Chapter 02 Testbank

Student: _____

1. Anything that occupies space and has mass is called

   A. an electron.
   B. living.
   C. matter.
   D. energy.
   E. space.

2. All of the following pertain to $^{14}_{6}C$ *except* it

   A. has 6 protons.
   B. has 6 electrons.
   C. has 14 neutrons.
   D. is an isotope of carbon.
   E. has a mass number of 14.

3. The electrons of an atom are

   A. always equal in number to the number of neutrons in an atom.
   B. found in the nucleus.
   C. used to determine atomic number.
   D. positively charged.
   E. moving in pathways called orbitals.

4. The subatomic particles that surround the nucleus are the

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

5. What is the maximum number of electrons in the second energy shell of an atom?

   A. 2
   B. 4
   C. 8
   D. 18
   E. 32

6. Isotopes are atoms of the same element that differ in their

   A. neutron number.
   B. electron number.
   C. proton number.
   D. atomic number.
   E. chemical properties.

7. Two or more atoms bonded together are called a/an

   A. ion.
   B. isotope.
   C. element.
   D. electrolyte.
   E. molecule.

8. What would be the valence number of electrons in the sulfur atom $^{32}_{16}S$?
   A. 2
   B. 6

C. 8
D. 16
E. 32

9. Polar molecules are composed of covalently-bonded

A. identical atoms.
B. carbon atoms.
C. ions.
D. atoms of different electronegativity.
E. atoms of identical electronegativity.

10. Reactions involving electron removal are called _____ reactions.

A. oxidation
B. reduction
C. dehydration
D. decomposition
E. dissolution

11. Which of the following represents a synthesis reaction?

A. $AB \rightarrow A + B$
B. $A + B \rightarrow AB$
C. $AB + XY \rightarrow AX + BY$
D. $AB + XY \rightarrow AX + BY$

12. The important solvent associated with living things is

A. carbon dioxide.
B. sodium chloride.
C. ethyl alcohol.
D. benzene.
E. water.

13. What do H_2O, NaCl, CO_2, and HCl all have in common?

A. All are salts.
B. All are acids.
C. All are gases.
D. All are inorganic.
E. All are solutes.

14. Which term does *not* belong in this list?

A. lactic acid
B. vinegar
C. hydrogen ion donor
D. pH 8
E. acidic

15. Compared to a solution of pH 9, a solution of pH 7

A. is more basic.
B. has no OH^- ions.
C. has more H^+ ions.
D. has a higher pH.
E. All of these choices are correct.

16. The building blocks of an enzyme are

A. nucleotides.
B. glycerol and fatty acids.
C. monosaccharides.

D. phosphate, glycerol, fatty acids.
E. amino acids.

17. Cations are

A. charged subatomic particles.
B. atoms that have gained electrons.
C. radioactive isotopes.
D. capable of forming ionic bonds with anions.
E. atoms without protons.

18. Which of the following functional groups is *mismatched* to the organic compound?

A. phosphate – carbohydrates
B. sulfhydryl – proteins
C. amino – proteins
D. hydroxyl – alcohols
E. carboxyl – fatty acids

19. All of the following are monosaccharides *except*

A. glucose.
B. glycogen.
C. fructose.
D. ribose.
E. deoxyribose.

20. All of the following are lipids *except*

A. cholesterol.
B. starch.
C. phospholipid.
D. wax.
E. triglyceride.

21. A monosaccharide with 5 carbon atoms will have _____ hydrogen atoms and _____ oxygen atoms.

A. 10; 5
B. 5; 10
C. 5; 5
D. 10; 10
E. 2; 1

22. One nucleotide contains

A. one phosphate.
B. one pentose.
C. one nitrogen base.
D. All of these choices are correct.

23. Which of the following would have glycosidic bonds?

A. triglycerides
B. monosaccharides
C. polypeptides
D. polysaccharides
E. ATP

24. All of the following are polysaccharides, *except*

A. dextran in some bacterial slime layers.
B. agar used to make solid culture media.
C. a cell's glycocalyx.
D. cellulose in certain cell walls.

E. prostaglandins in inflammation.

25. The hydrophobic tails of a phospholipid are composed of

A. fatty acids.
B. glycerol.
C. phosphate.
D. alcohol.
E. All of these choices are correct.

26. Which of the following is found in DNA but *not* in RNA?

A. ribose
B. adenine
C. thymine
D. uracil
E. nucleotides

27. An amino acid contains all of the following *except*

A. an amino group.
B. a carboxyl group.
C. a variable R group.
D. a carbon atom.
E. a nitrogenous base.

28. ATP is best described as

A. an enzyme.
B. a double helix.
C. an electron carrier.
D. the energy molecule of cells.
E. All of these choices are correct.

29. Which amino acid contains sulfur atoms that form covalent disulfide bonds and stabilize the tertiary structure of some proteins?

