Chapter 02: Testbank

Student: _____

1. The smallest unit of an element that still retains the chemical and physical properties of that element is called a(n)

   A. isotope.
   B. nucleus.
   C. atom.
   D. molecular bond.
   E. neutrino.

2. In an atom, the number of protons always equals the number of

   A. electrons.
   B. neutrons.
   C. neutrons and protons.
   D. quarks.
   E. neutrinos.

3. How many elements occur naturally?

   A. 112
   B. 92
   C. 64
   D. 32
   E. 6

4. The atomic number of an atom is determined by the number of

   A. protons.
   B. neutrons.
   C. electrons.
   D. protons and neutrons.
   E. protons and electrons.

5. An element cannot be broken down by chemical means.

   True False

6. Why is He positioned above Ne in the periodic table?

   A. They both have the same atomic mass.
   B. They both have the same number of electrons in their outermost orbital.
   C. They both have a full outermost orbital.
   D. They both have the same atomic number.
   E. They both have the same number of protons in their nuclei.

7. Be has an atomic number of 4 and an atomic mass of 9. How many protons does it have?

   A. 4
   B. 5
   C. 9
   D. 13
   E. 7

8. What is the symbol for sodium?

   A. Na
   B. S
   C. So
   D. N
   E. Dm

9. Which of the following elements will have more than two electrons and have a full outer orbital?

A. He
B. Ne
C. C
D. N
E. O

10. Isotopes of an element differ due to the number of

A. protons.
B. neutrons.
C. electrons.
D. both protons and electrons.
E. neutrinos.

11. Carbon dating is a common method employed in dating certain kinds of fossils. It is based on the radioactive decay of an isotope of carbon (C^{14}). Referring to the atomic number of carbon attained from the periodic table, how many neutrons does C^{14} have?

A. 2
B. 4
C. 8
D. 12
E. 14

12. What substance is used in medicine to produce various images of organs and tissues?

A. a mixture
B. a tracer
C. an emulsion
D. a colloid
E. a sensor

13. Radiation can have both positive and negative impact on humans.

True False

14. Two or more atoms joined together through the sharing of electrons are called a(n)

A. atomic unit.
B. molecule.
C. compound.
D. isotope.
E. ion.

15. $Ca_3(PO_4)_2$ represents a(n)

A. element.
B. mixture.
C. compound.
D. isotope.
E. atom.

16. Atoms that share electrons have what type of bonds?

A. covalent
B. neutral
C. hydrogen
D. colloidal
E. ionic

17. $CaCl_2$ is a salt that forms as the result of what type of bond?

    A. covalent
    B. hydrogen
    C. polar
    D. nonpolar
    E. ionic

18. Water makes up 60–70% of total body weight.

    True False

19. Which type of bond is responsible for holding two water molecules together, creating the properties of water?

    A. hydrogen
    B. covalent
    C. ionic
    D. polar
    E. double covalent

20. Hydrogen bonds

    A. result from the loss of neutrons by an atom.
    B. result in the formation of salts.
    C. involve the loss and gain of electrons.
    D. involve the sharing of electrons.
    E. are relatively weak and can be broken rather easily.

21. The reason water is polar is because

    A. in polar molecules atoms share electrons evenly.
    B. the electrons spend more time circling the oxygen atom than the hydrogens.
    C. hydrophilic molecules interact with water.
    D. hydrophobic molecules do not interact with water.
    E. there is a transfer of electrons from the hydrogen to the oxygen.

22. Which of the following characteristics of water is most responsible for the sinking of the Titanic?

    A. Water is liquid at room temperature.
    B. Water has a high heat of vaporization.
    C. The temperature of liquid water rises and falls slowly.
    D. Frozen water is less dense than liquid water.
    E. Water molecules are cohesive.

23. On a warm day in April, Tina jumped into the swimming pool. To her surprise the water was really cold. Which property of water did she discover?

    A. Water molecules are cohesive.
    B. The temperature of liquid water rises and falls slowly.
    C. Water possesses hydrogen bonds.
    D. Water is a polar molecule.
    E. Frozen water is less dense than liquid water.

24. William noticed water mysteriously climbing up a capillary tube. This is an example of which property of water?

    A. Frozen water is less dense than liquid water.
    B. The temperature of liquid water rises and falls slowly.
    C. Water molecules are cohesive.
    D. Water has a high heat of vaporization.
    E. Water is a solvent.

25. In an acidic solution, the number of H^+ is

    A. less than the number of OH^-.

B. greater than the number of OH^-.
C. equal to the number of OH^-.
D. 3 times less than the number of OH^-.
E. 10 times less than the number of OH^-.

