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 classe
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 one pair of double-bonded carbons.

6) \_\_\_\_\_\_

 ⊚ true
 ⊚ false

 **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 : 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 classe
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 classe
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 classe
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 classe
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 abundantelements 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 classe
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 byreactinga 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 thelaw of conservation of mass. This law also applies to biology, because the materials we are made of are \_\_\_\_\_\_\_\_\_ that change forms, but aren't truly lost through biochemical reactions.

13) \_\_\_\_\_\_

 A) matter
 B) energy
 C) solutions
 D) isotopes
 E) metals

 **Question Details**Bloom's : 2. Understand
Section : 02.01
Accessibility : Keyboard Navigation
Learning Outcome : 02.00.01 Explain the relationship between chemistry and biology.
Topic : Atomic Structure
Gradable : automatic

**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 polarcovalent bonds between oxygen and hydrogen. The polar covalentbonds are aresult of

14) \_\_\_\_\_\_

 A) oxygen being more electronegativeand thereforeattracting 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 being an electron acceptor.
 E) there being a greater number of electrons in oxygen outermost shell than in hydrogen.

 **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
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 classe
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 classe
Section : 02.05
Topic : Carbohydrates
Accessibility : Keyboard Navigation
Bloom's : 1. Remember
Gradable : automatic

**17)** The primary elements making up living organisms are

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 thenucleus.
 B) electrons in thenucleus.
 C) protons in thenucleus.
 D) neutrons in theorbitals.
 E) protons in theorbitals.

 **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


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 andelectrons
 C) protons andneutrons
 D) neutrons andelectrons
 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) highlyreactive.
 B) not chemicallystable.
 C) highly likely tocombine with other atoms.
 D) not inert.
 E) chemicallystable.

 **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) shareelectrons.
 B) of oppositecharges 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 chemicalsymbol for sodium.
 B) Chlorine donatesan electron.
 C) Sodium donates anelectron.
 D) Sodium becomespositively 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 highdensity.
 B) adhesion inwater.
 C) water's highboiling point.
 D) water's neutralpH.
 E) cohesion inwater.

 **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 answerchoices 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 liquid water samples. This is a result of

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

 **Question Details**Bloom's : 2. Understand
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
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 thattakes hydrogen ions from a solution.
 C) has a value of 7 on the pH scale.
 D) is a chemical thatadds hydrogen ions to a solution.
 E) All of the answerchoices 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 7on the pH scale.
 B) is a chemical thatadds hydrogen ions to a solution.
 C) is a chemical thatabsorbs hydrogen ions from a solution.
 D) has a value below7 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 classe
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.
 E) carbohydrates,proteins, amino acids, 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
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 classe
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 concentration of H + ions in a patient with a blood pH of 6.4?

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.
 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) atriglyceride
 B) aphospholipid
 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 classe
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 glucosemolecule.
 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.
 E) None of the answer choices are correct.

 **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

**49)** Sugars like glucose (C 6H 12O 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 classe
Section : 02.05
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

**51)** Saturated fats have long, straight tails of fatty acids and canclump tightly together in cells and animal bodies. Unsaturated fats have kinks in their tails due to double bonds, which preventthem 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 unsaturatedfats
 B) mostly saturatedfats
 C) equal amounts ofsaturated 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 classe
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) unsaturatedfats.
 B) waxes.
 C) carbohydrates.
 D) proteins.
 E) saturatedfats.

 **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 : 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) saturatedfats.
 B) unsaturatedfats.
 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 classe
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 classe
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 classe
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 6O 6.
 B) C 12H 6O 12.
 C) C 12H 22O 11.
 D) C 6H 6O 12.
 E) C 6H 12O 6.

 **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 : Carbohydrates
Accessibility : Keyboard Navigation
Gradable : automatic

**57)** Which of the following is not a compound?

57) \_\_\_\_\_\_

 A) water (H2O)
 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.


 **Question Details**

**61.1)** The correct functions of your lungs contribute to the normal pH level of between 7.35 and 7.45. If your lungs do not exchange and remove carbon dioxide from your blood, the blood pH will change. A pH 6.4 reading of your blood indicates

61.1) \_\_\_\_\_\_

 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– concentrations than 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 thatthe 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 classe
Section : 02.05
Topic : Carbohydrates
Accessibility : Keyboard Navigation
Bloom's : 1. Remember
Gradable : automatic

**62.2)** Starchy foods inour diets, such as rice and potatoes, consist of many glucosemolecules 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 classe
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 classe
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:oxygens 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 2.2D and 2.3 for more information.

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 water. Read section 2.3A for more information.

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 to life. Read sections 2.3C for more information.

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 surrounding water. Read section 2.3D for more information.

34) A

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