A. valine
B. cysteine
C. serine
D. alanine
E. tyrosine

30. The nucleic acid that delivers the correct amino acid to the ribosome for protein synthesis is

A. rRNA.
B. DNA.
C. tRNA.
D. mRNA.
E. ATP.

31. Which is *not* true about enzymes?

A. Enzymes are found in all cells.
B. Enzymes are catalysts.
C. Enzymes participate in the cell's chemical reactions.
D. Enzymes can be denatured by heat and other agents.
E. Enzymes have high-energy bonds between phosphates.

32. The weak, attractive force between water molecules is due to

A. hydrogen bonds.
B. covalent bonds.
C. ionic bonds.

D. peptide bonds.
E. glycosidic bonds.

33. The purine bases in nucleic acids include

A. thymine and cytosine.
B. guanine and adenine.
C. cytosine and guanine.
D. adenine and thymine.
E. ribose and deoxyribose.

34. A student forgot to label a beaker containing a DNA solution and a beaker containing a glucose solution. If chemical analysis was performed to identify the contents of each beaker, which of the following would be found in the beaker of DNA but *not* in the beaker with glucose?

A. amino acids
B. hydrogen and oxygen atoms
C. nitrogen and phosphorus
D. fatty acids
E. carbon atoms

35. The atomic number equals the number of _____ in an atom.

A. neutrons
B. protons
C. protons plus electrons
D. neutrons plus protons

36. $C_6H_{12}O_6 + C_6H_{12}O_6 \rightarrow C_{12}H_{22}O_{11} + H_2O$ is an example of

A. formation of a peptide bond.
B. a decomposition reaction.
C. denaturation.
D. a hydrolytic reaction.
E. dehydration synthesis.

37. If carbon has an atomic number of 6 and an atomic mass of 14, how many neutrons does it have?

A. 6
B. 7
C. 8
D. 14
E. There is not enough information to determine this.

38. The neutrons of an atom are

A. always equal to the number of protons in an atom.
B. found in the nucleus.
C. used to determine atomic number.
D. positively charged.
E. moving in pathways called orbitals.

39. Which of the following represents an exchange reaction?

A. $AB \rightarrow A + B$
40. B. $A + B \rightarrow AB$
41. C. $X + Y \rightarrow XYD$
D. $AB + XY \leftrightarrow AX + BY$

40. Jim needs to prepare one liter of a 4% NaCl solution. How much NaCl should he weigh out?

A. 0.4 grams
B. 4.0 grams
C. 40 grams

D. 400 grams

41. How many times more acidic is a solution with a pH of 3 than a solution with a pH of 6?

A. 3
B. 10
C. 1000
D. 36
E. 63

42. Which of the following carbohydrates is found in dairy products?

A. lactose
B. sucrose
C. maltose
D. glucose
E. fructose

43. Which of the following is the stored form of carbohydrates in animals?

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

44. All of the following are correct about triglycerides, *except*

A. triglycerides are insoluble in water.
B. triglycerides are a concentrated source of energy.
C. unsaturated triglycerides are solid at room temperature.
D. triglycerides dissolve in nonpolar solvents.
E. triglycerides are hydrolyzed by lipases.

45. Which of the following functional groups participate in the formation of an ester bond?

A. hydroxyl group and amino group
B. carboxyl group and amino group
C. hydroxyl group and carboxyl group
D. hydroxyl group and carbonyl group

46. The chemical reaction that forms an ester bond in a triglyceride is a _____ reaction.

A. dehydration synthesis
B. oxidation
C. hydrolysis
D. reduction

47. The type of chemical bond linking amino acids together is a(n)

A. glycosidic bond.
B. peptide bond.
C. ester bond.
D. ionic bond.
E. hydrogen bond.

48. The alpha helix and beta pleated sheet are examples of

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

49. The polynucleotide strands of DNA are linked along their length by _____ bonds between the bases.

    A. covalent
    B. ionic
    C. Van der Waals
    D. double
    E. hydrogen

50. Which of the following is/are hydrophilic?

    A. glucose
    B. vegetable oil
    C. butter
    D. cholesterol
    E. Vegetable oil, butter, and cholesterol are correct.

51. A covalent bond is formed between an anion and a cation.

    True False

52. Electrons that participate in chemical bonding are typically located closest to the nucleus.

    True False

53. Only charged atoms can form ionic bonds.

    True False

54. Water molecules are nonpolar molecules.

    True False

55. Polar molecules have more reactivity compared to nonpolar molecules.

    True False

56. Elements have predictable chemical properties.

    True False

57. The concentration of a solution expresses the amount of solvent present.

    True False

58. If solution A has a lower pH compared to solution B, then solution A is more acidic than solution B.

    True False

59. The only part of an amino acid that differs from other amino acids is its R group.

    True False

60. All proteins are enzymes.

    True False

61. Replication is the cellular process that copies the DNA prior to cell division.

    True False

62. Nucleic acids have primary, secondary, tertiary, and quaternary levels of organization.

    True False

63. The total number of protons and neutrons of an element establishes its _____ number.

_____

64. Atoms that gain or lose electrons become charged particles called _____.

_____

65. Protons and neutrons make up the atom's central core referred to as its _____.

_____

66. A solution is composed of one or more substances called _____ that are uniformly dispersed in a dissolving medium called a _____.

