Chapter 02 Test Bank

Student: _____

1. Which correctly describes the structure of an atom?
A. There are always the same number of protons and neutrons.
B. There are always the same number of protons and electrons.
C. There are always the same number of neutrons and electrons.
D. The number of protons, neutrons, and electrons is always the same
E. There are never the same number of neutrons and protons.

2. What directly determines an atom's identity?
A. the number of electrons
B. the number of neutrons
C. the number of protons
D. the number of bonds it can form
E. the ratio of protons to electrons

3. Carbon-12 and carbon-14 are isotopes. How are they different from each other?
A. different numbers of protons
B. different numbers of neutrons
C. different numbers of electrons
D. they can form different numbers of chemical bonds
E. different number of energy shells

4. Which is a covalent bond?
A. two atoms share inner-orbit electrons with each other
B. a bond between water molecules
C. a bond between two oppositely charged ions
D. a bond between two free radicals
E. two atoms share outer orbit electrons with each other

5. Ions are
A. electrically neutral.
B. electrically charged.
C. formed by the gain or loss of protons from the nucleus.
D. insoluble in water.
E. nonpolar atoms.

6. When magnesium loses electrons to become an ion, what does it become?
A. a covalent molecule
B. a cation
C. an anion
D. a new element
E. a free radical

7. If a sports beverage advertises that it replaces the body's electrolytes, what does the drink contain?
A. sugars that were broken down for energy
B. ionic forms of mineral elements
C. lipids that form the membranes of cells
D. oxygen and gases used by metabolism
E. vitamins

8. Of these major ions found in the body, which one carries a negative charge?
A. Chloride
B. Sodium
C. Potassium
D. Hydrogen
E. Calcium

9. Which describes a characteristic of free radicals?
A. They rapidly oxidize other atoms by removing an electron.
B. They are inert molecules that don't interact readily with other molecules.
C. They contain two electrons in the outermost orbital.
D. They have extra neutrons in their nuclei.
E. They are found in high quantities in most sports drinks.

10. Which is true about electrolytes?
A. They are neutral atoms.
B. They conduct electricity when dissolved in water.
C. They are found in pure water.
D. They have equal numbers of protons and electrons.
E. They are insoluble in water.

11. Which of the following is *not* true of a polar chemical bond?
A. It is covalent
B. It is ionized
C. It has opposite electrical charge at each end
D. It has no net electrical charge

12. Which best describes a hydrolysis reaction?
A. Molecules are broken down into smaller ones by breaking covalent bonds within water molecules and transferring hydrogen atoms and hydroxyl groups to the smaller ones.
B. Electrically-charged molecules separate into ions when they dissolve in water, and then hydrogen ions and hydroxyl groups covalently attach themselves to the oppositely-charged ions.
C. Large molecules are assembled from smaller ones by breaking water into hydrogen and hydroxyl ions.
D. Dissolving a large molecule in water reduces it to its individual atoms.
E. The breaking of hydrogen bonds between any two molecules.

13.

Oil spilled into the ocean does not easily disperse, but rather clumps into an oil slick. Which of the following explains why this occurs?

A. Oil is composed mainly of hydrophilic molecules.
B. Oil is composed mainly of nonpolar molecules.
C. Oil has no hydrogen in its molecular structure, so it can't form hydrogen bonds with water.
D. Water is hydrophobic.
E. Electrons are shared unequally between carbon and hydrogen atoms.

14. Molecules that have properties of both polar and nonpolar molecules are called
A. hydrophobic
B. hydrophilic
C. amphipathic
D. unipolar
E. bipolar

15. Compounds A, B and C have molecular weights of 10, 50 and 100 respectively. If 5 grams of each compound were put into 1 liter of water, which compound will have the greatest molar concentration?
A. Compound A
B. Compound B
C. Compound C
D. All will have the same molar concentration

16. The pH of a solution
A. is a measure of the concentration of hydrogen atoms in the solution.
B. is a measure of the concentration of hydrogen ions bound to other molecules in the solution.
C. is a measure of the concentration of free hydrogen ions in the solution.
D. increases as the acidity of the solution increases.
E. increases as the free hydrogen ion concentration in the solution increases.

17. Most of the body weight of an average young adult male is what substance?
A. Water
B. Protein
C. Minerals
D. Lipids
E. Carbohydrates

18. Which is true about the composition of organic molecules?
A. They always contain oxygen.
B. They always contain carbon.
C. They are always macromolecules.
D. They never contain hydrogen.
E. They never contain oxygen.

19. Carbohydrates:
A. have carbon and oxygen atoms in equal proportions.
B. are the major organic molecules of the body by mass.
C. are nonpolar molecules.
D. are defined by the inclusion of nitrogen in their structure.
E. are composed of only carbon and hydrogen atoms.

20. Which chemical group does glucose best fit into?
A. monosaccharides
B. disaccharides
C. polysaccharides
D. glycoproteins
E. phospholipids

21. Carbohydrates are stored in the liver and muscles in the form of
A. cellulose.
B. starch.
C. triacylglycerol.
D. glycogen.
E. protein.

22. What are the two main atoms in lipids, and what type of bonds connect them?
A. carbon and oxygen, connected by covalent bonds.
B. carbon and hydrogen, connected by covalent bonds
C. carbon and hydrogen, connected by ionic bonds
D. carbon and hydrogen, connected by hydrogen bonds
E. oxygen and hydrogen, connected by hydrogen bonds

23. Eicosanoids are an important class of regulatory molecules; what chemical class do they belong to?
A. steroids
B. proteins
C. carbohydrates
D. fatty acids
E. amino acids

24. Which statement is FALSE with regard to proteins?
A. Their roles in the body include acting as enzymes, providing structural support, and signaling between cells.
B. They make up a greater percentage of body mass than carbohydrates do.
C. They are composed of nucleic acids.
D. They are macromolecules with subunits linked by polypeptide bonds.
E. They are polymers made up of amino acids.

