Chapter 02 Test Bank: The Nature of Moleculars and the Properties of Water

Student: _____

1. Matter is composed of:
A. energy
B. molecules
C. mass
D. atoms

2. All atoms possess the ability to do work. The term that is defined as the ability to do work is:
A. matter
B. energy
C. molecules
D. space

3. The number of protons in a given atom is equal to its:
A. neutron number
B. mass
C. molecular number
D. atomic number

4. Isotopes that are unstable and decay when their nucleus breaks up into elements with lower atomic numbers, emitting significant amounts of energy in the process, are called:
A. energetic
B. ionic
C. radioactive
D. isometric

5. Atoms containing a specific number of protons are called:
A. metals
B. minerals
C. molecules
D. elements

6. Which chemical group forms hydrogen bonds with water and is most likely to explain why sugars dissolve well in water?
A. -C-H
B. -N-H
C. -C-C
D. -O-H

7. The negative logarithm of the hydrogen ion concentration in the solution is referred to as:
A. pH
B. atomic mass
C. OH^- concentration
D. electronegativity
E. specific heat

8. Bicarbonate ions in the blood can absorb hydrogen ions, keeping pH balanced. Therefore bicarbonate is acting as a _____ in blood.
A. base
B. buffer
C. acid
D. alkaline

9. Atomic nuclei contain protons and _____.
A. neutrons
B. isomers
C. ions
D. moles

10. Carbon-12, Carbon-13 and Carbon-14 are examples of:
A. isotopes
B. ions
C. molecules
D. isomers

11. Organisms are composed of molecules, which are collections of smaller units, termed:
A. monomers.
B. atoms.
C. electrons.
D. polymers.
E. ions.

12. Negatively charged subatomic particles that have almost no mass are called:
A. electrons.
B. protons.
C. neutrons.
D. ions.
E. polymers.

13. Atoms of a single element that possess different numbers of neutrons are called:
A. monomers.
B. isomers.
C. ions.
D. isotopes.
E. polymers.

14. $Cl + e^- \rightarrow Cl^-$ is an example of a _____ reaction.
A. ionization
B. reduction
C. polymerization
D. oxidation

15. When atoms gain or lose electrons, they become negatively or positively charged. These negatively or positively charged atoms are known as
A. unstable atoms.
B. ions.
C. isotopes.
D. isomers.

16. When two atoms share a pair of electrons, the bonding is referred to as:
A. ionic.
B. covalent.
C. unstable.
D. hydrogen.

17. Water molecules are polar with ends that exhibit partial positive and negative charges. These opposite charges allow water molecules to attract each other through:
A. ionic bonds.
B. covalent bonds.
C. hydrogen bonds.
D. peptide bonds.

18. An atom has 20 electrons and 20 neutrons. What is the mass of this atom?
A. 10
B. 20
C. 40
D. 80

19. Sue was monitoring the oil spill into the Gulf of Mexico from an oil tanker. From her observations, she noted that the oil was moving as large patches in the water. It did not appear as though the oil was dissolving into the water. Why did the oil not dissolve into the water?
A. Hydrophobic interactions
B. Surface tension
C. Sea water acts as a solvent
D. Water forms hydration shells
E. Water has a high heat of vaporization

20. The atomic number of an element is equal to the number of:
A. neutrons plus electrons.
B. neutrons only.
C. protons plus neutrons.
D. protons only.
E. protons plus electrons.

21. Oxygen has an atomic mass of 16 and an atomic number of 8. How many neutrons are present?
A. 8
B. 24
C. 16
D. 4

22. The pH of your small intestines is around 7.5 and the pH of your large intestine can be 5.5. As substances travel from the small intestines to the large intestine, what happens to the H^+ ion concentration?
A. It decreases 100 fold.
B. It increases by 100 fold.
C. It increases 10 fold.
D. It increases 2 fold.
E. It decreases 10 fold.

23. Oxygen-16 is abundant and has 8 protons and 8 neutrons. Oxygen-18 is a(n) _____ of oxygen-16.
A. isomer
B. isotope
C. dimer
D. ion

24. Which element's isotope is commonly used to determine when biological samples such as fossils, were formed?
A. oxygen
B. hydrogen
C. carbon
D. nitrogen
E. sulfur

25. Atoms in which the number of electrons does not equal the number of protons are known as:
A. valences.
B. ions.
C. isotopes.
D. isomers.

26. The area around a nucleus where an electron is most likely to be found is the:
A. electrical space.
B. energy level.
C. polar space.
D. orbital.

27. Regardless of its shape, a given orbital may contain no more than:
A. 1 electron.
B. 4 electrons.
C. 8 electrons.
D. 2 electrons.

28. All atoms tend to fill their outer energy levels with the maximum number of electrons, usually eight. Depending on whether atoms satisfy the octet rule will predict:
A. the chemical behavior of the atoms.
B. whether they will be found in nature.
C. whether they will dissolve in water.
D. their radioactive energy.

29. Mendeleev found that when he arranged the known elements according to their atomic mass, the entries in the table exhibited a pattern of chemical properties that repeated itself in groups of eight elements. This led to the generalization now known as:
A. an atomic model.
B. valance electrons.
C. the periodic table.
D. the octet rule.

30. Sodium has 11 electrons arranged in three energy levels. In order to become stable, sodium forms an ion with a
A. +8 charge.
B. no charge.
C. -8 charge.
D. -1 charge.
E. +1 charge.

31. In the crystal matrix of ordinary salt, the sodium and chlorine are held together by:
A. peptide bonds.
B. covalent bonds.
C. ionic bonds.
D. hydrogen bonds.
E. nonpolar bonds.

32. Two carbon atoms joined to each other by the sharing of two pairs of electrons, form a(n):
A. double covalent bond.
B. single bond.
C. hydrogen bond.
D. ionic bond.