26. A solution with a pH of 7 has 10 times as many H^+ as a pH of 6.

True False

27. A solution containing 0.00001 moles of H^+ has a pH of

A. 3.
B. 5.
C. 7.
D. 9.
E. 11.

28. The presence of a buffer in our blood helps maintain homeostasis.

True False

29. Joining small molecules (monomers) together to form longer chains (polymers) requires a process called

A. a hydrolysis reaction.
B. a dehydration reaction.
C. monomerization.
D. emulsification.
E. disassembly.

30. Which of the following is not one of the four classes of organic molecules found in cells?

A. vitamins
B. lipids
C. proteins
D. carbohydrates
E. nucleic acids

31. In biology, calling something organic means that it was grown without the use of any type of herbicide.

True False

32. NaCl is not an organic molecule.

True False

33. After lunch, our digestive system will use the process of hydrolysis to break the food down into smaller subunits.

True False

34. A hydrolysis reaction involves the loss of water.

True False

35. Which grouping of elements is found in carbohydrates?

A. C - H - O
B. C - H - P
C. H - O - Cl
D. N - S - O
E. Ca - H - O

36. Sugars with three to seven carbon atoms are called

A. monosaccharides.
B. disaccharides.
C. trisaccharides.

D. polysaccharides.
E. steroids.

37. A potato stores a reserve of energy in its underground tuber in the form of

A. glycogen.
B. fat.
C. protein.
D. vitamins.
E. starch.

38. Which of the following is not a monosaccharide?

A. glucose
B. fructose
C. galactose
D. maltose
E. None of these are monosaccharides.

39. Which polysacccharide is stored as an energy source in the body of animals?

A. glycogen
B. glucose
C. cellulose
D. starch
E. chitin

40. What passes through the digestive tract as fiber or roughage?

A. maltose
B. glucose
C. glycogen
D. starch
E. cellulose

41. Which of the following foods would be a good source of fiber?

A. peaches
B. whole-wheat bread
C. peanuts
D. bran cereal
E. All of these are good sources of fiber.

42. Which polysaccharide is branched the most?

A. cellulose
B. starch
C. glycogen
D. glucose
E. fructose

43. Which polysaccharide is consumed as a source of fiber?

A. cellulose
B. glycogen
C. glucose
D. chitin
E. starch

44. The main function of carbohydrates is for long-term energy storage.

True False

45. Our body is capable of converting starch into glycogen.

True False

46. Starch, cellulose, and glycogen are alike in that they

A. are all made of glucose.
B. contain the same number of side chains.
C. have the same types of bonds between the monomer units.
D. are all found in animals.
E. can all be digested by our bodies.

47. A fat contains how many fatty acids?

A. 1
B. 2
C. 3
D. 4
E. 5

48. How are fats, phospholipids, and steroids alike?

A. They are all solid at room temperature.
B. They each contain a polar phosphate group.
C. They each contain only one fatty acid.
D. They do not dissolve in water.
E. They all contain at least one carbon ring.

49. A fatty acid that contains only single bonds between the carbon atoms is considered

A. saturated.
B. unsaturated.
C. trans unsaturated.
D. a cholestrol.
E. a steroid.

50. Fats are usually of animal origin, while oils are usually of plant origin.

True False

51. The sex hormones belong to which category of lipids?

A. steroids
B. fats
C. oils
D. triglycerides
E. phospholipids

52. The membranes of cells are composed primarily of

A. phospholipids.
B. fats.
C. oils.
D. steroids.
E. triglycerides.

53. Fats and oils function better than other biological molecules as energy-storage molecules because of the carbon they contain.

True False

54. The monomer unit of a protein is
A. fatty acids.
B. amino acids.
C. monosaccharides.

D. polysaccharides.
E. nucleic acids.

55. What makes each amino acid unique?

A. the central carbon
B. the R group
C. the amino group
D. the carboxyl group
E. the carbon ring

56. Which of the following is not a function of proteins?

A. quick energy
B. support
C. transport
D. enzymes
E. motion

57. Why does a protein not function after it has been denatured?

A. The normal bonding between the R groups has been disturbed and the protein loses its normal shape.
B. The normal bonding between the beta sheets has been disturbed and the protein loses its normal shape.
C. The normal bonding between the hydrogens in the alpha helix has been disturbed and the protein loses its normal shape.
D. The R groups form additional bonds causing the structure to become more compact.
E. The normal peptide bonds are ruptured and the individual amino acids are not held together any more.

58. An alpha helix or a beta sheet are examples of what level of protein structure?

A. secondary
B. primary
C. tertiary
D. quaternary
E. octagon

59. Which level of protein structure is characterized by alpha and beta sheets in which hydrogen bonding holds the shape in place?

A. secondary structure
B. primary structure
C. tertiary structure
D. quaternary structure
E. pentagonal structure

60. When two amino acids combine via a dehydration reaction,

A. a peptide bond is formed.
B. the R groups are lost.
C. water is added to begin the reaction.
D. the carboxyl group of each join together.
E. the amino group of each join together.

61. The primary level of protein structure is composed of amino acids in a linear sequence joined by peptide bonds.

True False

62. All amino acids are alike in that their R groups are polar.

True False

63. The sides of the DNA ladder (backbone) are

A. alternating carbons and nitrogens.
B. the *R* groups.
C. the nitrogenous bases.
D. alternating nitrogens and phosphates.
E. sugars and phosphates.

64. When an ATP molecule is used to supply energy, which of the following occurs?

A. a phosphate bond is added
B. a phosphate bond is broken
C. oxygen is removed
D. oxygen is added
E. an adenine is added

65. Which of the following nitrogenous bases is not found in DNA?

A. cytosine
B. thymine
C. uracil
D. guanine
E. adenine

66. Which of the following is not present in a nucleotide?

A. phosphate
B. nitrogenous base
C. five-ring sugar
D. an R group
E. a pentose

67. A species has 29% of its DNA composed of the nucleotide containing guanine (G). What percent does the nitrogen base thymine (T) equal?

