and decreases the density of the ice.

D) the covalent bonds between the water molecules being in a fixed position that increases the volume and decreases the density of the ice.

E) the ionic bonds between the water molecules

Question Details

Bloom's : 2. Understand

Accessibility : Keyboard Navigation

Learning Outcome : 02.03.01 Explain how the structure of water affects

being unstable and constantly forming and breaking that increases the volume and decreases the density of the ice.

its chemical properties.

Section : 02.03

Topic : Properties of Water

Gradable : automatic

34) In a chemical equation, which components of a chemical reaction are found on the left side of the arrows?

34) _____

A) reactants

B) products

C) buffers

D) reagents

E) solvents

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.03.01 Explain how the structure of water affects its chemical properties.

Section : 02.03

Bloom's : 1. Remember

Topic : Chemical Reactions

Gradable : automatic

35) An acid

35) _____

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 of the answer choices are correct.

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.04.01

Explain how acids and bases affect pH.

Section : 02.04
Topic : Acids and Bases

Bloom's : 1. Remember
Gradable : automatic

36) A base

36) _____

- 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.
- E) All of the answer choices are correct.

Question Details

Accessibility : Keyboard Navigation
Learning Outcome : 02.04.01 Explain how acids and bases affect pH.

Section : 02.04
Topic : Acids and Bases
Bloom's : 1. Remember
Gradable : automatic

37) Organic molecules are defined as chemical compounds that contain _____ in distinct ratios and structures.

37) _____

- A) carbon
- B) carbon and oxygen
- C) carbon and nitrogen

- D) carbon, hydrogen, and nitrogen
- E) carbon and hydrogen

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes
Section : 02.05
Topic : Carbohydrates
Topic : Lipids

Topic : Proteins
Topic : Nucleic Acids
Accessibility : Keyboard Navigation
Bloom's : 1. Remember
Topic : Chemical Bonds
Gradable : automatic

38) The four major groups of organic compounds are

38) _____

- 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.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classe

Section : 02.05

Topic : Carbohydrates

Topic : Lipids

E)
carbohydrates,proteins,
amino acids, and nucleic
acids.

Topic : Proteins

Topic : Nucleic Acids

Accessibility : Keyboard
Navigation

Bloom's : 1. Remember

Gradable : automatic

39) In living cells, a process by which cells break polymers down into monomers with the addition of water is

39) _____

- A) hydrolysis.
- B) dehydrationsynthesis.
- C) reproduction.

D) reduction.
E) All of the
answer choices are correct.

Question Details

Section : 02.05

Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Learning Outcome : 02.05.01 Differentiate between dehydration synthesis

and hydrolysis.

Topic : Chemical Bonds

Topic : Chemical Reactions

Gradable : automatic

40) Which of the following is not an example of a monosaccharide?

40) _____

- A) glucose
- B) ribose
- C) fructose

D) cellulose
E) All of the
answer choices are correct.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Carbohydrates

Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Gradable : automatic

41) 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

41) _____

- A) H^+ concentration is decreased ten fold.
- B) H^+ concentration is decreased two fold.
- C) H^+ concentration is increased two fold.
- D) H^+ concentration is decreased four fold.

concentration of H^+ ions in a patient with a blood pH of 6.4?

E) H^+ concentration is increased ten fold.

Question Details

Bloom's : 2. Understand

Accessibility : Keyboard Navigation

Learning Outcome : 02.04.01 Explain how acids and bases affect pH.

Section : 02.04

Topic : Acids and Bases

Gradable : automatic

42) Which is not a lipid?

42) _____

- A) triglyceride
- B) phospholipid

- C) a wax
- D) a steroid
- E) a starch

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Lipids

Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Gradable : automatic

43) The primary building block (monomer) of proteins is

43) _____

- A) a glucosmolecule.
- B) a fatty acid.
- C) a nucleotide.

D) an aminoacid.
E) a group of four interconnected rings.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classe
Section : 02.05

Topic : Proteins
Accessibility : Keyboard Navigation
Bloom's : 1. Remember
Gradable : automatic

44) An amino acid contains a structural "backbone" chain of

44) _____

- A) nitrogens.
- B) nitrogens and carbons.
- C) carbons.