33. In a chemical analysis of an animal tissue sample, which element would be in the least quantity?
A. iodine
B. carbon
C. oxygen
D. hydrogen
E. nitrogen

34. Life is thought to have evolved from complex molecules formed by the interaction of smaller molecules in oceans and the atmosphere. The substance which brought these molecules together to interact is
A. salts.
B. hydrogen.
C. water.
D. acids.
E. buffers.

35. Because oxygen is more electronegative than hydrogen, the water molecule is:
A. hydrophobic.
B. hydrophilic.
C. nonpolar.
D. ionic.
E. polar.

36. Water molecules are attracted to each other due to the opposite charges created by partial charge separations within the molecules. These attractions are called:
A. peptide bonds.
B. covalent bonds.
C. ionic bonds.
D. hydrogen bonds.
E. double bonds.

37. An oxygen atom in water has two covalent bonds with hydrogen atoms and two unpaired electrons. How many hydrogen bonds can a water molecule form?
A. 1
B. 2
C. 3
D. 4
E. 5

38. Nitrogen has a higher electronegativity than hydrogen. As a result you would expect that ammonia (NH_3) molecules can form _____ with each other.
A. covalent bonds
B. cohesive bonds
C. hydrogen bonds
D. hydrophilic bonds
E. ionic bonds

39. When water ionizes, it produces equal amounts of hydrogen and hydroxide ions that can reassociate with each other. The pH of water is:
A. 3
B. 4
C. 5
D. 6
E. 7

40. A scientist conducts a procedure that causes nitrogen atoms to gain neutrons. The resulting atoms will be:
A. ions of nitrogen.
B. positively charged.
C. negatively charged.
D. isotopes of nitrogen.
E. new elements with higher atomic numbers.

41. The half-life of Carbon-14 is approximately 5,700 years. Using this information scientists have been able to determine the age of some artifacts left by humans. A scientist wants to know approximately how old a piece of wood was that she found on the floor in an old cave that had recently been discovered. She removed the wood (with permission) to her laboratory. Her wood sample contained 2 grams of Carbon-14. If the age of the wood was determined to be 22,800 years old, how much Carbon-14 originally existed in this piece of wood?
A. 32 grams
B. 16 grams
C. 12 grams
D. 8 grams
E. 4 grams

42. Plants transport water to their leaves through the xylem when water evaporates from the leaves. The evaporating water pulls other water molecules up the xylem through _____ .
A. Hydrophobic interactions
B. Hydrogen bonds
C. Ionic bonds
D. Covalent bonds

43. Water is most dense and thus heaviest at 4°C. At 0°C, ice forms and can float on liquid water. Suppose ice were most dense at 0°C. What would happen in a lake?
A. The ice would cover the bottom of the aquatic system and would build up in layers over time.
B. Ice would not form because solids are always less dense than liquids.
C. The ice would cover the surface of the aquatic system and would never melt.
D. The cold temperatures and the subsequent ice formation would prevent hydrogen bonds from forming between the water molecules, thus causing the existing ice crystals to become disassociated from each other.

44. Your dog becomes ill and you rush him to the veterinarian's office. A technician draws blood from your dog's leg for a vet-ordered lab test. After a few minutes the lab results are given to the vet, who immediately grabs a bottle from a shelf and begins to fill a syringe with an unknown fluid. You inquire about the fluid, and the vet informs you that the fluid is necessary to manage your dog's metabolic acidosis. Based on the information provided, what is acidosis, and what is the likely effect of the veterinarian's injection? Acidosis means that your dog's blood pH has _____ from its normal level, and an injection of _____ is required to reverse the condition.
A. dropped, water
B. increased, water
C. decreased, buffering solution
D. increased, buffering solution

45. As you and a friend are entering a chemistry laboratory at your university, you see a sign that states: DANGER—RADIOACTIVE ISOTOPES IN USE. Your friend is an accounting major and has not had any science courses yet. She asks you what a radioactive isotope is and you respond correctly with:
A. Radioactive isotopes are atoms that are unstable and as a result emit energy in a process called radioactive decay.
B. Radioactive isotopes are atoms that are stable and as a result emit energy in a process called radioactive decay.
C. Radioactive isotopes are atoms that are stable and as a result only emit energy if they are exposed to higher temperatures.
D. Radioactive isotopes are atoms that are unstable but unless actively disturbed by some chemical process will remain intact and pose no problems.

46. An effective way to increase the rate of the reaction A+B --> C would be to
A. add more C.
B. decrease the temperature.
C. add more A or B.
D. remove the catalyst.

47. The two nitrogen atoms in nitrogen gas (N_2) share six electrons forming a _____.
A. double covalent bond
B. double bond
C. single covalent bond
D. triple covalent bond
E. hydrogen bond

48. Capillary action is one of the forces that aids water's upward movement in plants. The narrower the diameter of the tube, the farther the water column will rise. Capillary action is a result of water molecules:
A. having an adhesive force, which allows them to attach to the vessel walls.
B. being associated with hydrophobic molecules, which can result in upward movement.
C. producing sufficient surface tension to overcome the pull of gravity.
D. having a strong cohesive force and attaching to the surrounding vessel walls.
E. storing heat and thus moving faster because of heat of vaporization.

49. Which atomic particle has no charge and is located in the nucleus?
A. electron
B. neutron
C. ion
D. proton
E. isotope

50. The sub-atomic particle with a positive charge is _____.
A. a neutron
B. an ion
C. an electron
D. an isotope
E. a proton

51. The smallest sub-atomic particle is the _____.
A. proton
B. isotope
C. neutron
D. electron
E. ion

52. An atom that is negatively charged because it has accepted an electron is a(n):
A. monomer.
B. ion.
C. isomer.
D. isotope.