25. What best describes the main determinant of the **secondary structure** of a protein?
A. the sequence of the various amino acids that make up a polypeptide chain
B. the total number of amino acids that make up a polypeptide chain, and its overall resulting length
C. the total number of polypeptide chains that combine to determine the overall size of the protein
D. molecular interactions between widely separated regions of a polypeptide, such as disulfide bonds, that stabilize the folded conformation
E. molecular interactions along a polypeptide chain that fold various regions into alpha helices or beta sheets

26. Which of the following is NOT a type of molecular interaction that determines the tertiary structure of a protein?
A. covalent bonds between purines and pyrimidine bases
B. ionic bonds
C. Van der Waals forces
D. covalent bonds between two cysteine amino acids
E. hydrogen bonds

27. What is the term describing the covalent bond formed between two amino acids?
A. Glycosidic bond
B. Peptide bond
C. Phosphodiester bond
D. Ester bond
E. Hydrolytic bond

28. Which is a correct description of nucleic acids?
A. They are polymers of subunits containing glucose an an amino acids.
B. They are polymers of subunits containing glucose, a phosphate group, and an amino acid.
C. They are polymers of subunits containing a phosphate group, a sugar, and a purine or pyrimidine base.
D. They are pollymers of subunits containing a phosphate group, a sugar, and an amino acid.
E. They are long polymers of amino acids, folded into an alpha helix.

29. Which best describes the main role of adenosine triphosphate (ATP)?
A. It is an amino acid that is part of polypeptide chains that serve structural functions within cells.
B. It is a nucleotide that makes up the backbone of DNA and RNA molecules, that harbor the genetic code.
C. It is a carbohydrate molecule that can be stored in large quantities in the liver to energize cellular processes.
D. It is a purine derivative created from the breakdown of fuel molecules, that transfers energy for cellular processes.
E. It is a waste product of aerobic metabolism that is excreted from the body by the kidneys.

30. An atom is electrically neutral.
True False

31. The mass of an atom is the sum of its protons and electrons.
True False

32. The atomic number of an element is given by the number of electrons in the atom.
True False

33. An atomic nucleus is electrically neutral.
True False

34. Protons and neutrons have roughly the same mass.
True False

35. The atomic number of an element refers to the number of particles in its atomic nucleus.
True False

36. Twelve grams of C contains the same number of atoms as one gram of H.
True False

37. The four most common elements in the body are hydrogen, carbon, calcium and oxygen.
True False

38. Important mineral elements in the body include Na, Ca and K.
True False

39. Trace elements such as zinc and manganese are found in minute quantities in the body but do not serve any known function.
True False

40. The number of covalent bonds that can be formed by a given atom depends upon the number of electrons present in the outermost orbit.
True False

41. Nitrogen atoms can form a maximum of four covalent bonds with other atoms.
True False

42. The shape of a molecule may change as atoms rotate about their covalent bonds.
True False

43. All of the physiologically important atoms of the body readily form ions.
True False

44. Water molecules can form covalent bonds with other water molecules.
True False

45. In a molecule of water, an oxygen atom forms a double bond with each of two hydrogen atoms.
True False

46. The carboxyl ion is an anion.
True False

47. NaCl is a molecule formed by the covalent bonding of a sodium atom to a chlorine atom.
True False

48. All covalent bonds are polar.
True False

49. During hydrolysis, hydrogen ions and hydroxyl groups are formed.
True False

50. In general, polar molecules will dissolve in polar solvents, while nonpolar molecules cannot.
True False

51. Solutes that do not dissolve in water are called hydrophilic.
True False

52. Molecules with both polar and nonpolar regions are called ambidextrous.
True False

53. The molarity of a solution is a measure of the concentration of the solute.
True False

54. A solution with a pH of 8 is more acidic than one with a pH of 3.
True False

55. Organic chemistry is the study of oxygen-containing compounds.
True False

56. When multiple repeating simple sugar molecules combine to form a larger molecule, it is called a polysaccharide.
True False

57. Sucrose is called "blood sugar" because it is the most abundant carbohydrate in the blood.
True False

58. Triacylglycerol is one subclass of lipid molecules.
True False

59. Saturated fats contain carbon atoms linked by double bonds.
True False

60. Cholesterol is a phospholipid.
True False

61. Glycoproteins are protein molecules with molecules of glycogen attached to the amino acid side chains.
True False

62. The sequence of amino acids in a protein is known as the secondary structure.
True False

63. A protein may consist of more than one polypeptide chain.
True False

64. Substitution of one amino acid for a different one in a given protein always significantly alters the conformation of that protein.
True False

65. In DNA, thymine binds with adenine and cytosine binds with uracil.
True False

66.
True False

67.
True False

Chapter 02 Test Bank Key

1. Which correctly describes the structure of an atom?
A. There are always the same number of protons and neutrons.
B. There are always the same number of protons and electrons.
C. There are always the same number of neutrons and electrons.
D. The number of protons, neutrons, and electrons is always the same
E. There are never the same number of neutrons and protons.

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry
Topic: Nutrition and Metabolism
Topic: Plants
Topic: Reproductive System
Topic: Respiratory System
Topic: Skeletal System
Topic: Urinary System
Topic: Water, Electrolyte, and Acid-Base Balance

2. What directly determines an atom's identity?
A. the number of electrons
B. the number of neutrons
C. the number of protons
D. the number of bonds it can form
E. the ratio of protons to electrons

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

3. Carbon-12 and carbon-14 are isotopes. How are they different from each other?
A. different numbers of protons
B. different numbers of neutrons
C. different numbers of electrons
D. they can form different numbers of chemical bonds
E. different number of energy shells

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

4. Which is a covalent bond?
A. two atoms share inner-orbit electrons with each other
B. a bond between water molecules
C. a bond between two oppositely charged ions
D. a bond between two free radicals
E. two atoms share outer orbit electrons with each other

Bloom's: Level 1. Remember
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

5. Ions are
A. electrically neutral.
B. electrically charged.
C. formed by the gain or loss of protons from the nucleus.
D. insoluble in water.
E. nonpolar atoms.