D) phosphorus atoms.
E) carbon and phosphorus atoms.

Question Details

Bloom's : 2. Understand
Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classe

Section : 02.05
Topic : Proteins
Accessibility : Keyboard Navigation
Gradable : automatic

45) The bond that builds amino acid monomers into protein polymers is

45) _____

- A) a primary structural bond.
- B) a denatured hydrogen bond.
- C) a covalent bond also known as a peptide bond.
- D) an ionic bond also known as a peptide bond.

E) a covalent bond also know as a glycosidic bond.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classe

Section : 02.05
Topic : Proteins
Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Topic : Chemical Bonds

Gradable : automatic

46) The primary building block (monomer) of nucleic acids is

46) _____

- A) a nucleotide.
- B) a glucosemolecule.
- C) a fatty acid.

- D) an aminoacid.
- E) a group of four interconnected rings.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classe

Section : 02.05

Topic : Nucleic Acids

Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Gradable : automatic

47) The three major components in a nucleotide are

47) _____

- A) glucose, a nitrogenous base, and a phosphate group.
- B) glucose, a fattyacid, and glycerol.
- C) a nitrogenous base, a six-carbon sugar, and a phosphate group.

- D) a nitrogenous base, a five-carbon sugar, and a phosphate group.
- E) a carboxyl group,an R group, and an amino group.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classe

Section : 02.05

Topic : Nucleic Acids

Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Gradable : automatic

48) The four nitrogen bases found in RNA are

48) _____

- A) adenine,

thymine, guanine, and uracil.

- B) adenine, cytosine, guanine, and uracil.
- C) adenine, thymine, cytosine, and uracil.
- D) thymine, cytosine, guanine, and uracil.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

E) None of the answer choices are correct.

Topic : Nucleic Acids

Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Gradable : automatic

49) Sugars like glucose ($C_6H_{12}O_6$) dissolve well in water because sugars form _____ bonds with water.

49) _____

- A) covalent
- B) ionic

- C) hydrogen
- D) hydrophobic
- E) nonpolar

Question Details

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03 Compare and contrast ionic, covalent, and hydrogen bonds.

Learning Outcome : 02.03.01 Explain how the structure of water affects its chemical properties.

Section : 02.02

Section : 02.03

Topic : Properties of Water

Bloom's : 1. Remember

Topic : Chemical Bonds

Gradable : automatic

50) _____ bonds are formed between monomers to form a polymer.

50) _____

- A) Ionic
- B) Covalent

- C) Hydrogen
- D) Hydrophobic
- E) Nuclear

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Accessibility : Keyboard Navigation

Learning Outcome : 02.02.03

Compare and contrast ionic, covalent, and hydrogen bonds.

51) Saturated fats have long, straight tails of fatty acids and can clump tightly together in cells and animal bodies. Unsaturated fats have kinks in their tails due to double bonds, which prevent them from packing together as tightly.

Animals that are ectotherms (their body temperature fluctuates with the environment) need to keep their membranes fluid at cooler temperature and thus use _____ in their membranes.

51) _____

- A) mostly unsaturated fats
- B) mostly saturated fats
- C) equal amounts of saturated and unsaturated fats

- D) carbohydrates
- E) proteins

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes
Section : 02.05
Topic : Lipids
Accessibility : Keyboard Navigation

Learning Outcome : 02.00.01
Explain the relationship between chemistry and biology.
Bloom's : 3. Apply
Topic : Chemical Bonds
Gradable : automatic

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

52) _____

- A) unsaturated fats.
- B) waxes.

- C) carbohydrates.
- D) proteins.
- E) saturated fats.

Question Details

Bloom's : 2. Understand
Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes
Section : 02.05
Topic : Lipids

Accessibility : Keyboard
Navigation
Topic : Chemical Bonds
Gradable : automatic

53) The group of organic molecule polymers with the most complex and diverse three-dimensional structure is

53) _____

- A) saturated fats.
- B) unsaturated fats.