53. Membrane lipids contain long chains of H-C-H groups joined by C-C bonds. Which interaction is most likely occurring between lipids in the membrane?
A. hydrogen bonds
B. Van der Waals
C. ionic
D. covalent

54. After taking your biology exam, you return to your car only to find that you had left the lights on and now the car battery is dead. Your friend offers to jump-start your car, but when you go to hook up the jumper cables you find that the battery terminals are covered with corrosion due to battery acid condensation. Based off your knowledge, what substance could be used to clean the corrosion?
A. vinegar (pH of 3)
B. water (pH of 7)
C. coffee (pH of 5)
D. baking soda (pH of 9)

55. The amino acid glycine ($C_3NO_2H_6$) is a(an):
A. inorganic molecule
B. vitamin
C. element
D. organic molecule

56. Consider the following electronegativity values:
Boron (B) = 1.8
Carbon (C) = 2.5
Chlorine (Cl) = 3.2
Selenium (Se) = 2.6

Which bond is the most polar?
A. cannot determine from the information provided
B. B-Cl
C. Se-Cl
D. C-Cl

57. The reaction ($H_2 + F_2 \rightarrow 2HF$) is an example of a redox reaction. In reality, two half reactions are occurring. The half reaction ($H_2 \rightarrow 2H^+ + 2e^-$) is a(n):
A. redox reaction
B. reduction reaction
C. oxidation reaction
D. potential energy reaction

58. The electronic configuration of the noble gas Neon, which has an atomic number of 10, can be written as follows: $1s^2 2s^2 2p^6$. What is the electronic configuration of the noble gas Argon, which has an atomic number of 18?

A. $1s^2 2s^8 3p^8$
B. $1s^2 2s^2 2p^6 3s^2 3p^6$
C. $1s^2 2s^6 2p^2 3s^6 3p^2$
D. $1s^2 2s^2 3p^6 4s^2 5p^6$

59. You identify an enzyme involved in a cellular reaction. How does the enzyme affect the reaction equilibrium between reactants and products and the time needed to reach equilibrium?

A. It alters the reaction equilibrium and shortens the time needed to reach equilibrium.
B. The reaction equilibrium is unaffected, but it shortens the time needed to reach equilibrium.
C. It alters the reaction equilibrium and lengthens the time needed to reach equilibrium.
D. The reaction equilibrium is unaffected, but it lengthens the time needed to reach equilibrium.

60. You walk down into your basement to find that the carpeting on the floor is damp. Concerned, you look around for large puddles of water or broken pipes, but find none. In fact, only the basement floor and carpeting is damp. You realize that water must have wicked into the carpet from the floor by _____.

A. adhesion, cohesion, and solubility
B. cohesion and solubility
C. adhesion and cohesion
D. adhesion and solubility

61. You recently discovered a new element, and find that this particular element one electron its outer energy level. What would you expect will happen to an atom of this element if placed in water?

A. It will gain an electron forming a negative ion.
B. It will lose an electron forming a positive ion.
C. It will lose an electron forming a negative ion.
D. It will gain an electron forming a positive ion.

62. Sulfur is found directly below Oxygen on the periodic table. What type of bond would you predict S-H would form?

A. Polar covalent
B. Hydrogen bond
C. Ionic
D. Non-polar covalent bond

63. Why is it necessary to take special safety precautions when using radioactivity?
A. Radioactive substances have the potential to cause damage to living cells.
B. Radioactive substances decay.
C. Radioactive substances will perforate plasma membranes.
D. Radioactive substances will ionize cells.

64. The high heat of vaporization of water helps you to feel cooler when you sweat because the transition of water from a liquid to a gas requires a _____ of energy to break hydrogen bonds. The energy is _____ from heat produced by your body, thus helping to lower the surface temperature of your body.
A. release; released
B. release; obtained
C. input; obtained
D. input; released

65. Salt is often used to melt ice on roads during the winter because it lowers the freezing/melting point of water. When salt dissolves in water, individual Na^+ and Cl^- ions break away from the salt lattice and become surrounded by water molecules. Why would this cause ice to melt?
A. Hydrogen bonds are broken, and the salt ions interfere with interactions between H and O. As a result, it is more difficult for water molecules to bond and form ice.
B. Hydrogen bonds are formed, and the salt ions bond with O. As a result, it is more difficulty for water molecules to bond and form ice.
C. Hydrogen bonds are broken, and the salt ions bond with O and H respectively. As a result, it is more difficult for water molecules to bond and form ice.

66. A chemist adds a chemical to pure water and there is a 100 fold increase in the concentration of hydrogen ions. What is the best approximation of the new pH value?
A. 0
B. 5
C. 7
D. 9
E. 14

67. The electronegativity of nitrogen (N) is 3.0, while the electronegativity of hydrogen (H) is 2.1. Knowing this, consider how the electrons will be shared in ammonia (NH_3). What do you predict about the polarity of ammonia?
A. Each H atom has a partial positive charge.
B. The N atom has a partial positive charge.
C. Each H atom has a partial negative charge.
D. The N atom has a strong positive charge.

68. Magnesium chloride is a salt formed with ionic bonds between one magnesium ion and two chloride ions. Magnesium has two electrons in its outer shell and chlorine has seven electrons in its outer shell. How are the electrons transferred between these atoms?
A. Both magnesium and chlorine are reduced.
B. Chlorine is oxidized and magnesium is reduced.
C. Both magnesium and chlorine are oxidized.
D. Magnesium is oxidized and chlorine is reduced.

69. The carbonic acid and bicarbonate buffer in blood is extremely important to help maintain homeostasis. Removing bicarbonate from the blood would most likely
A. increase the pH.
B. decrease the pH.
C. not affect the pH.