_____

67. Organic chemicals always have a basic framework of the element _____ bonded to other atoms.

_____

68. _____ bonds are formed by dehydration synthesis between adjacent amino acids.

_____

69. A fat is called _____ if all carbons of the fatty acid chain are single bonded to 2 other carbons and 2 hydrogens.

_____

70. Purines and pyrimidines are components in the building block units of all _____.

_____

71. During protein synthesis, genes in DNA are copied, making _____ RNA.

_____

72. Certain antibiotics are effective against bacteria that cause human infections because they target prokaryotic ribosomes. Discuss, in detail, how the drug attacking a pathogen's ribosomes will affect the cell. Discuss at least three specific detrimental results.

73. Explain what radioisotopes are, and describe how they can be used to monitor the uptake of a specific biochemical by a microbial culture.

74. Compare and contrast the chemical and functional characteristics of DNA and RNA molecules.

75. Identify and provide specific examples of the classes of macromolecules that are associated with life.

76. Water, glucose, and carbon dioxide are examples of

A. compounds.
B. atoms.
C. gases.
D. macromolecules.

77. Which elements are found in all carbohydrates, lipids, proteins, and nucleic acids?

nitrogen
carbon
hydrogen
oxygen
phosphorus
sulfur

78. Chemical analysis of an unidentified compound isolated from cells showed the presence of carbon, hydrogen, oxygen, nitrogen, and sulfur. This unknown compound is most likely a

A. carbohydrate.
B. nucleic acid.
C. lipid.
D. protein.

79. Select the incorrect statement.

A. Molecules contain atoms.
B. Compounds may contain only one type of atom.
C. Compounds contain molecules.
D. Atoms are joined by chemical bonds forming molecules.
E. Molecules may contain two of the same type of atom.

80. During cellular reactions, electrons may be removed from compounds such as glucose and picked up by a coenzyme known as NAD^+. When NAD^+ gains these electrons, it is said to be

A. oxidized.
B. reduced.
C. synthesized.
D. dehydrated.

81. A newly synthesized polypeptide that will ultimately form a cytoplasmic protein will most likely fold into a tertiary structure with its _____ amino acid R-groups facing outward.

A. hydrophilic
B. hydrophobic

82. A newly synthesized polypeptide will ultimately be located within the phospholipid bilayer of the plasma membrane. When this polypeptide folds to form its tertiary structure, the _____ amino acid R-groups will most likely be facing outward.

A. hydrophilic
B. hydrophobic

Chapter 02 Testbank Key

1. Anything that occupies space and has mass is called

   A. an electron.
   B. living.
   C. matter.
   D. energy.
   E. space.

ASM Objective: 02.05 The replication cycles of viruses (lytic and lysogenic) differ among viruses and are determined by their unique structures and genomes.
ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Learning Outcome: 02.17 Identify functional groups and give some examples.
Section: 02.01
Topic: Basic Chemistry

2. All of the following pertain to $^{14}_{6}C$ *except* it

   A. has 6 protons.
   B. has 6 electrons.
   C. has 14 neutrons.
   D. is an isotope of carbon.
   E. has a mass number of 14.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Section: 02.01
Topic: Basic Chemistry

3. The electrons of an atom are

   A. always equal in number to the number of neutrons in an atom.
   B. found in the nucleus.
   C. used to determine atomic number.
   D. positively charged.
   E. moving in pathways called orbitals.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Section: 02.01
Topic: Basic Chemistry

4. The subatomic particles that surround the nucleus are the

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

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Section: 02.01
Topic: Basic Chemistry

5. What is the maximum number of electrons in the second energy shell of an atom?

   A. 2
   B. 4
   C. 8
   D. 18
   E. 32

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.05 Describe electron orbitals and energy shells and how they are filled.
Section: 02.01
Topic: Basic Chemistry

6. Isotopes are atoms of the same element that differ in their

A. neutron number.
B. electron number.
C. proton number.
D. atomic number.
E. chemical properties.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.02 Characterize elements and their isotopes.
Section: 02.01
Topic: Basic Chemistry

7. Two or more atoms bonded together are called a/an

A. ion.
B. isotope.
C. element.
D. electrolyte.
E. molecule.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.06 Explain how elements make chemical bonds to form molecules and compounds.
Learning Outcome: 02.07 State the relationship among an atom, molecule, and compound.
Section: 02.02
Topic: Basic Chemistry

8. What would be the valence number of electrons in the sulfur atom $^{32}_{16}S$?

A. 2
B. 6
C. 8
D. 16
E. 32

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.05 Describe electron orbitals and energy shells and how they are filled.
Learning Outcome: 02.09 Summarize the concepts of valence, polarity, and diatomic elements.
Section: 02.02
Topic: Basic Chemistry