- C) proteins.
- D) waxes.
- E) carbohydrates.

Question Details

Bloom's : 2. Understand
Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05
Topic : Proteins
Accessibility : Keyboard
Navigation
Gradable : automatic

54) Which of these pairs does not correctly match a carbohydrate with its function?

54) _____

- 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.
- E) Starch provides long-term energy.

Question Details

Bloom's : 2. Understand
Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05
Topic : Carbohydrates
Accessibility : Keyboard
Navigation
Gradable : automatic

55) If a carbohydrate polymer is limited to two monomer units, such as sucrose made from glucose and fructose, it is called

55) _____

- A) a disaccharide.
- B) a polysaccharide.
- C) a monosaccharide.

- D) an oligosaccharide.
- E) a complex carbohydrate.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Carbohydrates

Accessibility : Keyboard

Navigation

Bloom's : 1. Remember

Gradable : automatic

56) Having the typical ratio of carbon, hydrogen, and oxygen of carbohydrates, the chemical formula for glucose is

56) _____

- A) $C_6H_{12}O_6$.
- B) $C_{12}H_{24}O_{12}$.

- C) $C_{12}H_{22}O_{11}$.
- D) $C_6H_6O_{12}$.
- E) $C_6H_{12}O_6$.

Question Details

Bloom's : 2. Understand

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Carbohydrates

Accessibility : Keyboard

Navigation

Gradable : automatic

57) Which of the following is not a compound?

57) _____

- A) water (H_2O)
- B) a hydrogen ion (H^+)
- C) sodium chloride ($NaCl$)

- D) a protein
- E) All of the answer choices are correct.

Question Details

Bloom's : 2. Understand

Accessibility : Keyboard Navigation

Section : 02.02

Topic : Chemical Bonds

Learning Outcome : 02.02.01

Differentiate between atoms and molecules.

58) How many hydrogen atoms are in the molecule methane (CH₄)?

58) _____

- A) 1
- B) 2

- C) 4
- D) 5
- E) 0

Question Details

Bloom's : 2. Understand

Accessibility : Keyboard Navigation

Section : 02.02

Topic : Chemical Bonds

Gradable : automatic

Learning Outcome : 02.02.01

Differentiate between atoms and molecules.

59) Scientists from the University of Texas at Austin experimentally plugged the venom glands of tawny ants before exposing them to fire ants to test the hypothesis that

59) _____

- A) crazy ant venom makes fire ant venom less poisonous to crazy ants.
- B) crazy ant venom is more detrimental to humans than fire ant venom.
- C) fire ants outcompete crazy ants in the southern

United States.

- D) crazy ant venom has a high pH.
- E) fire ant venom is less potent than crazy ant venom.

Question Details

Accessibility : Keyboard Navigation

Bloom's : 1. Remember

Learning Outcome : 02.06.01 Explain how researchers discovered that

some ants defend themselves again

Section : 02.06

Topic : Scientific Method

Type : Investigating Life

60) After being exposed to fire ant venom, crazy ants that were treated with formic acid had a significantly greater survival rate than those treated with a water-based control. In

this experiment, these results suggested that

60) _____

A) formic acid is not likely involved in deactivating fire ant venom.

B) formic acid is most likely involved in detoxifying the fire ant venom.

C) water is just as good as formic acid at detoxifying fire ant venom.

D) no conclusions could be drawn from the data.

E) formic acid is the main component of fire ant venom.