70. The common basilisk lizard will run across water on its hind legs in an erect position when startled by predators. This lizard has large feet and flaps of skin along its toes. What properties of water allow this lizard to walk on water?
A. Hydrogen bonds absorb heat when they break and release heat when they form. This helps to minimize temperature changes.
B. Polar molecules are attracted to ions and polar compounds, making these compounds soluble.
C. Hydrogen bonds hold water molecules together; many hydrogen bonds must be broken for water to evaporate.
D. The surface tension created by hydrogen bonds is greater than the weight of the lizard initially.

71. Cl has 7 electrons in its outer shell and K has 1 electron in its outer shell. How is the bond in Cl_2 different from the bond in KCl?
A. Cl_2 is covalent and KCl is ionic.
B. Cl_2 and KCl are both ionic.
C. Cl_2 is ionic and KCl is covalent.

72. Carbon has 4 valence electrons and oxygen has 6. Carbon and oxygen would form _____.
A. hydrogen bonds
B. ionic bonds
C. single covalent bonds
D. double covalent bonds

73. If water were non-polar it would not form hydrogen bonds. At normal room temperatures this non-polar water would be _____.
A. a solid
B. a gas
C. a liquid

74. Proteins are three dimensional molecules made of strands of amino acids (imagine a ball of string). There are 20 different amino acids used in proteins found in living organisms. Some of these amino acids are polar and others are non-polar. Where would a series of non-polar amino acids most likely be located in a protein that is found in an animal cell?
A. On the surface of the protein
B. In the interior of the protein
C. At the very top of the protein
D. At the very bottom of the protein

75. According to most car mechanics, plain water is the best coolant to use in an engine provided the engine is not being exposed to freezing temperatures. If the car is subject to freezing temperatures then a mixture of water and ethylene glycol (antifreeze) is recommended but it does not cool as efficiently as plain water. Why would ethylene glycol reduce the cooling efficiency of water?
A. Hydrogen bonds in water allow high levels of heat absorption and a large increase in temperature.
B. Ethylene glycol has a higher heat capacity than water.
C. Ethylene glycol has a lower heat capacity than water.
D. Ethylene glycol raises the freezing point of water.

76. Dennis had a history of heart disease in his family and was reducing his intake of saturated fats. Saturated means each carbon atom is bonded to as many hydrogen atoms as it can accept. If a carbon were bonded to two carbons, how many hydrogens could it accept?
A. 0
B. 1
C. 2
D. 3
E. 4

Chapter 02 Test Bank: The Nature of Moleculars and the Properties of Water Key

1. Matter is composed of:
A. energy
B. molecules
C. mass
D. atoms

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

2. All atoms possess the ability to do work. The term that is defined as the ability to do work is:
A. matter
B. energy
C. molecules
D. space

02.01.03 Explain how energy is quantized
Blooms Level: 1. Remember
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

3. The number of protons in a given atom is equal to its:
A. neutron number
B. mass
C. molecular number
D. atomic number

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

4. Isotopes that are unstable and decay when their nucleus breaks up into elements with lower atomic numbers, emitting significant amounts of energy in the process, are called:
A. energetic
B. ionic
C. radioactive
D. isometric

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

5. Atoms containing a specific number of protons are called:
A. metals
B. minerals
C. molecules
D. elements

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

6. Which chemical group forms hydrogen bonds with water and is most likely to explain why sugars dissolve well in water?
A. -C-H
B. -N-H
C. -C-C
D. -O-H

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.03.03 Predict which kinds of molecules will form hydrogen bonds with each other.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

7. The negative logarithm of the hydrogen ion concentration in the solution is referred to as:
A. pH
B. atomic mass
C. OH^- concentration
D. electronegativity
E. specific heat

Blooms Level: 1. Remember
Gradable: automatic
LO: 02.05.01 Calculate the pH of a solution based on the molar concentration of H+.
Section: 02.05 Water Molecules Can Dissociate into Ions
Topic: Chemistry

8. Bicarbonate ions in the blood can absorb hydrogen ions, keeping pH balanced. Therefore bicarbonate is acting as a _____ in blood.

A. base
B. buffer
C. acid
D. alkaline

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.05.01 Calculate the pH of a solution based on the molar concentration of H+.
Section: 02.05 Water Molecules Can Dissociate into Ions
Topic: Chemistry

9. Atomic nuclei contain protons and _____.

A. neutrons
B. isomers
C. ions
D. moles

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

10. Carbon-12, Carbon-13 and Carbon-14 are examples of:

A. isotopes
B. ions
C. molecules
D. isomers

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 2. Understand
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

11. Organisms are composed of molecules, which are collections of smaller units, termed:

A. monomers.
B. atoms.
C. electrons.
D. polymers.
E. ions.

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

12. Negatively charged subatomic particles that have almost no mass are called:
A. electrons.
B. protons.
C. neutrons.
D. ions.
E. polymers.

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 1. Remember
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

13. Atoms of a single element that possess different numbers of neutrons are called:
A. monomers.
B. isomers.
C. ions.
D. isotopes.
E. polymers.

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

14. $Cl + e^- \rightarrow Cl^-$ is an example of a _____ reaction.
A. ionization
B. reduction
C. polymerization
D. oxidation

02.01.03 Explain how energy is quantized
Blooms Level: 2. Understand
Gradable: automatic
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

15. When atoms gain or lose electrons, they become negatively or positively charged. These negatively or positively charged atoms are known as
A. unstable atoms.
B. ions.
C. isotopes.
D. isomers.

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 3. Apply
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

16. When two atoms share a pair of electrons, the bonding is referred to as:
A. ionic.
B. covalent.
C. unstable.
D. hydrogen.

Blooms Level: 1. Remember
LO: 02.03.02 Explain how covalent bonds hold atoms together.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

17. Water molecules are polar with ends that exhibit partial positive and negative charges. These opposite charges allow water molecules to attract each other through:
A. ionic bonds.
B. covalent bonds.
C. hydrogen bonds.
D. peptide bonds.