A. 58%
B. 42%
C. 21%
D. 67%
E. 29%

68. ATP carries energy in the form of high-energy

A. carbohydrate bonds.
B. peptide bonds.
C. lipid bonds.
D. phosphate bonds.
E. hydrogen bonds.

69. The function of RNA in the body is to store the genetic information in the nucleus.

True False

70. ATP is called the energy currency of the body because it is a type of electricity

True False

71. List the functions of proteins.

72. List the properties of water.

73. Describe the structure and function of the DNA molecule.

Chapter 02: Testbank Key

1. The smallest unit of an element that still retains the chemical and physical properties of that element is called a(n)

   A. isotope.
   B. nucleus.
   C. atom.
   D. molecular bond.
   E. neutrino.

   An atom is the smallest unit of an element that still retains the chemical and physical properties of that element.

   Blooms Level: 1. Remember
   Learning Outcome: 02.01.01 Distinguish between atoms and elements.
   Section: 02.01
   Topic: Atomic Structure

2. In an atom, the number of protons always equals the number of

   A. electrons.
   B. neutrons.
   C. neutrons and protons.
   D. quarks.
   E. neutrinos.

   In an atom, the number of protons always equals the number of electrons.

   Blooms Level: 1. Remember
   Learning Outcome: 02.01.02 Describe the structure of an atom.
   Section: 02.01
   Topic: Atomic Structure

3. How many elements occur naturally?

   A. 112
   B. 92
   C. 64
   D. 32
   E. 6

   There are 92 naturally occurring elements.

   Blooms Level: 1. Remember
   Learning Outcome: 02.01.01 Distinguish between atoms and elements.
   Section: 02.01
   Topic: Atomic Structure

4. The atomic number of an atom is determined by the number of

   A. protons.
   B. neutrons.
   C. electrons.
   D. protons and neutrons.
   E. protons and electrons.

   The atomic number of an atom is determined by the number of protons.

   Blooms Level: 1. Remember
   Learning Outcome: 02.01.02 Describe the structure of an atom.
   Section: 02.01
   Topic: Atomic Structure

5. An element cannot be broken down by chemical means.

TRUE

An element is one of the basic building blocks of matter and cannot be broken down by chemical means.

Blooms Level: 1. Remember
Learning Outcome: 02.01.01 Distinguish between atoms and elements.
Section: 02.01
Topic: Atomic Structure

6. Why is He positioned above Ne in the periodic table?

A. They both have the same atomic mass.
B. They both have the same number of electrons in their outermost orbital.
C. They both have a full outermost orbital.
D. They both have the same atomic number.
E. They both have the same number of protons in their nuclei.

He has a full outermost orbital with two electrons. Ne has a full outermost orbital with eight electrons.

Blooms Level: 5. Evaluate
Learning Outcome: 02.01.02 Describe the structure of an atom.
Section: 02.01
Topic: Atomic Structure

7. Be has an atomic number of 4 and an atomic mass of 9. How many protons does it have?

A. 4
B. 5
C. 9
D. 13
E. 7

The atomic number gives the number of protons, so Be has 4 protons.

Blooms Level: 2. Understand
Learning Outcome: 02.01.02 Describe the structure of an atom.
Section: 02.01
Topic: Atomic Structure

8. What is the symbol for sodium?

A. Na
B. S
C. So
D. N
E. Dm

Na (short for natrium) is the symbol for sodium.

Blooms Level: 1. Remember
Learning Outcome: 02.01.01 Distinguish between atoms and elements.
Section: 02.01
Topic: Atomic Structure

9. Which of the following elements will have more than two electrons and have a full outer orbital?

A. He
B. Ne
C. C
D. N
E. O

He contains 2 electrons and Ne contains 10 electrons. Both have their outermost orbital filled.

Blooms Level: 4. Analyze
Learning Outcome: 02.01.02 Describe the structure of an atom.
Section: 02.01

10. Isotopes of an element differ due to the number of

A. protons.
B. neutrons.
C. electrons.
D. both protons and electrons.
E. neutrinos.

Isotopes of an element differ due to the number of neutrons.

Blooms Level: 2. Understand
Learning Outcome: 02.01.03 Define an isotope and summarize its application in both medicine and biology.
Section: 02.01
Topic: Atomic Structure

11. Carbon dating is a common method employed in dating certain kinds of fossils. It is based on the radioactive decay of an isotope of carbon (C^{14}). Referring to the atomic number of carbon attained from the periodic table, how many neutrons does C^{14} have?

A. 2
B. 4
C. 8
D. 12
E. 14

Carbon 14 (C^{14}) possesses two more neutrons than carbon 12 (C^{12}), for a total of 8 neutrons.