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

6. When magnesium loses electrons to become an ion, what does it become?
A. a covalent molecule
B. a cation
C. an anion
D. a new element
E. a free radical

Bloom's: Level 2. Understand
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

7. If a sports beverage advertises that it replaces the body's electrolytes, what does the drink contain?
A. sugars that were broken down for energy
B. ionic forms of mineral elements
C. lipids that form the membranes of cells
D. oxygen and gases used by metabolism
E. vitamins

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

8. Of these major ions found in the body, which one carries a negative charge?
A. Chloride
B. Sodium
C. Potassium
D. Hydrogen
E. Calcium

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

9. Which describes a characteristic of free radicals?
A. They rapidly oxidize other atoms by removing an electron.
B. They are inert molecules that don't interact readily with other molecules.
C. They contain two electrons in the outermost orbital.
D. They have extra neutrons in their nuclei.
E. They are found in high quantities in most sports drinks.

Bloom's: Level 1. Remember
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

10. Which is true about electrolytes?
A. They are neutral atoms.
B. They conduct electricity when dissolved in water.
C. They are found in pure water.
D. They have equal numbers of protons and electrons.
E. They are insoluble in water.

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

11. Which of the following is *not* true of a polar chemical bond?
A. It is covalent
B. It is ionized
C. It has opposite electrical charge at each end
D. It has no net electrical charge

Bloom's: Level 2. Understand
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

12. Which best describes a hydrolysis reaction?
A. Molecules are broken down into smaller ones by breaking covalent bonds within water molecules and transferring hydrogen atoms and hydroxyl groups to the smaller ones.
B. Electrically-charged molecules separate into ions when they dissolve in water, and then hydrogen ions and hydroxyl groups covalently attach themselves to the oppositely-charged ions.
C. Large molecules are assembled from smaller ones by breaking water into hydrogen and hydroxyl ions.
D. Dissolving a large molecule in water reduces it to its individual atoms.
E. The breaking of hydrogen bonds between any two molecules.

Bloom's: Level 2. Understand
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

13.

Oil spilled into the ocean does not easily disperse, but rather clumps into an oil slick. Which of the following explains why this occurs?

A. Oil is composed mainly of hydrophilic molecules.
B. Oil is composed mainly of nonpolar molecules.
C. Oil has no hydrogen in its molecular structure, so it can't form hydrogen bonds with water.
D. Water is hydrophobic.
E. Electrons are shared unequally between carbon and hydrogen atoms.

Bloom's: Level 2. Understand
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

14. Molecules that have properties of both polar and nonpolar molecules are called
A. hydrophobic
B. hydrophilic
C. amphipathic
D. unipolar
E. bipolar

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

15. Compounds A, B and C have molecular weights of 10, 50 and 100 respectively. If 5 grams of each compound were put into 1 liter of water, which compound will have the greatest molar concentration?

A. Compound A
B. Compound B
C. Compound C
D. All will have the same molar concentration

Bloom's: Level 2. Understand
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

16. The pH of a solution

A. is a measure of the concentration of hydrogen atoms in the solution.
B. is a measure of the concentration of hydrogen ions bound to other molecules in the solution.
C. is a measure of the concentration of free hydrogen ions in the solution.
D. increases as the acidity of the solution increases.
E. increases as the free hydrogen ion concentration in the solution increases.

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

17. Most of the body weight of an average young adult male is what substance?

A. Water
B. Protein
C. Minerals
D. Lipids
E. Carbohydrates

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

18. Which is true about the composition of organic molecules?

A. They always contain oxygen.
B. They always contain carbon.
C. They are always macromolecules.
D. They never contain hydrogen.
E. They never contain oxygen.

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

19. Carbohydrates:
A. have carbon and oxygen atoms in equal proportions.
B. are the major organic molecules of the body by mass.
C. are nonpolar molecules.
D. are defined by the inclusion of nitrogen in their structure.
E. are composed of only carbon and hydrogen atoms.

Bloom's: Level 2. Understand
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

20. Which chemical group does glucose best fit into?
A. monosaccharides
B. disaccharides
C. polysaccharides
D. glycoproteins
E. phospholipids

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

21. Carbohydrates are stored in the liver and muscles in the form of
A. cellulose.
B. starch.
C. triacylglycerol.
D. glycogen.
E. protein.

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

22. What are the two main atoms in lipids, and what type of bonds connect them?
A. carbon and oxygen, connected by covalent bonds.
B. carbon and hydrogen, connected by covalent bonds
C. carbon and hydrogen, connected by ionic bonds
D. carbon and hydrogen, connected by hydrogen bonds
E. oxygen and hydrogen, connected by hydrogen bonds

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

23. Eicosanoids are an important class of regulatory molecules; what chemical class do they belong to?
A. steroids
B. proteins
C. carbohydrates
D. fatty acids
E. amino acids

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

24. Which statement is FALSE with regard to proteins?
A. Their roles in the body include acting as enzymes, providing structural support, and signaling between cells.
B. They make up a greater percentage of body mass than carbohydrates do.
C. They are composed of nucleic acids.
D. They are macromolecules with subunits linked by polypeptide bonds.
E. They are polymers made up of amino acids.