Question Details

Accessibility : Keyboard Navigation

Topic : Acids and Bases

Bloom's : 1. Remember

Gradable : automatic

Learning Outcome : 02.06.01 Explain how researchers discovered that

some ants defend themselves again

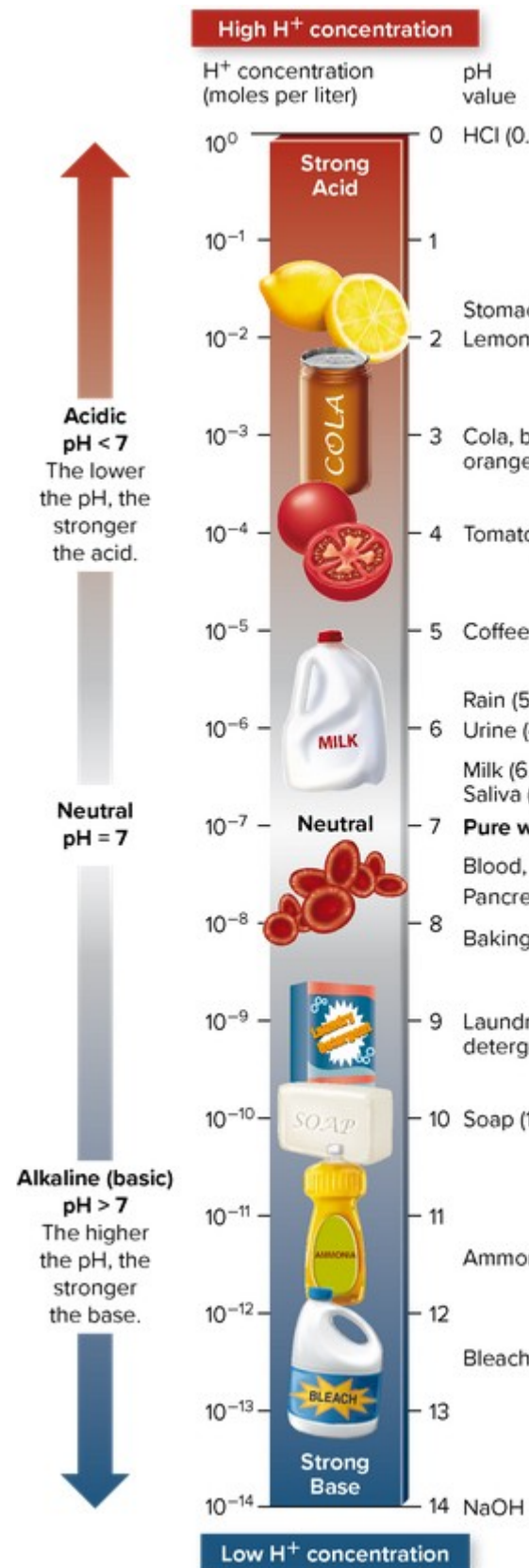
Section : 02.06

Topic : Scientific Method

Type : Investigating Life

SECTION BREAK. Answer all the part questions.

61) Refer to this diagram with common examples of substances and their pH.



- A) a health problem due to 10X higher H^+ concentrations than normal in your body.
- B) a health problem due to 2X higher H^+ concentrations than normal in your body.
- C) a health problem due to 10X higher OH^- concentrations than normal in your body.
- D) a health problem due to 2X higher OH^-

normal in your body.

E) no health risk, as part of normal pH changes in your body that in this case bring it closer to neutral pH.

Question Details

Accessibility : Keyboard Navigation

Bloom's : 3. Apply

Learning Outcome : 02.04.01 Explain how acids and bases affect

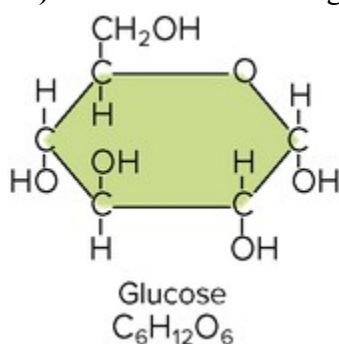
pH.

Section : 02.04

Topic : Acids and Bases

Gradable : automatic

62) Examine this image of the glucose molecule.



Question Details

62.1) Based on the 1:2:1 proportions of carbon, hydrogen, and oxygen, it can be determined that the

glucose molecule is a(n)

- 62.1) _____
- A) carbohydrate.
 - B) disaccharide.

- C) triglyceride.
- D) polymer.
- E) amino acid.

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

Topic : Carbohydrates

Accessibility : Keyboard Navigation

Bloom's : 1. Remember
Gradable : automatic

62.2) Starchy foods in our diets, such as rice and potatoes, consist of many glucose molecules covalently

bonded together to form

62.2) _____

- A) a complex carbohydrate.
- B) a simple sugar.
- C) a triglyceride.