Blooms Level: 3. Apply
Learning Outcome: 02.01.03 Define an isotope and summarize its application in both medicine and biology.
Section: 02.01
Topic: Atomic Structure

12. What substance is used in medicine to produce various images of organs and tissues?

A. a mixture
B. a tracer
C. an emulsion
D. a colloid
E. a sensor

Tracers, such as iodine 131, can be used in medicine to produce various images of organs and tissues.

Blooms Level: 1. Remember
Learning Outcome: 02.01.03 Define an isotope and summarize its application in both medicine and biology.
Section: 02.01
Topic: Atomic Structure

13. Radiation can have both positive and negative impact on humans.

TRUE

Radiation can be used beneficially but can also harm.

Blooms Level: 2. Understand
Learning Outcome: 02.01.03 Define an isotope and summarize its application in both medicine and biology.
Section: 02.01
Topic: Atomic Structure

14. Two or more atoms joined together through the sharing of electrons are called a(n)

A. atomic unit.
B. molecule.
C. compound.
D. isotope.
E. ion.

Two or more atoms of the same type that combine are defined as a molecule.

Blooms Level: 1. Remember
Learning Outcome: 02.01.04 Distinguish between ionic and covalent bonds.
Section: 02.01
Topic: Chemical Bonds

15. $Ca_3(PO_4)_2$ represents a(n)

A. element.
B. mixture.
C. compound.
D. isotope.
E. atom.

$Ca_3(PO_4)_2$ represents a compound because it is a combination of different atoms.

Blooms Level: 2. Understand
Learning Outcome: 02.01.04 Distinguish between ionic and covalent bonds.
Section: 02.01
Topic: Chemical Bonds

16. Atoms that share electrons have what type of bonds?

A. covalent
B. neutral
C. hydrogen
D. colloidal
E. ionic

Atoms that share electrons have covalent bonds.

Blooms Level: 1. Remember
Learning Outcome: 02.01.04 Distinguish between ionic and covalent bonds.
Section: 02.01
Topic: Chemical Bonds

17. $CaCl_2$ is a salt that forms as the result of what type of bond?

A. covalent
B. hydrogen
C. polar
D. nonpolar
E. ionic

$CaCl_2$ is a salt that forms as the result of an ionic bond.

Blooms Level: 2. Understand
Learning Outcome: 02.01.04 Distinguish between ionic and covalent bonds.
Section: 02.01
Topic: Chemical Bonds

18. Water makes up 60–70% of total body weight.

TRUE

Water is the most abundant molecule in living organisms.

Blooms Level: 1. Remember
Learning Outcome: 02.02.01 Describe the properties of water.
Section: 02.02
Topic: Properties of Water

19. Which type of bond is responsible for holding two water molecules together, creating the properties of water?

A. hydrogen
B. covalent

C. ionic
D. polar
E. double covalent

Hydrogen bonds are the attraction of the hydrogen of one water molecule to the oxygen of a second water molecule. Due to this type of bond, the properties of water are established.

Blooms Level: 2. Understand
Learning Outcome: 02.02.02 Explain the role of hydrogen bonds in the properties of water.
Section: 02.02
Topic: Chemical Bonds

20. Hydrogen bonds

A. result from the loss of neutrons by an atom.
B. result in the formation of salts.
C. involve the loss and gain of electrons.
D. involve the sharing of electrons.
E. are relatively weak and can be broken rather easily.

Hydrogen bonds are relatively weak and can be broken rather easily.

Blooms Level: 2. Understand
Learning Outcome: 02.02.01 Describe the properties of water.
Section: 02.02
Topic: Chemical Bonds

21. The reason water is polar is because

A. in polar molecules atoms share electrons evenly.
B. the electrons spend more time circling the oxygen atom than the hydrogens.
C. hydrophilic molecules interact with water.
D. hydrophobic molecules do not interact with water.
E. there is a transfer of electrons from the hydrogen to the oxygen.

Because the oxygen atom is more electronegative than the hydrogen, the electron spends more time circling the oxygen, and therefore, water is polar.

Blooms Level: 2. Understand
Learning Outcome: 02.02.01 Describe the properties of water.
Section: 02.02
Topic: Properties of Water

22. Which of the following characteristics of water is most responsible for the sinking of the Titanic?

A. Water is liquid at room temperature.
B. Water has a high heat of vaporization.
C. The temperature of liquid water rises and falls slowly.
D. Frozen water is less dense than liquid water.
E. Water molecules are cohesive.

Since frozen water is less dense than liquid water, ice, including icebergs, will float in liquid water.

Blooms Level: 2. Understand
Learning Outcome: 02.02.01 Describe the properties of water.
Section: 02.02
Topic: Properties of Water

23. On a warm day in April, Tina jumped into the swimming pool. To her surprise the water was really cold. Which property of water did she discover?

A. Water molecules are cohesive.
B. The temperature of liquid water rises and falls slowly.
C. Water possesses hydrogen bonds.
D. Water is a polar molecule.
E. Frozen water is less dense than liquid water.

Water is a good temperature buffer because a great deal of energy is required to raise the temperature of water.

Blooms Level: 4. Analyze
Learning Outcome: 02.02.01 Describe the properties of water.
Section: 02.02
Topic: Properties of Water

24. William noticed water mysteriously climbing up a capillary tube. This is an example of which property of water?

A. Frozen water is less dense than liquid water.
B. The temperature of liquid water rises and falls slowly.
C. Water molecules are cohesive.
D. Water has a high heat of vaporization.
E. Water is a solvent.