9. Polar molecules are composed of covalently-bonded

A. identical atoms.
B. carbon atoms.
C. ions.
D. atoms of different electronegativity.
E. atoms of identical electronegativity.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.08 Identify the differences between covalent, ionic, and hydrogen bonds.
Learning Outcome: 02.09 Summarize the concepts of valence, polarity, and diatomic elements.
Section: 02.02
Topic: Basic Chemistry

10. Reactions involving electron removal are called _____ reactions.

A. oxidation
B. reduction
C. dehydration
D. decomposition
E. dissolution

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.11 Compare oxidation and reduction and their effects.
Section: 02.02
Topic: Basic Chemistry

11. Which of the following represents a synthesis reaction?

A. $AB \rightarrow A + B$
B. $A + B \rightarrow AB$
C. $AB + XY \rightarrow AX + BY$
D. $AB + XY \leftrightarrow AX + BY$

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.06 Explain how elements make chemical bonds to form molecules and compounds.
Learning Outcome: 02.12 Classify different forms of chemical shorthand and types of reactions.
Section: 02.03
Topic: Basic Chemistry

12. The important solvent associated with living things is

A. carbon dioxide.
B. sodium chloride.
C. ethyl alcohol.
D. benzene.
E. water.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.
Section: 02.03
Topic: Basic Chemistry

13. What do H_2O, NaCl, CO_2, and HCl all have in common?

A. All are salts.
B. All are acids.
C. All are gases.
D. All are inorganic.
E. All are solutes.

ASM Topic: Module 02 Structure and Function
ASM Topic: Module 08 Microbiology Skills
Bloom's: Level 4 Analyze
Learning Outcome: 02.16 Describe the chemistry of carbon and the difference between inorganic and organic compounds.
Section: 02.05
Topic: Basic Chemistry

14. Which term does *not* belong in this list?

A. lactic acid
B. vinegar
C. hydrogen ion donor
D. pH 8
E. acidic

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.
Section: 02.03
Topic: Basic Chemistry

15. Compared to a solution of pH 9, a solution of pH 7

A. is more basic.
B. has no OH^- ions.
C. has more H^+ ions.
D. has a higher pH.
E. All of these choices are correct.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.
Section: 02.03
Topic: Basic Chemistry

16. The building blocks of an enzyme are

A. nucleotides.
B. glycerol and fatty acids.
C. monosaccharides.
D. phosphate, glycerol, fatty acids.
E. amino acids.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.18 Define macromolecule, polymer, and monomer.
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Learning Outcome: 02.27 Summarize some of the essential functions of proteins.
Section: 02.04
Topic: Biochemistry

17. Cations are

A. charged subatomic particles.
B. atoms that have gained electrons.
C. radioactive isotopes.
D. capable of forming ionic bonds with anions.
E. atoms without protons.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.06 Explain how elements make chemical bonds to form molecules and compounds.
Learning Outcome: 02.10 Describe ionization and distinguish between anions and cations.
Section: 02.02
Topic: Basic Chemistry

18. Which of the following functional groups is *mismatched* to the organic compound?

A. phosphate – carbohydrates
B. sulfhydryl – proteins
C. amino – proteins
D. hydroxyl – alcohols
E. carboxyl – fatty acids

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.16 Describe the chemistry of carbon and the difference between inorganic and organic compounds.
Learning Outcome: 02.17 Identify functional groups and give some examples.
Learning Outcome: 02.19 Define carbohydrate and know the functional groups that characterize carbohydrates.
Section: 02.04
Topic: Basic Chemistry
Topic: Biochemistry

19. All of the following are monosaccharides *except*

A. glucose.
B. glycogen.
C. fructose.
D. ribose.
E. deoxyribose.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
Section: 02.05
Topic: Biochemistry

20. All of the following are lipids *except*

A. cholesterol.
B. starch.
C. phospholipid.
D. wax.
E. triglyceride.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.22 Define lipid, triglyceride, phospholipid, fatty acid, and cholesterol.
Section: 02.06
Topic: Biochemistry

21. A monosaccharide with 5 carbon atoms will have _____ hydrogen atoms and _____ oxygen atoms.

A. 10; 5
B. 5; 10
C. 5; 5
D. 10; 10
E. 2; 1

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.19 Define carbohydrate and know the functional groups that characterize carbohydrates.
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
Section: 02.05
Topic: Biochemistry

22. One nucleotide contains

A. one phosphate.
B. one pentose.
C. one nitrogen base.
D. All of these choices are correct.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Section: 02.08
Topic: Biochemistry

23. Which of the following would have glycosidic bonds?

A. triglycerides
B. monosaccharides
C. polypeptides
D. polysaccharides
E. ATP

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
Section: 02.05
Topic: Biochemistry