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

25. What best describes the main determinant of the **secondary structure** of a protein?
A. the sequence of the various amino acids that make up a polypeptide chain
B. the total number of amino acids that make up a polypeptide chain, and its overall resulting length
C. the total number of polypeptide chains that combine to determine the overall size of the protein
D. molecular interactions between widely separated regions of a polypeptide, such as disulfide bonds, that stabilize the folded conformation
E. molecular interactions along a polypeptide chain that fold various regions into alpha helices or beta sheets

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

26. Which of the following is NOT a type of molecular interaction that determines the tertiary structure of a protein?

A. covalent bonds between purines and pyrimidine bases
B. ionic bonds
C. Van der Waals forces
D. covalent bonds between two cysteine amino acids
E. hydrogen bonds

Bloom's: Level 2. Understand
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

27. What is the term describing the covalent bond formed between two amino acids?

A. Glycosidic bond
B. Peptide bond
C. Phosphodiester bond
D. Ester bond
E. Hydrolytic bond

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

28. Which is a correct description of nucleic acids?

A. They are polymers of subunits containing glucose an an amino acids.
B. They are polymers of subunits containing glucose, a phosphate group, and an amino acid.
C. They are polymers of subunits containing a phosphate group, a sugar, and a purine or pyrimidine base.
D. They are pollymers of subunits containing a phosphate group, a sugar, and an amino acid.
E. They are long polymers of amino acids, folded into an alpha helix.

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

29. Which best describes the main role of adenosine triphosphate (ATP)?
A. It is an amino acid that is part of polypeptide chains that serve structural functions within cells.
B. It is a nucleotide that makes up the backbone of DNA and RNA molecules, that harbor the genetic code.
C. It is a carbohydrate molecule that can be stored in large quantities in the liver to energize cellular processes.
D. It is a purine derivative created from the breakdown of fuel molecules, that transfers energy for cellular processes.
E. It is a waste product of aerobic metabolism that is excreted from the body by the kidneys.

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

30. An atom is electrically neutral.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

31. The mass of an atom is the sum of its protons and electrons.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

32. The atomic number of an element is given by the number of electrons in the atom.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

33. An atomic nucleus is electrically neutral.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

34. Protons and neutrons have roughly the same mass.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

35. The atomic number of an element refers to the number of particles in its atomic nucleus.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

36. Twelve grams of C contains the same number of atoms as one gram of H.
TRUE

Bloom's: Level 2. Understand
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

37. The four most common elements in the body are hydrogen, carbon, calcium and oxygen.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

38. Important mineral elements in the body include Na, Ca and K.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

39. Trace elements such as zinc and manganese are found in minute quantities in the body but do not serve any known function.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

40. The number of covalent bonds that can be formed by a given atom depends upon the number of electrons present in the outermost orbit.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Learning Outcome: 02.02
Section: 02.01
Section: 02.02
Topic: Chemistry

41. Nitrogen atoms can form a maximum of four covalent bonds with other atoms.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.01
Learning Outcome: 02.02
Section: 02.01
Section: 02.02
Topic: Chemistry

42. The shape of a molecule may change as atoms rotate about their covalent bonds.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

43. All of the physiologically important atoms of the body readily form ions.
FALSE

Bloom's: Level 2. Understand
Learning Outcome: 02.01
Section: 02.01
Topic: Chemistry

44. Water molecules can form covalent bonds with other water molecules.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

45. In a molecule of water, an oxygen atom forms a double bond with each of two hydrogen atoms.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

46. The carboxyl ion is an anion.
TRUE

Bloom's: Level 2. Understand
Learning Outcome: 02.01
Learning Outcome: 02.02
Section: 02.01
Section: 02.02
Topic: Chemistry

47. NaCl is a molecule formed by the covalent bonding of a sodium atom to a chlorine atom.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

48. All covalent bonds are polar.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.02
Section: 02.02
Topic: Chemistry

49. During hydrolysis, hydrogen ions and hydroxyl groups are formed.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

50. In general, polar molecules will dissolve in polar solvents, while nonpolar molecules cannot.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

51. Solutes that do not dissolve in water are called hydrophilic.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

52. Molecules with both polar and nonpolar regions are called ambidextrous.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

53. The molarity of a solution is a measure of the concentration of the solute.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

54. A solution with a pH of 8 is more acidic than one with a pH of 3.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.03
Section: 02.03
Topic: Chemistry

55. Organic chemistry is the study of oxygen-containing compounds.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

56. When multiple repeating simple sugar molecules combine to form a larger molecule, it is called a polysaccharide.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

57. Sucrose is called "blood sugar" because it is the most abundant carbohydrate in the blood.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

58. Triacylglycerol is one subclass of lipid molecules.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

59. Saturated fats contain carbon atoms linked by double bonds.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

60. Cholesterol is a phospholipid.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

61. Glycoproteins are protein molecules with molecules of glycogen attached to the amino acid side chains.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

62. The sequence of amino acids in a protein is known as the secondary structure.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

63. A protein may consist of more than one polypeptide chain.
TRUE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

64. Substitution of one amino acid for a different one in a given protein always significantly alters the conformation of that protein.
FALSE

Bloom's: Level 2. Understand
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

65. In DNA, thymine binds with adenine and cytosine binds with uracil.
FALSE

Bloom's: Level 1. Remember
Learning Outcome: 02.04
Section: 02.04
Topic: Chemistry