Water climbing up a capillary tube is an example of the cohesive nature of water.

Blooms Level: 3. Apply
Learning Outcome: 02.02.01 Describe the properties of water.
Section: 02.02
Topic: Properties of Water

25. In an acidic solution, the number of H^+ is

A. less than the number of OH^-.
B. greater than the number of OH^-.
C. equal to the number of OH^-.
D. 3 times less than the number of OH^-.
E. 10 times less than the number of OH^-.

In an acidic solution, the number of H^+ is greater than the number of OH^-.

Blooms Level: 2. Understand
Learning Outcome: 02.02.03 Summarize the structure of the pH scale and the importance of buffers to biological systems.
Section: 02.02
Topic: Acids and Bases

26. A solution with a pH of 7 has 10 times as many H^+ as a pH of 6.

FALSE

A solution with a pH of 7 actually has 10 times fewer H^+ than a pH of 6.

Blooms Level: 2. Understand
Learning Outcome: 02.02.03 Summarize the structure of the pH scale and the importance of buffers to biological systems.
Section: 02.02
Topic: Acids and Bases

27. A solution containing 0.00001 moles of H^+ has a pH of

A. 3.
B. 5.
C. 7.
D. 9.
E. 11.

This (0.00001 moles) is the same as 1×10^{-5} moles, so the pH would be 5.

Blooms Level: 4. Analyze
Learning Outcome: 02.02.03 Summarize the structure of the pH scale and the importance of buffers to biological systems.
Section: 02.02
Topic: Acids and Bases

28. The presence of a buffer in our blood helps maintain homeostasis.

TRUE

A buffer maintains the pH within a normal range which is required for homeostasis.

Blooms Level: 3. Apply

Learning Outcome: 02.02.03 Summarize the structure of the pH scale and the importance of buffers to biological systems.
Section: 02.02
Topic: Acids and Bases

29. Joining small molecules (monomers) together to form longer chains (polymers) requires a process called

A. a hydrolysis reaction.
B. a dehydration reaction.
C. monomerization.
D. emulsification.
E. disassembly.

Polymerization of monomers into polymers requires a process called a dehydration reaction.

Blooms Level: 1. Remember
Learning Outcome: 02.03.02 Describe the processes by which the organic molecules are assembled and disassembled.
Section: 02.03
Topic: Chemical Reactions

30. Which of the following is not one of the four classes of organic molecules found in cells?

A. vitamins
B. lipids
C. proteins
D. carbohydrates
E. nucleic acids

Vitamins are not one of the four categories of organic molecules unique to cells.

Blooms Level: 2. Understand
Learning Outcome: 02.03.01 List the four classes of organic molecules that are found in cells.
Section: 02.03
Topic: Chemical Reactions

31. In biology, calling something organic means that it was grown without the use of any type of herbicide.

FALSE

False. In biology, *organic* refers to molecules that have carbon and hydrogen in them. This is usually associated with living organisms.

Blooms Level: 1. Remember
Learning Outcome: 02.03.01 List the four classes of organic molecules that are found in cells.
Section: 02.03
Topic: Chemical Reactions

32. NaCl is not an organic molecule.

TRUE

Organic molecules contain carbon and hydrogen and NaCl does not.

Blooms Level: 2. Understand
Learning Outcome: 02.03.01 List the four classes of organic molecules that are found in cells.
Section: 02.03
Topic: Chemical Reactions

33. After lunch, our digestive system will use the process of hydrolysis to break the food down into smaller subunits.

TRUE

True. Hydrolysis is the process of breaking down food into smaller subunits.

Blooms Level: 1. Remember
Learning Outcome: 02.03.02 Describe the processes by which the organic molecules are assembled and disassembled.
Section: 02.03
Topic: Chemical Reactions

34. A hydrolysis reaction involves the loss of water.

FALSE

A hydrolysis reaction involves the addition of water.

Blooms Level: 2. Understand
Learning Outcome: 02.03.02 Describe the processes by which the organic molecules are assembled and disassembled.
Section: 02.03
Topic: Chemical Reactions

35. Which grouping of elements is found in carbohydrates?

A. C - H - O
B. C - H - P
C. H - O - Cl
D. N - S - O
E. Ca - H - O

Carbon (C), hydrogen (H), and oxygen (O) are the primary elements that make up the basic structure of carbohydrates.

Blooms Level: 1. Remember
Learning Outcome: 02.04.01 Summarize the basic chemical properties of a carbohydrate.
Section: 02.04
Topic: Carbohydrates

36. Sugars with three to seven carbon atoms are called

A. monosaccharides.
B. disaccharides.
C. trisaccharides.
D. polysaccharides.
E. steroids.

Sugars with only three to seven carbon atoms are called simple sugars or monosaccharides.

Blooms Level: 1. Remember
Learning Outcome: 02.04.01 Summarize the basic chemical properties of a carbohydrate.
Section: 02.04
Topic: Carbohydrates

37. A potato stores a reserve of energy in its underground tuber in the form of

A. glycogen.
B. fat.
C. protein.
D. vitamins.
E. starch.

Starch is a common energy storage molecule for potatoes and plants in general.