24. All of the following are polysaccharides, *except*

A. dextran in some bacterial slime layers.
B. agar used to make solid culture media.
C. a cell's glycocalyx.
D. cellulose in certain cell walls.
E. prostaglandins in inflammation.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
Learning Outcome: 02.21 Discuss the functions of carbohydrates in cells.
Section: 02.05
Topic: Biochemistry

25. The hydrophobic tails of a phospholipid are composed of

A. fatty acids.
B. glycerol.
C. phosphate.
D. alcohol.
E. All of these choices are correct.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.14 Differentiate between hydrophilic and hydrophobic.
Learning Outcome: 02.22 Define lipid, triglyceride, phospholipid, fatty acid, and cholesterol.
Section: 02.06
Topic: Biochemistry

26. Which of the following is found in DNA but *not* in RNA?

A. ribose
B. adenine
C. thymine
D. uracil
E. nucleotides

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.28 Identify a nucleic acid and differentiate between DNA and RNA.
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Section: 02.08
Topic: Biochemistry

27. An amino acid contains all of the following *except*

A. an amino group.
B. a carboxyl group.
C. a variable R group.
D. a carbon atom.
E. a nitrogenous base.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Section: 02.07
Topic: Biochemistry

28. ATP is best described as

A. an enzyme.
B. a double helix.
C. an electron carrier.
D. the energy molecule of cells.
E. All of these choices are correct.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Section: 02.08
Topic: Biochemistry

29. Which amino acid contains sulfur atoms that form covalent disulfide bonds and stabilize the tertiary structure of some proteins?

A. valine
B. cysteine
C. serine
D. alanine
E. tyrosine

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Learning Outcome: 02.26 Characterize the four levels of protein structure and describe the pattern of folding.
Section: 02.07
Topic: Biochemistry

30. The nucleic acid that delivers the correct amino acid to the ribosome for protein synthesis is

A. rRNA.
B. DNA.
C. tRNA.
D. mRNA.
E. ATP.

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.
ASM Topic: Module 02 Structure and Function
ASM Topic: Module 04 Information Flow
Bloom's: Level 2 Understand
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.
Section: 02.08
Topic: Biochemistry

31. Which is *not* true about enzymes?

A. Enzymes are found in all cells.
B. Enzymes are catalysts.
C. Enzymes participate in the cell's chemical reactions.
D. Enzymes can be denatured by heat and other agents.
E. Enzymes have high-energy bonds between phosphates.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.26 Characterize the four levels of protein structure and describe the pattern of folding.
Learning Outcome: 02.27 Summarize some of the essential functions of proteins.
Section: 02.07
Topic: Biochemistry

32. The weak, attractive force between water molecules is due to

A. hydrogen bonds.
B. covalent bonds.
C. ionic bonds.
D. peptide bonds.
E. glycosidic bonds.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.08 Identify the differences between covalent, ionic, and hydrogen bonds.
Section: 02.02
Topic: Basic Chemistry

33. The purine bases in nucleic acids include

A. thymine and cytosine.
B. guanine and adenine.
C. cytosine and guanine.
D. adenine and thymine.
E. ribose and deoxyribose.

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.
ASM Topic: Module 02 Structure and Function
ASM Topic: Module 04 Information Flow
Bloom's: Level 1 Remember
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Section: 02.08
Topic: Biochemistry

34. A student forgot to label a beaker containing a DNA solution and a beaker containing a glucose solution. If chemical analysis was performed to identify the contents of each beaker, which of the following would be found in the beaker of DNA but *not* in the beaker with glucose?

A. amino acids
B. hydrogen and oxygen atoms
C. nitrogen and phosphorus
D. fatty acids
E. carbon atoms

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.04 List the major elements that are associated with life.
Learning Outcome: 02.19 Define carbohydrate and know the functional groups that characterize carbohydrates.
Learning Outcome: 02.28 Identify a nucleic acid and differentiate between DNA and RNA.
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Section: 02.05
Section: 02.08
Topic: Biochemistry

35. The atomic number equals the number of _____ in an atom.

A. neutrons
B. protons
C. protons plus electrons
D. neutrons plus protons

ASM Topic: Module 02 Structure and Function

Bloom's: Level 1 Remember
Learning Outcome: 02.03 Explain the differences between atomic number, mass number, and atomic weight.
Section: 02.01
Topic: Basic Chemistry

36. $C_6H_{12}O_6 + C_6H_{12}O_6 \rightarrow C_{12}H_{22}O_{11} + H_2O$ is an example of

A. formation of a peptide bond.
B. a decomposition reaction.
C. denaturation.
D. a hydrolytic reaction.
E. dehydration synthesis.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.12 Classify different forms of chemical shorthand and types of reactions.
Learning Outcome: 02.18 Define macromolecule, polymer, and monomer.
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
Section: 02.05
Topic: Basic Chemistry
Topic: Biochemistry

37. If carbon has an atomic number of 6 and an atomic mass of 14, how many neutrons does it have?

A. 6
B. 7
C. 8
D. 14
E. There is not enough information to determine this.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Learning Outcome: 02.03 Explain the differences between atomic number, mass number, and atomic weight.
Section: 02.01
Topic: Basic Chemistry