66.
TRUE

HAPS Objective: C01.01a Describe the charge, mass, and relative location of electrons, protons and neutrons with respect to the structure of an atom.
HAPS Objective: C01.01b Relate the number of electrons in an electron shell to an atoms chemical stability and its ability to form chemical bonds with respect to the structure of an atom.
HAPS Objective: C01.01c Explain how ions and isotopes are produced by changing the relative number of specific subatomic particles with respect to the structure of an atom.
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
HAPS Objective: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.
HAPS Objective: C02.01a List each type of bond in order by relative strength with respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C02.01c Provide biologically significant examples of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
HAPS Objective: C03.02 Distinguish among the terms solution, solute, solvent, colloid suspension, and emulsion.
HAPS Objective: C03.03 Define the term salt and give examples of physiological significance.
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
HAPS Objective: C03.05 State acidic, neutral, and alkaline pH values.
HAPS Objective: C04.01 Define the term organic molecule.
HAPS Objective: C04.02 Explain the relationship between monomers and polymers.
HAPS Objective: C04.03 Define and give examples of dehydration synthesis and hydrolysis reactions.
HAPS Objective: C04.04a Identify the monomers and polymers of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C04.04d Identify dietary sources of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C04.05 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.
HAPS Objective: C04.06 Demonstrate factors that affect enzyme activity, including denaturation, and interpret graphs showing the effects of various factors on the rate of enzyme- catalyzed reactions.
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.
HAPS Objective: C06.01 Identify the three main parts of a cell, and list the general functions of each.
HAPS Objective: C06.02 Explain how cytoplasm and cytosol are different.
HAPS Objective: C07.01 Describe how lipids are distributed in a cell membrane, and explain their functions.
HAPS Objective: C07.02 Describe how carbohydrates are distributed in a cell membrane, and explain their functions.
HAPS Objective: C07.03 Describe how proteins are distributed in a cell membrane, and explain their functions.
HAPS Objective: C08.01a State the type of material moving in each of the membrane transport process – simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis, phagocytosis, pinocytosis, and filtration.
HAPS Objective: C08.01b Describe the mechanism by which movement of material occurs in each membrane transport process – simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis, phagocytosis, pinocytosis, and filtration.
HAPS Objective: C08.01c Discuss the energy requirements and, if applicable, the sources of energy for each process – simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis, phagocytosis, pinocytosis, and filtration.
HAPS Objective: C08.01d Give examples of each membrane transport process in the human body – simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis, phagocytosis, pinocytosis, and filtration.
HAPS Objective: C08.02 Describe the effects of hypertonic, isotonic, and hypotonic conditions on cells.
HAPS Objective: C08.03 Demonstrate various cell transport processes and, given appropriate information, predict the outcomes of these demonstrations.
HAPS Objective: C09.01 Define the term organelle.
HAPS Objective: C09.02a each different type of organelle associated with human cells.
HAPS Objective: C09.02b Describe the structure of each different type of organelle associated with human cells.
HAPS Objective: C09.02c Describe the function of each different type of organelle associated with human cells.
HAPS Objective: C10.01 Define the terms genetic code, transcription and translation.
HAPS Objective: C10.02 Explain how and why RNA is synthesized.
HAPS Objective: C10.03 Explain the roles of tRNA, mRNA, and rRNA in protein synthesis.
HAPS Objective: C11.01 Define the term cellular respiration.
HAPS Objective: C11.02 With respect to glycolysis, the Krebs (citric acid or TCA) cycle, and the electron transport chain: compare and contrast energy input, efficiency of energy production, oxygen use, by-products and cellular location.
HAPS Objective: C12.01a Describe the events that take place in each stage of generalized cell cycle, including interphase and the stages of mitosis.
HAPS Objective: C12.01b Identify cells that are in each stage of generalized cell cycle, including interphase and the stages of mitosis.
HAPS Objective: C12.01c Analyze the functional significance of each stage of generalized cell cycle, including interphase and the stages of mitosis.
HAPS Objective: C12.02 Distinguish between mitosis and cytokinesis.
HAPS Objective: C12.03 Describe DNA replication.
HAPS Objective: C12.04 Analyze the interrelationships among chromatin, chromosomes and chromatids.
HAPS Objective: C12.05 Give examples of cell types in the body that divide by mitosis and examples of circumstances in the body that require mitotic cell division.
HAPS Objective: C13.01 Describe the events that take place in each stage of meiosis I and meiosis II.
HAPS Objective: C13.02 Identify cells that are in each stage of meiosis I and meiosis II.
HAPS Objective: C13.03 Compare and contrast the general features of meiosis I and meiosis II.
HAPS Objective: C13.04 Compare and contrast the processes of mitosis and meiosis.
HAPS Objective: C13.05 Give examples of cell types in the body that divide by meiosis and examples of circumstances in the body that require meiotic cell division.
HAPS Objective: C14.01 Provide specific examples to demonstrate how individual cells respond to their environment (e.g., in terms of organelle function, transport processes, protein synthesis, or regulation of cell cycle) in order to maintain homeostasis in the body.
HAPS Objective: C15.01 Predict factors or situations that could disrupt organelle function, transport processes, protein synthesis, or the cell cycle.
HAPS Objective: C15.02 Predict the types of problems that would occur if the cells could not maintain homeostasis due to abnormalities in organelle function, transport processes, protein synthesis, or the cell cycle.
HAPS Topic: Module C01 Atoms and molecules.
HAPS Topic: Module C02 Chemical bonding.
HAPS Topic: Module C03 Inorganic compounds and solutions.
HAPS Topic: Module C04 Organic compounds.
HAPS Topic: Module C05 Energy transfer using ATP.
HAPS Topic: Module C06 Intracellular organization of nucleus and cytoplasm.
HAPS Topic: Module C07 Membrane structure and function.

HAPS Topic: Module C08 Mechanisms for movement of materials across cell membranes.
HAPS Topic: Module C09 Organelles.
HAPS Topic: Module C10 Protein synthesis.
HAPS Topic: Module C11 Cellular respiration.
HAPS Topic: Module C12 Somatic cell division.
HAPS Topic: Module C13 Reproductive cell division.
HAPS Topic: Module C14 Application of homeostatic mechanisms.
HAPS Topic: Module C15 Predictions related to homeostatic imbalance, including disease states and disorders.