Blooms Level: 2. Understand
LO: 02.04.01 Explain how the structure of water leads to hydrogen bond formation.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

18. An atom has 20 electrons and 20 neutrons. What is the mass of this atom?
A. 10
B. 20
C. 40
D. 80

Blooms Level: 3. Apply
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

19. Sue was monitoring the oil spill into the Gulf of Mexico from an oil tanker. From her observations, she noted that the oil was moving as large patches in the water. It did not appear as though the oil was dissolving into the water. Why did the oil not dissolve into the water?
A. Hydrophobic interactions
B. Surface tension
C. Sea water acts as a solvent
D. Water forms hydration shells
E. Water has a high heat of vaporization

Blooms Level: 3. Apply
LO: 02.04.07 Explain why oil will not dissolve in water.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

20. The atomic number of an element is equal to the number of:
A. neutrons plus electrons.
B. neutrons only.
C. protons plus neutrons.
D. protons only.
E. protons plus electrons.

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

21. Oxygen has an atomic mass of 16 and an atomic number of 8. How many neutrons are present?
A. 8
B. 24
C. 16
D. 4

Blooms Level: 3. Apply
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

22. The pH of your small intestines is around 7.5 and the pH of your large intestine can be 5.5. As substances travel from the small intestines to the large intestine, what happens to the H^+ ion concentration?
A. It decreases 100 fold.
B. It increases by 100 fold.
C. It increases 10 fold.
D. It increases 2 fold.
E. It decreases 10 fold.

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.05.01 Calculate the pH of a solution based on the molar concentration of H+.
Section: 02.05 Water Molecules Can Dissociate into Ions
Topic: Chemistry

23. Oxygen-16 is abundant and has 8 protons and 8 neutrons. Oxygen-18 is a(n) _____ of oxygen-16.
A. isomer
B. isotope
C. dimer
D. ion

Blooms Level: 2. Understand
Gradable: automatic
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

24. Which element's isotope is commonly used to determine when biological samples such as fossils, were formed?
A. oxygen
B. hydrogen
C. carbon
D. nitrogen
E. sulfur

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

25. Atoms in which the number of electrons does not equal the number of protons are known as:
A. valences.
B. ions.
C. isotopes.
D. isomers.

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

26. The area around a nucleus where an electron is most likely to be found is the:
A. electrical space.
B. energy level.
C. polar space.
D. orbital.

02.01.03 Explain how energy is quantized
Blooms Level: 1. Remember
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

27. Regardless of its shape, a given orbital may contain no more than:
A. 1 electron.
B. 4 electrons.
C. 8 electrons.
D. 2 electrons.

02.01.03 Explain how energy is quantized
Blooms Level: 1. Remember
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

28. All atoms tend to fill their outer energy levels with the maximum number of electrons, usually eight. Depending on whether atoms satisfy the octet rule will predict:
A. the chemical behavior of the atoms.
B. whether they will be found in nature.
C. whether they will dissolve in water.
D. their radioactive energy.

Blooms Level: 2. Understand
LO: 02.02.01 Relate the periodic table to the chemical reactivity of different elements.
Section: 02.02 The Elements in Living Systems Have Low Atomic Masses
Topic: Chemistry

29. Mendeleev found that when he arranged the known elements according to their atomic mass, the entries in the table exhibited a pattern of chemical properties that repeated itself in groups of eight elements. This led to the generalization now known as:
A. an atomic model.
B. valance electrons.
C. the periodic table.
D. the octet rule.

Blooms Level: 1. Remember
LO: 02.02.01 Relate the periodic table to the chemical reactivity of different elements.
Section: 02.02 The Elements in Living Systems Have Low Atomic Masses
Topic: Chemistry

30. Sodium has 11 electrons arranged in three energy levels. In order to become stable, sodium forms an ion with a
A. +8 charge.
B. no charge.
C. -8 charge.
D. -1 charge.
E. +1 charge.

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.03.01 Explain how ionic bonds promote crystal formation.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

31. In the crystal matrix of ordinary salt, the sodium and chlorine are held together by:
A. peptide bonds.
B. covalent bonds.
C. ionic bonds.
D. hydrogen bonds.
E. nonpolar bonds.

Blooms Level: 1. Remember
LO: 02.03.01 Explain how ionic bonds promote crystal formation.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

32. Two carbon atoms joined to each other by the sharing of two pairs of electrons, form a(n):
A. double covalent bond.
B. single bond.
C. hydrogen bond.
D. ionic bond.

Blooms Level: 1. Remember
LO: 02.03.02 Explain how covalent bonds hold atoms together.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

33. In a chemical analysis of an animal tissue sample, which element would be in the least quantity?
A. iodine
B. carbon
C. oxygen
D. hydrogen
E. nitrogen

Blooms Level: 2. Understand
LO: 02.02.01 Relate the periodic table to the chemical reactivity of different elements.
Section: 02.02 The Elements in Living Systems Have Low Atomic Masses
Topic: Chemistry

34. Life is thought to have evolved from complex molecules formed by the interaction of smaller molecules in oceans and the atmosphere. The substance which brought these molecules together to interact is
A. salts.
B. hydrogen.
C. water.
D. acids.
E. buffers.

Blooms Level: 2. Understand
LO: 02.04.01 Explain how the structure of water leads to hydrogen bond formation.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

35. Because oxygen is more electronegative than hydrogen, the water molecule is:
A. hydrophobic.
B. hydrophilic.
C. nonpolar.
D. ionic.
E. polar.

Blooms Level: 1. Remember
LO: 02.04.01 Explain how the structure of water leads to hydrogen bond formation.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

36. Water molecules are attracted to each other due to the opposite charges created by partial charge separations within the molecules. These attractions are called:
A. peptide bonds.
B. covalent bonds.
C. ionic bonds.
D. hydrogen bonds.
E. double bonds.