Blooms Level: 5. Evaluate
Learning Outcome: 02.04.03 Compare the structures of simple and complex carbohydrates.
Section: 02.04
Topic: Carbohydrates

38. Which of the following is not a monosaccharide?

A. glucose
B. fructose
C. galactose
D. maltose
E. None of these are monosaccharides.

All of these are single sugars except maltose, which is a disaccharide composed of two glucose molecules.

Blooms Level: 1. Remember

Learning Outcome: 02.04.03 Compare the structures of simple and complex carbohydrates.
Section: 02.04
Topic: Carbohydrates

39. Which polysacccharide is stored as an energy source in the body of animals?

A. glycogen
B. glucose
C. cellulose
D. starch
E. chitin

Glycogen is a polysaccharide that is stored in the muscle tissue and blood of animals. Glucose is a monosaccharide that can be found in both plant and animals. Cellulose and starch are both polysaccharides that are found in members of kingdom Plantae. Chitin is a polysaccharide found in fungi and the exoskeleton of insects and crustaceans. It is not stored as an energy source.

Blooms Level: 2. Understand
Learning Outcome: 02.04.03 Compare the structures of simple and complex carbohydrates.
Section: 02.04
Topic: Carbohydrates

40. What passes through the digestive tract as fiber or roughage?

A. maltose
B. glucose
C. glycogen
D. starch
E. cellulose

Cellulose passes through the digestive tract as fiber or roughage because we are unable to break it down.

Blooms Level: 1. Remember
Learning Outcome: 02.04.04 Explain the importance of fiber in the diet.
Section: 02.04
Topic: Carbohydrates

41. Which of the following foods would be a good source of fiber?

A. peaches
B. whole-wheat bread
C. peanuts
D. bran cereal
E. All of these are good sources of fiber.

All of these are a good source of fiber. Fruits are a type of soluble fiber. Bran, nuts, seeds, and whole-wheat foods are forms of insoluble fiber.

Blooms Level: 2. Understand
Learning Outcome: 02.04.04 Explain the importance of fiber in the diet.
Section: 02.04
Topic: Carbohydrates

42. Which polysaccharide is branched the most?

A. cellulose
B. starch
C. glycogen
D. glucose
E. fructose

Glycogen has more side chains than the others. Glucose and fructose are monosaccharides and do not have side branches.

Blooms Level: 4. Analyze
Learning Outcome: 02.04.03 Compare the structures of simple and complex carbohydrates.
Section: 02.04
Topic: Carbohydrates

43. Which polysaccharide is consumed as a source of fiber?

A. cellulose
B. glycogen
C. glucose
D. chitin
E. starch

Cellulose is the main polysaccharide that functions as a source of fiber in our diets. Glycogen is a polysaccharide, but it acts as a backup source of energy for our body. Glucose is a monosaccharide that acts as a quick source of energy for our body. Chitin is a polysaccharide, but it is not a source of fiber for our body. Starch is a polysaccharide, but it is digested into glucose and used as a source of energy.

Blooms Level: 3. Apply
Learning Outcome: 02.04.04 Explain the importance of fiber in the diet.
Section: 02.04
Topic: Carbohydrates

44. The main function of carbohydrates is for long-term energy storage.

FALSE

The main function of carbohydrates is for quick and short-term energy storage.

Blooms Level: 2. Understand
Learning Outcome: 02.04.02 State the roles of carbohydrates in human physiology.
Section: 02.04
Topic: Carbohydrates

45. Our body is capable of converting starch into glycogen.

TRUE

We eat starchy foods, and the glucose enters the bloodstream. The liver then can store this glucose as glycogen.

Blooms Level: 3. Apply
Learning Outcome: 02.04.02 State the roles of carbohydrates in human physiology.
Section: 02.04
Topic: Carbohydrates

46. Starch, cellulose, and glycogen are alike in that they

A. are all made of glucose.
B. contain the same number of side chains.
C. have the same types of bonds between the monomer units.
D. are all found in animals.
E. can all be digested by our bodies.

Starch, glycogen, and cellulose are all made of glucose molecules.

Blooms Level: 2. Understand
Learning Outcome: 02.04.03 Compare the structures of simple and complex carbohydrates.
Section: 02.04
Topic: Carbohydrates

47. A fat contains how many fatty acids?

A. 1
B. 2
C. 3
D. 4
E. 5

A fat, or triglyceride, contains three fatty acids.

Blooms Level: 2. Understand
Learning Outcome: 02.05.01 Compare the structures of fats, phospholipids, and steroids.

Section: 02.05
Topic: Lipids

48. How are fats, phospholipids, and steroids alike?

A. They are all solid at room temperature.
B. They each contain a polar phosphate group.
C. They each contain only one fatty acid.
D. They do not dissolve in water.
E. They all contain at least one carbon ring.

All lipids are insoluble in water.

Blooms Level: 4. Analyze
Learning Outcome: 02.05.01 Compare the structures of fats, phospholipids, and steroids.
Section: 02.05
Topic: Lipids

49. A fatty acid that contains only single bonds between the carbon atoms is considered

A. saturated.
B. unsaturated.
C. trans unsaturated.
D. a cholestrol.
E. a steroid.

If all the carbon atoms are connected by single bonds, the fatty acid is considered saturated.