38. The neutrons of an atom are

A. always equal to the number of protons in an atom.
B. found in the nucleus.
C. used to determine atomic number.
D. positively charged.
E. moving in pathways called orbitals.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Section: 02.01
Topic: Basic Chemistry

39. Which of the following represents an exchange reaction?

A. $AB \rightarrow A + B$
B. $A + B \rightarrow AB$
C. $X + Y \rightarrow XYD$
D. $AB + XY \leftrightarrow AX + BY$

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.12 Classify different forms of chemical shorthand and types of reactions.
Section: 02.03
Topic: Basic Chemistry

40. Jim needs to prepare one liter of a 4% NaCl solution. How much NaCl should he weigh out?

A. 0.4 grams
B. 4.0 grams
C. 40 grams
D. 400 grams

ASM Topic: Module 02 Structure and Function

ASM Topic: Module 08 Microbiology Skills
Bloom's: Level 3 Apply
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.
Section: 02.03
Topic: Basic Chemistry

41. How many times more acidic is a solution with a pH of 3 than a solution with a pH of 6?

A. 3
B. 10
C. 1000
D. 36
E. 63

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.
Section: 02.03
Topic: Basic Chemistry

42. Which of the following carbohydrates is found in dairy products?

A. lactose
B. sucrose
C. maltose
D. glucose
E. fructose

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
Learning Outcome: 02.21 Discuss the functions of carbohydrates in cells.
Section: 02.05
Topic: Biochemistry

43. Which of the following is the stored form of carbohydrates in animals?

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

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
Learning Outcome: 02.21 Discuss the functions of carbohydrates in cells.
Section: 02.05
Topic: Biochemistry

44. All of the following are correct about triglycerides, *except*

A. triglycerides are insoluble in water.
B. triglycerides are a concentrated source of energy.
C. unsaturated triglycerides are solid at room temperature.
D. triglycerides dissolve in nonpolar solvents.
E. triglycerides are hydrolyzed by lipases.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.22 Define lipid, triglyceride, phospholipid, fatty acid, and cholesterol.
Learning Outcome: 02.24 Discuss major functions of lipids in cells.
Section: 02.06
Topic: Biochemistry

45. Which of the following functional groups participate in the formation of an ester bond?

A. hydroxyl group and amino group
B. carboxyl group and amino group
C. hydroxyl group and carboxyl group
D. hydroxyl group and carbonyl group

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.23 Describe how an ester bond is formed.

Section: 02.06
Topic: Biochemistry

46. The chemical reaction that forms an ester bond in a triglyceride is a _____ reaction.

A. dehydration synthesis
B. oxidation
C. hydrolysis
D. reduction

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.23 Describe how an ester bond is formed.
Section: 02.06
Topic: Biochemistry

47. The type of chemical bond linking amino acids together is a(n)

A. glycosidic bond.
B. peptide bond.
C. ester bond.
D. ionic bond.
E. hydrogen bond.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Section: 02.07
Topic: Biochemistry

48. The alpha helix and beta pleated sheet are examples of

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

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.26 Characterize the four levels of protein structure and describe the pattern of folding.
Section: 02.07
Topic: Biochemistry

49. The polynucleotide strands of DNA are linked along their length by _____ bonds between the bases.

A. covalent
B. ionic
C. Van der Waals
D. double
E. hydrogen

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.08 Identify the differences between covalent, ionic, and hydrogen bonds.
Learning Outcome: 02.28 Identify a nucleic acid and differentiate between DNA and RNA.
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Section: 02.08
Topic: Biochemistry

50. Which of the following is/are hydrophilic?

A. glucose
B. vegetable oil
C. butter
D. cholesterol
E. Vegetable oil, butter, and cholesterol are correct.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.14 Differentiate between hydrophilic and hydrophobic.
Learning Outcome: 02.19 Define carbohydrate and know the functional groups that characterize carbohydrates.
Learning Outcome: 02.24 Discuss major functions of lipids in cells.
Section: 02.03

Topic: Biochemistry

51. A covalent bond is formed between an anion and a cation.

FALSE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.06 Explain how elements make chemical bonds to form molecules and compounds.
Learning Outcome: 02.10 Describe ionization and distinguish between anions and cations.
Section: 02.02
Topic: Basic Chemistry

52. Electrons that participate in chemical bonding are typically located closest to the nucleus.

FALSE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.05 Describe electron orbitals and energy shells and how they are filled.
Learning Outcome: 02.06 Explain how elements make chemical bonds to form molecules and compounds.
Learning Outcome: 02.09 Summarize the concepts of valence, polarity, and diatomic elements.
Section: 02.02
Topic: Basic Chemistry