Blooms Level: 2. Understand
LO: 02.04.02 Distinguish adhesion from cohesion.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

37. An oxygen atom in water has two covalent bonds with hydrogen atoms and two unpaired electrons. How many hydrogen bonds can a water molecule form?
A. 1
B. 2
C. 3
D. 4
E. 5

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.04.01 Explain how the structure of water leads to hydrogen bond formation.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

38. Nitrogen has a higher electronegativity than hydrogen. As a result you would expect that ammonia (NH_3) molecules can form _____ with each other.

A. covalent bonds
B. cohesive bonds
C. hydrogen bonds
D. hydrophilic bonds
E. ionic bonds

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.04.02 Distinguish adhesion from cohesion.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

39. When water ionizes, it produces equal amounts of hydrogen and hydroxide ions that can reassociate with each other. The pH of water is:

A. 3
B. 4
C. 5
D. 6
E. 7

Blooms Level: 1. Remember
LO: 02.05.01 Calculate the pH of a solution based on the molar concentration of H+.
Section: 02.05 Water Molecules Can Dissociate into Ions
Topic: Chemistry

40. A scientist conducts a procedure that causes nitrogen atoms to gain neutrons. The resulting atoms will be:

A. ions of nitrogen.
B. positively charged.
C. negatively charged.
D. isotopes of nitrogen.
E. new elements with higher atomic numbers.

Blooms Level: 2. Understand
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

41. The half-life of Carbon-14 is approximately 5,700 years. Using this information scientists have been able to determine the age of some artifacts left by humans. A scientist wants to know approximately how old a piece of wood was that she found on the floor in an old cave that had recently been discovered. She removed the wood (with permission) to her laboratory. Her wood sample contained 2 grams of Carbon-14. If the age of the wood was determined to be 22,800 years old, how much Carbon-14 originally existed in this piece of wood?

A. 32 grams
B. 16 grams
C. 12 grams
D. 8 grams
E. 4 grams

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 4. Analyze
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

42. Plants transport water to their leaves through the xylem when water evaporates from the leaves. The evaporating water pulls other water molecules up the xylem through _____ .

A. Hydrophobic interactions
B. Hydrogen bonds
C. Ionic bonds
D. Covalent bonds

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.04.02 Distinguish adhesion from cohesion.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

43. Water is most dense and thus heaviest at 4ºC. At 0ºC, ice forms and can float on liquid water. Suppose ice were most dense at 0ºC. What would happen in a lake?

A. The ice would cover the bottom of the aquatic system and would build up in layers over time.
B. Ice would not form because solids are always less dense than liquids.
C. The ice would cover the surface of the aquatic system and would never melt.
D. The cold temperatures and the subsequent ice formation would prevent hydrogen bonds from forming between the water molecules, thus causing the existing ice crystals to become disassociated from each other.

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.04.05 Explain why ice floats.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

44. Your dog becomes ill and you rush him to the veterinarian's office. A technician draws blood from your dog's leg for a vet-ordered lab test. After a few minutes the lab results are given to the vet, who immediately grabs a bottle from a shelf and begins to fill a syringe with an unknown fluid. You inquire about the fluid, and the vet informs you that the fluid is necessary to manage your dog's metabolic acidosis. Based on the information provided, what is acidosis, and what is the likely effect of the veterinarian's injection? Acidosis means that your dog's blood pH has _____ from its normal level, and an injection of _____ is required to reverse the condition.

A. dropped, water
B. increased, water
C. decreased, buffering solution
D. increased, buffering solution

Blooms Level: 4. Analyze
LO: 02.05.01 Calculate the pH of a solution based on the molar concentration of H+.
Section: 02.05 Water Molecules Can Dissociate into Ions
Topic: Chemistry

45. As you and a friend are entering a chemistry laboratory at your university, you see a sign that states: DANGER—RADIOACTIVE ISOTOPES IN USE. Your friend is an accounting major and has not had any science courses yet. She asks you what a radioactive isotope is and you respond correctly with:

A. Radioactive isotopes are atoms that are unstable and as a result emit energy in a process called radioactive decay.
B. Radioactive isotopes are atoms that are stable and as a result emit energy in a process called radioactive decay.
C. Radioactive isotopes are atoms that are stable and as a result only emit energy if they are exposed to higher temperatures.
D. Radioactive isotopes are atoms that are unstable but unless actively disturbed by some chemical process will remain intact and pose no problems.

Blooms Level: 2. Understand
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

46. An effective way to increase the rate of the reaction A+B --> C would be to
A. add more C.
B. decrease the temperature.
C. add more A or B.
D. remove the catalyst.

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.03.05 Identify three factors that influence which chemical reactions occur within cells.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

47. The two nitrogen atoms in nitrogen gas (N_2) share six electrons forming a _____.
A. double covalent bond
B. double bond
C. single covalent bond
D. triple covalent bond
E. hydrogen bond

Blooms Level: 3. Apply
LO: 02.03.02 Explain how covalent bonds hold atoms together.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

48. Capillary action is one of the forces that aids water's upward movement in plants. The narrower the diameter of the tube, the farther the water column will rise. Capillary action is a result of water molecules:
A. having an adhesive force, which allows them to attach to the vessel walls.
B. being associated with hydrophobic molecules, which can result in upward movement.
C. producing sufficient surface tension to overcome the pull of gravity.
D. having a strong cohesive force and attaching to the surrounding vessel walls.
E. storing heat and thus moving faster because of heat of vaporization.