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HAPS Objective: Q01.01 List and describe the routes of water entry into the body and state representative volumes for each.
HAPS Objective: Q01.02 List and describe the routes of water loss from the body and state representative volumes for each.
HAPS Objective: Q01.03 Describe the mechanisms used to regulate water intake.
HAPS Objective: Q01.04 Describe the mechanisms used to regulate water output.
HAPS Objective: Q02.01 Describe the fluid compartments (including the subdivisions of the extracellular fluid) and state the relative volumes of each.
HAPS Objective: Q03.01 Define electrolyte.
HAPS Objective: Q03.02 Compare and contrast the relative concentrations of major electrolytes in intracellular and extracellular fluids.
HAPS Objective: Q03.03 Describe the function(s) of each abundant electrolyte found in body fluids, including sodium, chloride, potassium, phosphate and calcium.
HAPS Objective: Q03.04 Describe hormonal regulation of electrolyte levels in the plasma, including sodium, chloride, potassium, phosphate and calcium.
HAPS Objective: Q04.01 Explain the role of electrolytes and non-electrolytes in the determination of osmotic pressure.
HAPS Objective: Q04.02 Describe the forces that affect capillary filtration, including the determinants of each force.
HAPS Objective: Q04.03 Compare and contrast the roles that osmosis and capillary filtration play in the movement of fluids between compartments.
HAPS Objective: Q04.04 Describe the role of "capillary permeability" in fluid movement across the capillary wall.
HAPS Objective: Q04.05 Explain how dehydration and overhydration (water intoxication) develop and how fluids shift between the three major body compartments during each.
HAPS Objective: Q05.01 Define acid, base, pH and buffer.
HAPS Objective: Q05.02 State the normal pH range for arterial blood.
HAPS Objective: Q05.03a State the chemical equation for bicarbonate buffer system, the phosphate buffer system and the protein buffer system.
HAPS Objective: Q05.03b Explain the role of the bicarbonate buffer system, the phosphate buffer system and the protein buffer system in regulation of blood, interstitial fluid, and intracellular pH, including how each system responds to increases or decreases in pH.
HAPS Objective: Q05.04 Explain the role of hemoglobin in pH buffering.
HAPS Objective: Q06.01 State the normal ranges for PCO2 and HCO3 in arterial blood and summarize their relationship to blood pH.
HAPS Objective: Q06.02 Describe the role of the respiratory system in regulation of blood pH and predict how hypo- and hyperventilation will affect blood pH.
HAPS Objective: Q06.03 Explain the mechanisms by which the kidneys secrete hydrogen ions, and how this process affects blood pH.
HAPS Objective: Q06.04 Explain the mechanisms by which the kidneys retain bicarbonate ions, and how this process affects blood pH.
HAPS Objective: Q06.05 Discuss the concept of compensation to correct respiratory and metabolic acidosis and alkalosis.
HAPS Objective: Q06.06 Given appropriate arterial blood gas values, determine whether a patient has normal blood pH or is in respiratory acidosis or alkalosis or is in metabolic acidosis or alkalosis, and whether the acidosis/alkalosis is partially or fully compensated or uncompensated.
HAPS Objective: Q07.01 Provide specific examples to demonstrate how the cardiovascular, endocrine, and urinary systems respond to maintain homeostasis of fluid volume in the body.
HAPS Objective: Q07.02 Provide specific examples to demonstrate how the cardiovascular, endocrine, respiratory, and urinary systems respond to maintain homeostasis of electrolyte concentrations and pH of body fluids.
HAPS Objective: Q07.03 Explain how fluid volumes and distribution contribute to the maintenance of homeostasis in other body systems.
HAPS Objective: Q07.04 Explain how electrolyte concentrations and body fluid pH contribute to the maintenance of homeostasis in other body systems.
HAPS Objective: Q08.01 Predict factors or situations that would lead to a disruption of homeostasis by affecting the volume or composition of body fluids.
HAPS Objective: Q08.02 Predict factors or situations that would lead to a disruption of homeostasis by causing respiratory acidosis, respiratory alkalosis, metabolic acidosis, or metabolic alkalosis.
HAPS Objective: Q08.03 Predict the types of problems that would occur in the body if the volume and composition of body fluids were not maintained within normal homeostatic ranges.
HAPS Objective: Q08.04 Predict the types of problems that would occur in the body if body fluid pH were not maintained within the normal homeostatic range.
HAPS Topic: Module Q01 Regulation of water intake and output.
HAPS Topic: Module Q02 Description of the major fluid compartments.
HAPS Topic: Module Q03 Chemical composition of the major compartment fluids.
HAPS Topic: Module Q04 Movements between the major fluid compartments.
HAPS Topic: Module Q05 Buffer systems and their roles in acid/base balance.
HAPS Topic: Module Q06 Role of the respiratory and urinary systems in acid/base balance.
HAPS Topic: Module Q07 Application of homeostatic mechanisms.
HAPS Topic: Module Q08 Predictions related to homeostatic imbalance, including disease states and disorders.