Blooms Level: 2. Understand
Learning Outcome: 02.05.01 Compare the structures of fats, phospholipids, and steroids.
Section: 02.05
Topic: Lipids

50. Fats are usually of animal origin, while oils are usually of plant origin.

TRUE

Fats, such as lard and butter, are of animal origin, while oils, such as corn oil and soybean oil, are of plant origin.

Blooms Level: 1. Remember
Learning Outcome: 02.05.01 Compare the structures of fats, phospholipids, and steroids.
Section: 02.05
Topic: Lipids

51. The sex hormones belong to which category of lipids?

A. steroids
B. fats
C. oils
D. triglycerides
E. phospholipids

The sex hormones are steroids.

Blooms Level: 2. Understand
Learning Outcome: 02.05.02 State the function of each class of lipids.
Section: 02.05
Topic: Lipids

52. The membranes of cells are composed primarily of

A. phospholipids.
B. fats.
C. oils.
D. steroids.

E. triglycerides.

Membranes are bilayers of phospholipids.

Blooms Level: 2. Understand
Learning Outcome: 02.05.02 State the function of each class of lipids.
Section: 02.05
Topic: Lipids

53. Fats and oils function better than other biological molecules as energy-storage molecules because of the carbon they contain.

FALSE

Fats and oils function well as energy-storage molecules because they contain more energy per gram than other biological molecules. All organic molecules contain carbon.

Blooms Level: 3. Apply
Learning Outcome: 02.05.02 State the function of each class of lipids.
Section: 02.05
Topic: Lipids

54. The monomer unit of a protein is

A. fatty acids.
B. amino acids.
C. monosaccharides.
D. polysaccharides.
E. nucleic acids.

Proteins are composed of amino acids.

Blooms Level: 1. Remember
Learning Outcome: 02.06.02 Explain how amino acids are combined to form proteins.
Section: 02.06
Topic: Proteins

55. What makes each amino acid unique?

A. the central carbon
B. the R group
C. the amino group
D. the carboxyl group
E. the carbon ring

The R group for each amino acid is unique.

Blooms Level: 2. Understand
Learning Outcome: 02.06.01 Describe the structure of an amino acid.
Section: 02.06
Topic: Proteins

56. Which of the following is not a function of proteins?

A. quick energy
B. support
C. transport
D. enzymes
E. motion

Carbohydrates, not proteins, serve as a source of quick energy.

Blooms Level: 2. Understand
Learning Outcome: 02.06.01 Describe the structure of an amino acid.
Section: 02.06
Topic: Proteins

57. Why does a protein not function after it has been denatured?

A. The normal bonding between the R groups has been disturbed and the protein loses its normal shape.
B. The normal bonding between the beta sheets has been disturbed and the protein loses its normal shape.
C. The normal bonding between the hydrogens in the alpha helix has been disturbed and the protein loses its normal shape.
D. The R groups form additional bonds causing the structure to become more compact.
E. The normal peptide bonds are ruptured and the individual amino acids are not held together any more.

F. During denaturation, the normal bonding between the R groups has been disturbed and the protein loses its normal shape. This is due to changes in temperature and/or pH.

Blooms Level: 5. Evaluate
Learning Outcome: 02.06.03 Summarize the four levels of protein structure.
Section: 02.06
Topic: Proteins

58. An alpha helix or a beta sheet are examples of what level of protein structure?

A. secondary
B. primary
C. tertiary
D. quaternary
E. octagon

The secondary structure of a protein can be an alpha helix or a beta sheet.

Blooms Level: 2. Understand
Learning Outcome: 02.06.03 Summarize the four levels of protein structure.
Section: 02.06
Topic: Proteins

59. Which level of protein structure is characterized by alpha and beta sheets in which hydrogen bonding holds the shape in place?

A. secondary structure
B. primary structure
C. tertiary structure
D. quaternary structure
E. pentagonal structure

The secondary structure is characterized by alpha and beta sheets in which hydrogen bonding holds the shape in place. The primary structure is characterized by a straight chain sequence of amino acids. The tertiary structure is characterized by the combination secondary structures in a three-dimensional shape. Shape is maintained by the bonding between the R groups. Quaternary structures are composed of multiple polypeptides that are bonded to each other. There is no such protein level as a pentagonal structure.

Blooms Level: 4. Analyze
Learning Outcome: 02.06.03 Summarize the four levels of protein structure.
Section: 02.06
Topic: Proteins

60. When two amino acids combine via a dehydration reaction,

A. a peptide bond is formed.
B. the R groups are lost.
C. water is added to begin the reaction.
D. the carboxyl group of each join together.
E. the amino group of each join together.

When two amino acids form a dipeptide, a peptide bond is formed between the carboxyl group of one and the amino group of the other.

Blooms Level: 3. Apply
Learning Outcome: 02.06.02 Explain how amino acids are combined to form proteins.
Section: 02.06
Topic: Proteins

61. The primary level of protein structure is composed of amino acids in a linear sequence joined by peptide bonds.

TRUE

True. The primary level of protein structure is composed of amino acids in a linear sequence joined by peptide bonds.