- D) a fatty acid chain.
- E) a protein.

Question Details

Bloom's : 2. Understand

Learning Outcome : 02.05.02 Compare and contrast the structures and functions of the four main classes

Section : 02.05

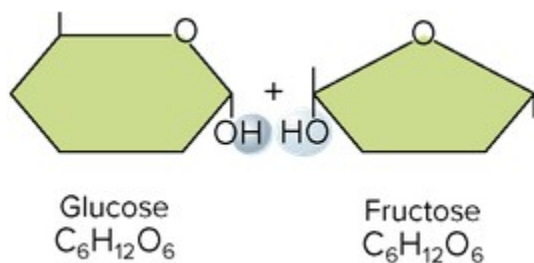
Topic : Carbohydrates

Accessibility : Keyboard

Navigation

Gradable : automatic

63) Examine these two sugars, as shown prior to the chemical reaction that would bond them.



Question Details

63.1) These glucose and fructose molecules will bond to form a monosaccharide with the removal of water.

63.1) _____

- ☐ true
- ☐ false

Question Details

Learning Outcome : 02.05.02 Compare and contrast the structures

and functions of the four main classes

Section : 02.05

Topic : Carbohydrates
Accessibility : Keyboard Navigation

Bloom's : 1. Remember
Gradable : automatic

63.2) The diagram shows the monomers, glucose and fructose, before _____ occurs, which builds a

polymer via the removal of water.

63.2) _____

- A) hydrolysis
- B) reproduction
- C) dehydration synthesis

- D) evaporation
- E) oxidation

Question Details

Bloom's : 2. Understand
Section : 02.05
Topic : Carbohydrates
Accessibility : Keyboard Navigation

Learning Outcome :
02.05.01 Differentiate between dehydration synthesis and hydrolysis.
Topic : Chemical Bonds
Gradable : automatic

Answer Key

Test name: Biology: Concepts and Investigations Chapter 02 Test Bank

1) FALSE

Water's partial charges allow it to be cohesive, so that the surface tension among molecules can support this light insect.

Read section 2.3A for more information.

2) TRUE

In understanding water's function as a solvent, hydrophilic molecules are charged or polar molecules that can be dissolved easily by the

polar water molecule. Read section 2.3B for more information.

3) TRUE

Cohesion occurs when molecules of any substance attract other molecules of the same substance, and water does this with hydrogen

bonds. Read sections 2.2D and 2.3A for more information.

4) FALSE

Locations of peptide bonds are not random in building the polymers, but must be located in specific positions. Read section 2.5C for more information.

5) FALSE

Liquid solutions, such as our blood plasma, rely on the solvent and solute components to be balanced for our health. Read section 2.3B

for more information.

6) TRUE

The economic understanding of food sources we buy can be important as you note differences among the natural and modified

fatty acids. Read section 2.5E for more information.

7) TRUE

There are eight amino acids that humans gain from protein-rich foods. Read section 2.5C for more information.

8) TRUE

Normal functions of proteins cease if the three-dimensional structure is changed by various conditions. Read section 2.5C for more information.

9) FALSE

Although proteins have many functions, and have structures determined by the DNA genetic code, protein functions do not include storage and inheritance of genetics. Read

section 2.5C for more information.

10) [A, C, D]

11) [B, C, E]

Although DNA and RNA both have a sugar-phosphate backbone, DNA nucleotides contain the sugar deoxyribose, and RNA nucleotides contain the sugar ribose. DNA functions to store genetic information, while RNA is used to translate genetic code into

proteins for different biological functions. Read section 2.5D for more information.

12) A

Organic molecules are composed mainly of carbon, hydrogen, oxygen, and nitrogen. Read sections 2.1A and 2.5 for more information.

13) A

Lavoisier showed that chemical reactions rearrange matter, rather than create or destroy atoms that make matter. Read section 2.1 for more information on elements and also section

2.2 for more information on bonds.