Chapter 02 Test Bank Summary

Category	# of Questions
Bloom's: Level 1. Remember	54
Bloom's: Level 2. Understand	11
HAPS Objective: C01.01a Describe the charge, mass, and relative location of electrons, protons and neutrons with respect to the structure of an atom.	1
HAPS Objective: C01.01b Relate the number of electrons in an electron shell to an atoms chemical stability and its ability to form chemical bonds with respect to the structure of an atom.	1
HAPS Objective: C01.01c Explain how ions and isotopes are produced by changing the relative number of specific subatomic particles with respect to the structure of an atom.	1
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.	1
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.	1
HAPS Objective: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.	1
HAPS Objective: C02.01a List each type of bond in order by relative strength with respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds.	1
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.	1
HAPS Objective: C02.01c Provide biologically significant examples of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.	1
HAPS Objective: C03.01 Discuss the physiologically important properties of water.	1
HAPS Objective: C03.02 Distinguish among the terms solution, solute, solvent, colloid suspension, and emulsion.	1
HAPS Objective: C03.03 Define the term salt and give examples of physiological significance.	1
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.	1
HAPS Objective: C03.05 State acidic, neutral, and alkaline pH values.	1
HAPS Objective: C04.01 Define the term organic molecule.	1
HAPS Objective: C04.02 Explain the relationship between monomers and polymers.	1
HAPS Objective: C04.03 Define and give examples of dehydration synthesis and hydrolysis reactions.	1
HAPS Objective: C04.04a Identify the monomers and polymers of carbohydrates, proteins, lipids and nucleic acids.	1
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.	1
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.	1
HAPS Objective: C04.04d Identify dietary sources of carbohydrates, proteins, lipids and nucleic acids.	1
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.	1
HAPS Objective: C04.05 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.	1
HAPS Objective: C04.06 Demonstrate factors that affect enzyme activity, including denaturation, and interpret graphs showing the effects of various factors on the rate of enzyme- catalyzed reactions.	1
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.	1
HAPS Objective: C06.01 Identify the three main parts of a cell, and list the general functions of each.	1
HAPS Objective: C06.02 Explain how cytoplasm and cytosol are different.	1
HAPS Objective: C07.01 Describe how lipids are distributed in a cell membrane, and explain their functions.	1
HAPS Objective: C07.02 Describe how carbohydrates are distributed in a cell membrane, and explain their functions.	1
HAPS Objective: C07.03 Describe how proteins are distributed in a cell membrane, and explain their functions.	1
HAPS Objective: C08.01a State the type of material moving in each of the membrane transport process – simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis, phagocytosis, pinocytosis, and filtration.	1
HAPS Objective: C08.01b Describe the mechanism by which movement of material occurs in each membrane transport process – simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis, phagocytosis, pinocytosis, and filtration.	1

HAPS Objective: C08.01c Discuss the energy requirements and, if applicable, the sources of energy for each process – simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis, phagocytosis, pinocytosis, and filtration.	1
HAPS Objective: C08.01d Give examples of each membrane transport process in the human body – simple diffusion, facilitated diffusion, osmosis, active transport, exocytosis, endocytosis, phagocytosis, pinocytosis, and filtration.	1
HAPS Objective: C08.02 Describe the effects of hypertonic, isotonic, and hypotonic conditions on cells.	1
HAPS Objective: C08.03 Demonstrate various cell transport processes and, given appropriate information, predict the outcomes of these demonstrations.	1
HAPS Objective: C09.01 Define the term organelle.	1
HAPS Objective: C09.02a each different type of organelle associated with human cells.	1
HAPS Objective: C09.02b Describe the structure of each different type of organelle associated with human cells.	1
HAPS Objective: C09.02c Describe the function of each different type of organelle associated with human cells.	1
HAPS Objective: C10.01 Define the terms genetic code, transcription and translation.	1
HAPS Objective: C10.02 Explain how and why RNA is synthesized.	1
HAPS Objective: C10.03 Explain the roles of tRNA, mRNA, and rRNA in protein synthesis.	1
HAPS Objective: C11.01 Define the term cellular respiration.	1
HAPS Objective: C11.02 With respect to glycolysis, the Krebs (citric acid or TCA) cycle, and the electron transport chain: compare and contrast energy input, efficiency of energy production, oxygen use, by-products and cellular location.	1
HAPS Objective: C12.01a Describe the events that take place in each stage of generalized cell cycle, including interphase and the stages of mitosis.	1
HAPS Objective: C12.01b Identify cells that are in each stage of generalized cell cycle, including interphase and the stages of mitosis.	1
HAPS Objective: C12.01c Analyze the functional significance of each stage of generalized cell cycle, including interphase and the stages of mitosis.	1
HAPS Objective: C12.02 Distinguish between mitosis and cytokinesis.	1
HAPS Objective: C12.03 Describe DNA replication.	1
HAPS Objective: C12.04 Analyze the interrelationships among chromatin, chromosomes and chromatids.	1
HAPS Objective: C12.05 Give examples of cell types in the body that divide by mitosis and examples of circumstances in the body that require mitotic cell division.	1
HAPS Objective: C13.01 Describe the events that take place in each stage of meiosis I and meiosis II.	1
HAPS Objective: C13.02 Identify cells that are in each stage of meiosis I and meiosis II.	1
HAPS Objective: C13.03 Compare and contrast the general features of meiosis I and meiosis II.	1
HAPS Objective: C13.04 Compare and contrast the processes of mitosis and meiosis.	1
HAPS Objective: C13.05 Give examples of cell types in the body that divide by meiosis and examples of circumstances in the body that require meiotic cell division.	1
HAPS Objective: C14.01 Provide specific examples to demonstrate how individual cells respond to their environment (e.g., in terms of organelle function, transport processes, protein synthesis, or regulation of cell cycle) in order to maintain homeostasis in the body.	1
HAPS Objective: C15.01 Predict factors or situations that could disrupt organelle function, transport processes, protein synthesis, or the cell cycle.	1
HAPS Objective: C15.02 Predict the types of problems that would occur if the cells could not maintain homeostasis due to abnormalities in organelle function, transport processes, protein synthesis, or the cell cycle.	1
HAPS Objective: Q01.01 List and describe the routes of water entry into the body and state representative volumes for each.	1
HAPS Objective: Q01.02 List and describe the routes of water loss from the body and state representative volumes for each.	1
HAPS Objective: Q01.03 Describe the mechanisms used to regulate water intake.	1
HAPS Objective: Q01.04 Describe the mechanisms used to regulate water output.	1
HAPS Objective: Q02.01 Describe the fluid compartments (including the subdivisions of the extracellular fluid) and state the relative volumes of each.	1
HAPS Objective: Q03.01 Define electrolyte.	1
HAPS Objective: Q03.02 Compare and contrast the relative concentrations of major electrolytes in intracellular and extracellular fluids.	1
HAPS Objective: Q03.03 Describe the function(s) of each abundant electrolyte found in body fluids, including sodium, chloride, potassium, phosphate and calcium.	1
HAPS Objective: Q03.04 Describe hormonal regulation of electrolyte levels in the plasma, including sodium, chloride, potassium, phosphate and calcium.	1
HAPS Objective: Q04.01 Explain the role of electrolytes and non-electrolytes in the determination of osmotic pressure.	1
HAPS Objective: Q04.02 Describe the forces that affect capillary filtration, including the determinants of each force.	1
HAPS Objective: Q04.03 Compare and contrast the roles that osmosis and capillary filtration play in the movement of fluids between co	1

mpartments.