Blooms Level: 1. Remember
Learning Outcome: 02.06.03 Summarize the four levels of protein structure.
Section: 02.06
Topic: Proteins

62. All amino acids are alike in that their R groups are polar.

FALSE

The R groups of an amino acid can be polar or nonpolar.

Blooms Level: 2. Understand
Learning Outcome: 02.06.01 Describe the structure of an amino acid.
Section: 02.06
Topic: Proteins

63. The sides of the DNA ladder (backbone) are

A. alternating carbons and nitrogens.
B. the *R* groups.
C. the nitrogenous bases.
D. alternating nitrogens and phosphates.
E. sugars and phosphates.

Sugars and phosphates make up the sides of the DNA ladder.

Blooms Level: 1. Remember
Learning Outcome: 02.07.01 Explain the differences between RNA and DNA.
Section: 02.07
Topic: Nucleic Acids

64. When an ATP molecule is used to supply energy, which of the following occurs?

A. a phosphate bond is added
B. a phosphate bond is broken
C. oxygen is removed
D. oxygen is added
E. an adenine is added

A phosphate bond is broken when ATP is converted to ADP + phosphate + energy.

Blooms Level: 2. Understand
Learning Outcome: 02.07.02 Summarize the role of ATP in cellular reactions.
Section: 02.07
Topic: Nucleic Acids

65. Which of the following nitrogenous bases is not found in DNA?

A. cytosine
B. thymine
C. uracil
D. guanine
E. adenine

Uracil is found in RNA, not DNA.

Blooms Level: 1. Remember
Learning Outcome: 02.07.01 Explain the differences between RNA and DNA.
Section: 02.07
Topic: Nucleic Acids

66. Which of the following is not present in a nucleotide?

A. phosphate
B. nitrogenous base
C. five-ring sugar
D. an R group
E. a pentose

R groups are found in amino acids, not nucleotides.

Blooms Level: 2. Understand
Learning Outcome: 02.07.01 Explain the differences between RNA and DNA.
Section: 02.07
Topic: Nucleic Acids

67. A species has 29% of its DNA composed of the nucleotide containing guanine (G). What percent does the nitrogen base thymine (T) equal?

A. 58%
B. 42%
C. 21%
D. 67%
E. 29%

In DNA, G pairs with C, and A pairs with T. If G is 29%, then C would be 29%. The combination of G (guanine) and C (cytosine) would equal 58%. This would leave 42% for the combination of A (adenine) and T (thymine). Since A and T are equal, then both A and T would comprise 21%.

Blooms Level: 4. Analyze
Learning Outcome: 02.07.01 Explain the differences between RNA and DNA.
Section: 02.07
Topic: Nucleic Acids

68. ATP carries energy in the form of high-energy

A. carbohydrate bonds.
B. peptide bonds.
C. lipid bonds.
D. phosphate bonds.
E. hydrogen bonds.

ATP carries energy in the form of high-energy phosphate bonds.

Blooms Level: 1. Remember
Learning Outcome: 02.07.02 Summarize the role of ATP in cellular reactions.
Section: 02.07
Topic: Nucleic Acids

69. The function of RNA in the body is to store the genetic information in the nucleus.

FALSE

The function of DNA is to store genetic information in the nucleus.

Blooms Level: 1. Remember
Learning Outcome: 02.07.01 Explain the differences between RNA and DNA.
Section: 02.07
Topic: Nucleic Acids

70. ATP is called the energy currency of the body because it is a type of electricity.

FALSE

ATP is called the energy currency of the body because it can be spent (like money or currency) to facilitate reactions.

Blooms Level: 4. Analyze
Learning Outcome: 02.07.02 Summarize the role of ATP in cellular reactions.

Section: 02.07
Topic: Nucleic Acids

71. List the functions of proteins.

Functions of proteins include:

1. support
2. enzymes that bring reactants together in chemical reactions
3. transport of substance through the cell membrane and within the cell
4. defense of the body from foreign substances
5. hormones that serve as intercellular messengers
6. motion of the body

Blooms Level: 6. Create
Learning Outcome: 02.06.02 Explain how amino acids are combined to form proteins.
Section: 02.06
Topic: Proteins

72. List the properties of water.

1. Water has a high heat capacity.
2. Water has a high heat of evaporation.
3. Water is a solvent.
4. Water molecules are cohesive and adhesive.
5. Frozen water is less dense than liquid water.

Blooms Level: 6. Create
Learning Outcome: 02.02.01 Describe the properties of water.
Section: 02.02
Topic: Properties of Water

73. Describe the structure and function of the DNA molecule.

DNA is composed of a phosphate group, nitrogen-containing base, and a five-carbon (pentose) sugar. The nitrogen-containing base can have one of four bases associated with it (adenine, thymine, cytosine, and guanine). Functions of DNA include: stores information about how to copy or replicate itself and specifies the order in which amino acids are joined to make a protein.

Blooms Level: 6. Create
Learning Outcome: 02.07.01 Explain the differences between RNA and DNA.
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Topic: Nucleic Acids

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