53. Only charged atoms can form ionic bonds.

TRUE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.08 Identify the differences between covalent, ionic, and hydrogen bonds.
Learning Outcome: 02.10 Describe ionization and distinguish between anions and cations.
Section: 02.02
Topic: Basic Chemistry

54. Water molecules are nonpolar molecules.

FALSE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.09 Summarize the concepts of valence, polarity, and diatomic elements.
Section: 02.02
Topic: Basic Chemistry

55. Polar molecules have more reactivity compared to nonpolar molecules.

TRUE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.09 Summarize the concepts of valence, polarity, and diatomic elements.
Section: 02.02
Topic: Basic Chemistry

56. Elements have predictable chemical properties.

TRUE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.02 Characterize elements and their isotopes.
Section: 02.01
Topic: Basic Chemistry

57. The concentration of a solution expresses the amount of solvent present.

FALSE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.
Section: 02.03
Topic: Basic Chemistry

58. If solution A has a lower pH compared to solution B, then solution A is more acidic than solution B.

TRUE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.
Section: 02.03
Topic: Basic Chemistry

59. The only part of an amino acid that differs from other amino acids is its R group.

TRUE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Section: 02.07
Topic: Biochemistry

60. All proteins are enzymes.

FALSE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.27 Summarize some of the essential functions of proteins.
Section: 02.07
Topic: Biochemistry

61. Replication is the cellular process that copies the DNA prior to cell division.

TRUE

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.
ASM Topic: Module 02 Structure and Function
ASM Topic: Module 04 Information Flow
Bloom's: Level 2 Understand
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.
Section: 02.08
Topic: Biochemistry

62. Nucleic acids have primary, secondary, tertiary, and quaternary levels of organization.

FALSE

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.26 Characterize the four levels of protein structure and describe the pattern of folding.
Learning Outcome: 02.28 Identify a nucleic acid and differentiate between DNA and RNA.
Section: 02.08
Topic: Biochemistry

63. The total number of protons and neutrons of an element establishes its _____ number.

mass

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.03 Explain the differences between atomic number, mass number, and atomic weight.
Section: 02.01
Topic: Basic Chemistry

64. Atoms that gain or lose electrons become charged particles called _____.

ions

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.10 Describe ionization and distinguish between anions and cations.
Section: 02.02
Topic: Basic Chemistry

65. Protons and neutrons make up the atom's central core referred to as its _____.

nucleus

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Section: 02.01

Topic: Basic Chemistry

66. A solution is composed of one or more substances called _____ that are uniformly dispersed in a dissolving medium called a _____.

solutes

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.
Section: 02.03
Topic: Basic Chemistry

67. Organic chemicals always have a basic framework of the element _____ bonded to other atoms.

carbon

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.16 Describe the chemistry of carbon and the difference between inorganic and organic compounds.
Section: 02.04
Topic: Basic Chemistry
Topic: Biochemistry

68. _____ bonds are formed by dehydration synthesis between adjacent amino acids.

Peptide

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Section: 02.07
Topic: Biochemistry

69. A fat is called _____ if all carbons of the fatty acid chain are single bonded to 2 other carbons and 2 hydrogens.

saturated

ASM Objective: 05.01 Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.
ASM Objective: 05.03 Microorganisms and their environment interact with and modify each other.
ASM Objective: 06.03 Humans utilize and harness microorganisms and their products.
ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.24 Discuss major functions of lipids in cells.
Section: 02.06
Topic:

70. Purines and pyrimidines are components in the building block units of all _____

nucleic acids

ASM Topic: Module 02 Structure and Function
Bloom's: Level 1 Remember
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Section: 02.08
Topic: Biochemistry

71. During protein synthesis, genes in DNA are copied, making _____ RNA.

messenger; m; M

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.
ASM Topic: Module 02 Structure and Function
ASM Topic: Module 04 Information Flow
Bloom's: Level 2 Understand
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.
Section: 02.08
Topic: Biochemistry

72. Certain antibiotics are effective against bacteria that cause human infections because they target prokaryotic ribosomes. Discuss, in detail, how the drug attacking a pathogen's ribosomes will affect the cell. Discuss at least three specific detrimental results.

ASM Objective: 02.02 Bacteria have unique cell structures that can be targets for antibiotics, immunity, and phage infection.

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.
ASM Topic: Module 02 Structure and Function
ASM Topic: Module 04 Information Flow
Bloom's: Level 3 Apply
Learning Outcome: 02.27 Summarize some of the essential functions of proteins.
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.
Section: 02.08
Topic: Biochemistry

73. Explain what radioisotopes are, and describe how they can be used to monitor the uptake of a specific biochemical by a microbial culture.