Blooms Level: 2. Understand
LO: 02.04.02 Distinguish adhesion from cohesion.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

49. Which atomic particle has no charge and is located in the nucleus?
A. electron
B. neutron
C. ion
D. proton
E. isotope

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

50. The sub-atomic particle with a positive charge is _____.
A. a neutron
B. an ion
C. an electron
D. an isotope
E. a proton

Blooms Level: 1. Remember
LO: 02.01.01 Describe the structure of the Bohr atom.
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

51. The smallest sub-atomic particle is the _____.
A. proton
B. isotope
C. neutron
D. electron
E. ion

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 1. Remember
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

52. An atom that is negatively charged because it has accepted an electron is a(n):
A. monomer.
B. ion.
C. isomer.
D. isotope.

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 1. Remember
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

53. Membrane lipids contain long chains of H-C-H groups joined by C-C bonds. Which interaction is most likely occurring between lipids in the membrane?
A. hydrogen bonds
B. Van der Waals
C. ionic
D. covalent

Blooms Level: 5. Evaluate
Gradable: automatic
LO: 02.03.04 Distinguish between a chemical bond and van der Waals attractions.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

54. After taking your biology exam, you return to your car only to find that you had left the lights on and now the car battery is dead. Your friend offers to jump-start your car, but when you go to hook up the jumper cables you find that the battery terminals are covered with corrosion due to battery acid condensation. Based off your knowledge, what substance could be used to clean the corrosion?

A. vinegar (pH of 3)
B. water (pH of 7)
C. coffee (pH of 5)
D. baking soda (pH of 9)

Blooms Level: 3. Apply
LO: 02.05.01 Calculate the pH of a solution based on the molar concentration of H+.
Section: 02.05 Water Molecules Can Dissociate into Ions
Topic: Chemistry

55. The amino acid glycine ($C_3NO_2H_6$) is a(an):

A. inorganic molecule
B. vitamin
C. element
D. organic molecule

Blooms Level: 2. Understand
LO: 02.02.01 Relate the periodic table to the chemical reactivity of different elements.
Section: 02.02 The Elements in Living Systems Have Low Atomic Masses
Topic: Chemistry

56. Consider the following electronegativity values:
Boron (B) = 1.8
Carbon (C) = 2.5
Chlorine (Cl) = 3.2
Selenium (Se) = 2.6

Which bond is the most polar?

A. cannot determine from the information provided
B. B-Cl
C. Se-Cl
D. C-Cl

Blooms Level: 4. Analyze
Gradable: automatic
LO: 02.03.02 Explain how covalent bonds hold atoms together.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

57. The reaction ($H_2 + F_2 \rightarrow 2HF$) is an example of a redox reaction. In reality, two half reactions are occurring. The half reaction ($H_2 \rightarrow 2H^+ + 2e^-$) is a(n):

A. redox reaction
B. reduction reaction
C. oxidation reaction
D. potential energy reaction

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 3. Apply
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

58. The electronic configuration of the noble gas Neon, which has an atomic number of 10, can be written as follows: $1s^2 2s^2 2p^6$. What is the electronic configuration of the noble gas Argon, which has an atomic number of 18?

A. $1s^2 2s^8 3p^8$
B. $1s^2 2s^2 2p^6 3s^2 3p^6$
C. $1s^2 2s^6 2p^2 3s^6 3p^2$
D. $1s^2 2s^2 3p^6 4s^2 5p^6$

02.01.03 Explain how energy is quantized
Blooms Level: 3. Apply
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

59. You identify an enzyme involved in a cellular reaction. How does the enzyme affect the reaction equilibrium between reactants and products and the time needed to reach equilibrium?

A. It alters the reaction equilibrium and shortens the time needed to reach equilibrium.
B. The reaction equilibrium is unaffected, but it shortens the time needed to reach equilibrium.
C. It alters the reaction equilibrium and lengthens the time needed to reach equilibrium.
D. The reaction equilibrium is unaffected, but it lengthens the time needed to reach equilibrium.

Blooms Level: 2. Understand
LO: 02.03.05 Identify three factors that influence which chemical reactions occur within cells.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

60. You walk down into your basement to find that the carpeting on the floor is damp. Concerned, you look around for large puddles of water or broken pipes, but find none. In fact, only the basement floor and carpeting is damp. You realize that water must have wicked into the carpet from the floor by _____.
A. adhesion, cohesion, and solubility
B. cohesion and solubility
C. adhesion and cohesion
D. adhesion and solubility

Blooms Level: 3. Apply
LO: 02.04.02 Distinguish adhesion from cohesion.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

61. You recently discovered a new element, and find that this particular element one electron its outer energy level. What would you expect will happen to an atom of this element if placed in water?
A. It will gain an electron forming a negative ion.
B. It will lose an electron forming a positive ion.
C. It will lose an electron forming a negative ion.
D. It will gain an electron forming a positive ion.

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 3. Apply
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

62. Sulfur is found directly below Oxygen on the periodic table. What type of bond would you predict S-H would form?
A. Polar covalent
B. Hydrogen bond
C. Ionic
D. Non-polar covalent bond

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.02.01 Relate the periodic table to the chemical reactivity of different elements.
Section: 02.02 The Elements in Living Systems Have Low Atomic Masses
Topic: Chemistry

63. Why is it necessary to take special safety precautions when using radioactivity?
A. Radioactive substances have the potential to cause damage to living cells.
B. Radioactive substances decay.
C. Radioactive substances will perforate plasma membranes.
D. Radioactive substances will ionize cells.

02.01.02 Relate the arrangement of electrons in an atom to its chemical behavior.
Blooms Level: 1. Remember
Section: 02.01 All Matter Is Composed of Atoms
Topic: Chemistry

64. The high heat of vaporization of water helps you to feel cooler when you sweat because the transition of water from a liquid to a gas requires a _____ of energy to break hydrogen bonds. The energy is _____ from heat produced by your body, thus helping to lower the surface temperature of your body.
A. release; released
B. release; obtained
C. input; obtained
D. input; released

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.04.04 Explain why sweating cools.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

65. Salt is often used to melt ice on roads during the winter because it lowers the freezing/melting point of water. When salt dissolves in water, individual Na^+ and Cl^- ions break away from the salt lattice and become surrounded by water molecules. Why would this cause ice to melt?
A. Hydrogen bonds are broken, and the salt ions interfere with interactions between H and O. As a result, it is more difficult for water molecules to bond and form ice.
B. Hydrogen bonds are formed, and the salt ions bond with O. As a result, it is more difficulty for water molecules to bond and form ice.
C. Hydrogen bonds are broken, and the salt ions bond with O and H respectively. As a result, it is more difficult for water molecules to bond and form ice.