14) A

The same basic properties of water from its covalent bond and resulting electronegativity contribute to the importance of all water properties that benefit life. Read sections 2.2D

and 2.3 for more information.

15) A

Our diets include simple sugars and complex sugars. The uses vary depending on how simple sugars are bonded to each other in chains. Read section 2.5B for more information.

16) A

The single ring structure and the approximate ratio of carbons:hydrogens:oxygen of 1:2:1 indicates the general type of molecule as a

unit. Read section 2.5B for more information.

17) D

Bulk elements are often listed on labels of vitamins and food nutrition labels, enforcing the understanding that they are required for

our vital health. They are commonly also needed by other

organisms for their health. Read section 2.1A for more information.

18) C

Each named element has distinct properties associated with their protons and electrons, and the periodic table of the elements organizes elements by these components.

Read section 2.1B for more information.

19) A

The information about elements is reported in standardized form for reference by all scientists. Read sections 2.1B and 2.1C for more information.

20) C

Mass number is analyzed and reported, because researchers may need to identify if isotopes or radioisotopes are present. Read

section 2.1C for more information.

21) E

The elemental form listed in the periodic table of elements assumes a neutral condition, having electron and proton numbers equal.

Read section 2.1B for more information.

22) B

The numbers of electrons that fill the first energy shell is common to all elements. Read

section 2.2A for more information.

23) E

The stability, or lack of chemical reactivity, is dependent upon whether the valence shell is

full or not, regardless of

whether or not the atom is charged. Read sections 2.1B and 2.2A for more information.

24) A

The outer valence shells can be filled by either "sharing" or complete "donation" of electrons. Read section 2.2C for more information.

25) C

The outer valence shells can be filled by either "sharing" or complete "donation" of electrons. The positive and negative charges are due to complete gains or losses of electrons, changing the charge balance with protons.

Read section 2.2B for more information.

26) A

Electronegativity will impact the distribution of where atoms spend most time while shared in covalent bonds. Read section 2.2C for more information.

27) D

Covalent bonds require sharing of electrons, though the time electrons spend in orbit around each atom will vary. Read section 2.2C

for more information.

28) B

The donation, or loss, of the electron from sodium (Na) is shown, forming it into an ion. The gain of the electron by

chlorine (Cl) forms it into an ion. Read section 2.2B for more information.

29) C

Hydrogen bonds between water molecules

provide "flexibility"

in distances and angles between the water molecules without gain, loss, or sharing of electrons. This contributes to the numerous important properties of water. Read sections

30) E

Though individually small, water molecules form hydrogen bonds with each other to produce surface conditions we experience differently depending on how we enter the

31) B

As the diagram shows, the oxygen and hydrogens share orbits of electrons in their valence shells. Read section 2.2C for more information.

32) A

Water's hydrogen bonds hold it in different phases of solid, liquid, or gas (vapor), and the specific types of phase changes are associated with energy and habitat conditions important

33) B

Density of molecules changes with most substances at different temperatures, but water is most dense at just above freezing, so the colder, crystalline ice is less dense than

34) A

Chemical reactions can neither create, nor destroy atoms, so chemical reactions are

2.2D and 2.3 for more information.

water. Read section 2.3A for more information.

to life. Read sections 2.3C for more information.

surrounding water. Read section 2.3D for more information.

written in a way that shows balance of all

input and output atoms, based on how the substances react. Read section 2.3E for more information.

35) D

The pH values are based on how molecules break apart into smaller ion components of hydrogen (H^+) and hydroxide (OH^-). Read

section 2.4 for more information.

36) C

The pH values are based on how molecules break apart into smaller ion components of hydrogen (H^+) and hydroxide (OH^-). Read

section 2.4 for more information.

37) E

From the monomer units to the polymer structures, the four main organic molecule groups have distinct properties that repeat in

structure. Read all subsections in 2.5 for more information.

38) D

What scientists know about industrial plastics they initially learned from studying organic molecule structures. Each large organic molecule group has subtypes that must be discerned. Read all sections in 2.5 and

examine table 2.3 for more information.