HAPS Objective: Q04.04 Describe the role of “capillary permeability” in fluid movement across the capillary wall.	1
HAPS Objective: Q04.05 Explain how dehydration and overhydration (water intoxication) develop and how fluids shift between the three major body compartments during each.	1
HAPS Objective: Q05.01 Define acid, base, pH and buffer.	1
HAPS Objective: Q05.02 State the normal pH range for arterial blood.	1
HAPS Objective: Q05.03a State the chemical equation for bicarbonate buffer system, the phosphate buffer system and the protein buffer system.	1
HAPS Objective: Q05.03b Explain the role of the bicarbonate buffer system, the phosphate buffer system and the protein buffer system in regulation of blood, interstitial fluid, and intracellular pH, including how each system responds to increases or decreases in pH.	1
HAPS Objective: Q05.04 Explain the role of hemoglobin in pH buffering.	1
HAPS Objective: Q06.01 State the normal ranges for PCO2 and HCO3 in arterial blood and summarize their relationship to blood pH.	1
HAPS Objective: Q06.02 Describe the role of the respiratory system in regulation of blood pH and predict how hypo- and hyperventilation will affect blood pH.	1
HAPS Objective: Q06.03 Explain the mechanisms by which the kidneys secrete hydrogen ions, and how this process affects blood pH.	1
HAPS Objective: Q06.04 Explain the mechanisms by which the kidneys retain bicarbonate ions, and how this process affects blood pH.	1
HAPS Objective: Q06.05 Discuss the concept of compensation to correct respiratory and metabolic acidosis and alkalosis.	1
HAPS Objective: Q06.06 Given appropriate arterial blood gas values, determine whether a patient has normal blood pH or is in respiratory acidosis or alkalosis or is in metabolic acidosis or alkalosis, and whether the acidosis/alkalosis is partially or fully compensated or uncompensated.	1
HAPS Objective: Q07.01 Provide specific examples to demonstrate how the cardiovascular, endocrine, and urinary systems respond to maintain homeostasis of fluid volume in the body.	1
HAPS Objective: Q07.02 Provide specific examples to demonstrate how the cardiovascular, endocrine, respiratory, and urinary systems respond to maintain homeostasis of electrolyte concentrations and pH of body fluids.	1
HAPS Objective: Q07.03 Explain how fluid volumes and distribution contribute to the maintenance of homeostasis in other body systems.	1
HAPS Objective: Q07.04 Explain how electrolyte concentrations and body fluid pH contribute to the maintenance of homeostasis in other body systems.	1
HAPS Objective: Q08.01 Predict factors or situations that would lead to a disruption of homeostasis by affecting the volume or composition of body fluids.	1
HAPS Objective: Q08.02 Predict factors or situations that would lead to a disruption of homeostasis by causing respiratory acidosis, respiratory alkalosis, metabolic acidosis, or metabolic alkalosis.	1
HAPS Objective: Q08.03 Predict the types of problems that would occur in the body if the volume and composition of body fluids were not maintained within normal homeostatic ranges.	1
HAPS Objective: Q08.04 Predict the types of problems that would occur in the body if body fluid pH were not maintained within the normal homeostatic range.	1
HAPS Topic: Module C01 Atoms and molecules.	1
HAPS Topic: Module C02 Chemical bonding.	1
HAPS Topic: Module C03 Inorganic compounds and solutions.	1
HAPS Topic: Module C04 Organic compounds.	1
HAPS Topic: Module C05 Energy transfer using ATP.	1
HAPS Topic: Module C06 Intracellular organization of nucleus and cytoplasm.	1
HAPS Topic: Module C07 Membrane structure and function.	1
HAPS Topic: Module C08 Mechanisms for movement of materials across cell membranes.	1
HAPS Topic: Module C09 Organelles.	1
HAPS Topic: Module C10 Protein synthesis.	1
HAPS Topic: Module C11 Cellular respiration.	1
HAPS Topic: Module C12 Somatic cell division.	1
HAPS Topic: Module C13 Reproductive cell division.	1
HAPS Topic: Module C14 Application of homeostatic mechanisms.	1
HAPS Topic: Module C15 Predictions related to homeostatic imbalance, including disease states and disorders.	1
HAPS Topic: Module Q01 Regulation of water intake and output.	1
HAPS Topic: Module Q02 Description of the major fluid compartments.	1
HAPS Topic: Module Q03 Chemical composition of the major compartment fluids.	1

HAPS Topic: Module Q04 Movements between the major fluid compartments.	1
HAPS Topic: Module Q05 Buffer systems and their roles in acid/base balance.	1
HAPS Topic: Module Q06 Role of the respiratory and urinary systems in acid/base balance.	1
HAPS Topic: Module Q07 Application of homeostatic mechanisms.	1
HAPS Topic: Module Q08 Predictions related to homeostatic imbalance, including disease states and disorders.	1
Learning Outcome: 02.01	22
Learning Outcome: 02.02	12
Learning Outcome: 02.03	11
Learning Outcome: 02.04	23
Section: 02.01	22
Section: 02.02	12
Section: 02.03	11
Section: 02.04	23
Topic: Chemistry	65
Topic: Nutrition and Metabolism	1
Topic: Plants	1
Topic: Reproductive System	1
Topic: Respiratory System	1
Topic: Skeletal System	1
Topic: Urinary System	1
Topic: Water, Electrolyte, and Acid-Base Balance	1