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.04.06 Explain why salt dissolves in water.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

66. A chemist adds a chemical to pure water and there is a 100 fold increase in the concentration of hydrogen ions. What is the best approximation of the new pH value?
A. 0
B. 5
C. 7
D. 9
E. 14

Blooms Level: 3. Apply
LO: 02.05.01 Calculate the pH of a solution based on the molar concentration of H+.
Section: 02.05 Water Molecules Can Dissociate into Ions
Topic: Chemistry

67. The electronegativity of nitrogen (N) is 3.0, while the electronegativity of hydrogen (H) is 2.1. Knowing this, consider how the electrons will be shared in ammonia (NH_3). What do you predict about the polarity of ammonia?

A. Each H atom has a partial positive charge.
B. The N atom has a partial positive charge.
C. Each H atom has a partial negative charge.
D. The N atom has a strong positive charge.

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.03.02 Explain how covalent bonds hold atoms together.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

68. Magnesium chloride is a salt formed with ionic bonds between one magnesium ion and two chloride ions. Magnesium has two electrons in its outer shell and chlorine has seven electrons in its outer shell. How are the electrons transferred between these atoms?

A. Both magnesium and chlorine are reduced.
B. Chlorine is oxidized and magnesium is reduced.
C. Both magnesium and chlorine are oxidized.
D. Magnesium is oxidized and chlorine is reduced.

Blooms Level: 3. Apply
LO: 02.03.01 Explain how ionic bonds promote crystal formation.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

69. The carbonic acid and bicarbonate buffer in blood is extremely important to help maintain homeostasis. Removing bicarbonate from the blood would most likely

A. increase the pH.
B. decrease the pH.
C. not affect the pH.

Blooms Level: 5. Evaluate
Gradable: automatic
LO: 02.05.01 Calculate the pH of a solution based on the molar concentration of H+.
Section: 02.05 Water Molecules Can Dissociate into Ions
Topic: Chemistry

70. The common basilisk lizard will run across water on its hind legs in an erect position when startled by predators. This lizard has large feet and flaps of skin along its toes. What properties of water allow this lizard to walk on water?

A. Hydrogen bonds absorb heat when they break and release heat when they form. This helps to minimize temperature changes.

B. Polar molecules are attracted to ions and polar compounds, making these compounds soluble.

C. Hydrogen bonds hold water molecules together; many hydrogen bonds must be broken for water to evaporate.

D. The surface tension created by hydrogen bonds is greater than the weight of the lizard initially.

Blooms Level: 2. Understand
LO: 02.04.02 Distinguish adhesion from cohesion.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

71. Cl has 7 electrons in its outer shell and K has 1 electron in its outer shell. How is the bond in Cl_2 different from the bond in KCl?

A. Cl_2 is covalent and KCl is ionic.

B. Cl_2 and KCl are both ionic.

C. Cl_2 is ionic and KCl is covalent.

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.03.02 Explain how covalent bonds hold atoms together.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

72. Carbon has 4 valence electrons and oxygen has 6. Carbon and oxygen would form _____.

A. hydrogen bonds

B. ionic bonds

C. single covalent bonds

D. double covalent bonds

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.03.02 Explain how covalent bonds hold atoms together.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
Topic: Chemistry

73. If water were non-polar it would not form hydrogen bonds. At normal room temperatures this non-polar water would be _____.
A. a solid
B. a gas
C. a liquid

Blooms Level: 4. Analyze
Gradable: automatic
LO: 02.04.04 Explain why sweating cools.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

74. Proteins are three dimensional molecules made of strands of amino acids (imagine a ball of string). There are 20 different amino acids used in proteins found in living organisms. Some of these amino acids are polar and others are non-polar. Where would a series of non-polar amino acids most likely be located in a protein that is found in an animal cell?
A. On the surface of the protein
B. In the interior of the protein
C. At the very top of the protein
D. At the very bottom of the protein

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.04.07 Explain why oil will not dissolve in water.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

75. According to most car mechanics, plain water is the best coolant to use in an engine provided the engine is not being exposed to freezing temperatures. If the car is subject to freezing temperatures then a mixture of water and ethylene glycol (antifreeze) is recommended but it does not cool as efficiently as plain water. Why would ethylene glycol reduce the cooling efficiency of water?
A. Hydrogen bonds in water allow high levels of heat absorption and a large increase in temperature.
B. Ethylene glycol has a higher heat capacity than water.
C. Ethylene glycol has a lower heat capacity than water.
D. Ethylene glycol raises the freezing point of water.

Blooms Level: 3. Apply
Gradable: automatic
LO: 02.04.03 Explain why water heats up so slowly.
Section: 02.04 The Properties of Water Result from Its Polar Nature
Topic: Chemistry

76. Dennis had a history of heart disease in his family and was reducing his intake of saturated fats. Saturated means each carbon atom is bonded to as many hydrogen atoms as it can accept. If a carbon were bonded to two carbons, how many hydrogens could it accept?

A. 0
B. 1
C. 2
D. 3
E. 4

Blooms Level: 3. Apply
LO: 02.03.02 Explain how covalent bonds hold atoms together.
Section: 02.03 Molecules Are Collections of Atoms Held Together by Chemical Bonds
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Chapter 02 Test Bank: The Nature of Moleculars and the Properties of Water Summary

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