39) A

Living cells constantly build and tear apart polymers as needed for varying functions. Covalent bonds are formed and broken with

the addition or

subtraction of components of water. Read section 2.5A for more information.

40) D

Monosaccharides are single-ring structures, usually of four to six carbons. Read section

2.5B for more information.

41) E

Without proper homeostasis of pH controls by buffers and other body functions, relatively small numerical pH changes can result in potentially deadly consequences. Read section

2.4A for more information.

42) E

Fatty acid chains are characteristically attached among the types of lipids. Steroids have distinct clusters of four interconnected rings, differently arranged from chains of

rings in carbohydrates. Read section 2.5E for more information.

43) D

Proteins are diverse in structure and function, yet are consistently made of chains of linked building blocks, "notably including the

element nitrogen". Read section 2.5C for more information.

44) B

Amino acid monomers and the resulting protein polymers have a characteristic repeating sequence of the two main elements, in addition to the specialized R groups. Read

section 2.5C for more information.

45) C

The bond between amino acids is named

specifically because

it is linking carbon end groups of one monomer to nitrogen end groups of the other. Read section 2.5C for more information.

46) A

The characteristic double helix shape of DNA can be described as a twisted ladder, with the monomers forming each "rung" of the

structure. Read section 2.5D for more information.

47) D

Nucleotides in DNA and RNA have a more complex structure, with three smaller subunits making up each nucleotide. Read section 2.5D

for more information.

48) B

For all known life, there are four nucleotides common in DNA, and the four nucleotides of RNA are similar with one substituted

nucleotide. Read section 2.5D for more information.

49) C

The partial charges that allow water molecules to bond cohesively with each other also allow it to form hydrogen bonds with molecules of

other substances. Read section 2.3B for more information.

50) B

It is important to study the monomer units, and the processes of making and breaking the bonds that form larger polymers. Read section

2.5 for more information.

51) A

This represents a range of ecological relationships among animals and the temperature in their habitat, and a trait that can vary among species, their habitats, or in

seasonal changes.
Read section 2.5E
for more
information.

52) E

Hydrogenation is a technological manipulation that converts less expensive plant oils to forms that taste to us, as economic consumers, more like animal fats.

Read section 2.5B
for more
information.

53) C

Primary, secondary, tertiary, and quaternary structures of proteins demonstrate the different complexity and diversity of the polymers.

Read section 2.5C
for more
information.

54) C

The majority of carbohydrate functions are related to energy and energy storage. Review section 2.5B and table 2.3 more information.

55) A

Whether used for storage or structure, the number and arrangement of monomers in carbohydrates change the properties most, as cells use them. Read sections 2.5A and 2.5B

for more
information.

56) E

Through all of the carbohydrates, the C:H:O ratio is relatively consistent. Read section

2.5A for more
information.

57) B

Chemical bonds link atoms to form molecules and compounds. Read section 2.2 for more information.

58) C

Subscripts in the molecular formula indicate how many atoms of each element are in the

molecule. Read section 2.2 for more information.

59) A

The control group included ants that had nail polish applied to another part of their abdomen, leaving their venom glands intact.

Read section 2.6 for more information.

60) B

Scientists hypothesize that the formic acid may denature the enzymes that make fire ant venom lethal to other insects. Read section 2.6

for more information.

61) Section Break

61.1) A

Because the pH scale is logarithmic, every whole number change represents 10X change in concentrations and reactivity of the solution. Slight changes to the decimal place of pH change can

affect your health. Read section 2.4A for more information.

62) Section Break

62.1) A

The shapes, structures, and sizes of organic molecules are specifically linked to vital cell functions. Read section 2.5B

for more information.

62.2) A

We typically hear of monomers and polymers regarding "plastics," but organic chemists learned about these materials by studying organic molecules from life.

Read section 2.5B for more information.

63) Section Break

63.1) FALSE

Formation of new covalent bonds between monomers results in larger, multiple unit molecules. Read section 2.5

for more information.

63.2) C

Living cells constantly build and tear apart polymers as needed for varying functions. Covalent bonds are formed and broken with the addition or subtraction of components of water. Read sections 2.5A

and 2.5B for more information.