ASM Objective: 05.03 Microorganisms and their environment interact with and modify each other.
ASM Topic: Module 05 Systems
Bloom's: Level 3 Apply
Learning Outcome: 02.02 Characterize elements and their isotopes.
Section: 02.01
Topic: Basic Chemistry

74. Compare and contrast the chemical and functional characteristics of DNA and RNA molecules.

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.
ASM Topic: Module 02 Structure and Function
ASM Topic: Module 04 Information Flow
Bloom's: Level 2 Understand
Learning Outcome: 02.28 Identify a nucleic acid and differentiate between DNA and RNA.
Section: 02.08
Topic: Biochemistry

75. Identify and provide specific examples of the classes of macromolecules that are associated with life.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.04 List the major elements that are associated with life.
Learning Outcome: 02.18 Define macromolecule, polymer, and monomer.
Learning Outcome: 02.19 Define carbohydrate and know the functional groups that characterize carbohydrates.
Learning Outcome: 02.22 Define lipid, triglyceride, phospholipid, fatty acid, and cholesterol.
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Learning Outcome: 02.28 Identify a nucleic acid and differentiate between DNA and RNA.
Section: 02.05
Section: 02.06
Section: 02.07
Section: 02.08
Topic: Biochemistry

76. Water, glucose, and carbon dioxide are examples of

A. compounds.
B. atoms.
C. gases.
D. macromolecules.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.07 State the relationship among an atom, molecule, and compound.
Section: 02.01
Topic: Basic Chemistry

77. Which elements are found in all carbohydrates, lipids, proteins, and nucleic acids?

nitrogen
carbon
hydrogen
oxygen
phosphorus
sulfur

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.04 List the major elements that are associated with life.
Section: 02.01
Topic: Biochemistry

78. Chemical analysis of an unidentified compound isolated from cells showed the presence of carbon, hydrogen, oxygen, nitrogen, and sulfur. This unknown compound is most likely a

A. carbohydrate.

B. nucleic acid.
C. lipid.
D. protein.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.04 List the major elements that are associated with life.
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Section: 02.01
Section: 02.07

79. Select the incorrect statement.

A. Molecules contain atoms.
B. Compounds may contain only one type of atom.
C. Compounds contain molecules.
D. Atoms are joined by chemical bonds forming molecules.
E. Molecules may contain two of the same type of atom.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 2 Understand
Learning Outcome: 02.07 State the relationship among an atom, molecule, and compound.
Section: 02.02
Topic: Basic Chemistry

80. During cellular reactions, electrons may be removed from compounds such as glucose and picked up by a coenzyme known as NAD^+. When NAD^+ gains these electrons, it is said to be

A. oxidized.
B. reduced.
C. synthesized.
D. dehydrated.

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.11 Compare oxidation and reduction and their effects.
Section: 02.02
Topic: Basic Chemistry

81. A newly synthesized polypeptide that will ultimately form a cytoplasmic protein will most likely fold into a tertiary structure with its _____ amino acid R-groups facing outward.

A. hydrophilic
B. hydrophobic

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.14 Differentiate between hydrophilic and hydrophobic.
Learning Outcome: 02.26 Characterize the four levels of protein structure and describe the pattern of folding.
Section: 02.03
Section: 02.07
Topic: Biochemistry

82. A newly synthesized polypeptide will ultimately be located within the phospholipid bilayer of the plasma membrane. When this polypeptide folds to form its tertiary structure, the _____ amino acid R-groups will most likely be facing outward.

A. hydrophilic
B. hydrophobic

ASM Topic: Module 02 Structure and Function
Bloom's: Level 3 Apply
Learning Outcome: 02.14 Differentiate between hydrophilic and hydrophobic.
Learning Outcome: 02.26 Characterize the four levels of protein structure and describe the pattern of folding.
Section: 02.03
Section: 02.07
Topic: Biochemistry

Chapter 02 Testbank Summary

Category	*# of Questions*
ASM Objective: 02.02 Bacteria have unique cell structures that can be targets for antibiotics, immunity, and phage infection.	1
ASM Objective: 02.05 The replication cycles of viruses (lytic and lysogenic) differ among viruses and are determined by their unique structures and genomes.	1
ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.	6
ASM Objective: 05.01 Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.	1
ASM Objective: 05.03 Microorganisms and their environment interact with and modify each other.	2
ASM Objective: 06.03 Humans utilize and harness microorganisms and their products.	1
ASM Topic: Module 02 Structure and Function	81
ASM Topic: Module 04 Information Flow	6
ASM Topic: Module 05 Systems	1
ASM Topic: Module 08 Microbiology Skills	2
Bloom's: Level 1 Remember	29
Bloom's: Level 2 Understand	33
Bloom's: Level 3 Apply	19
Bloom's: Level 4 Analyze	1
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.	7
Learning Outcome: 02.02 Characterize elements and their isotopes.	3
Learning Outcome: 02.03 Explain the differences between atomic number, mass number, and atomic weight.	3
Learning Outcome: 02.04 List the major elements that are associated with life.	4
Learning Outcome: 02.05 Describe electron orbitals and energy shells and how they are filled.	3
Learning Outcome: 02.06 Explain how elements make chemical bonds to form molecules and compounds.	5
Learning Outcome: 02.07 State the relationship among an atom, molecule, and compound.	3
Learning Outcome: 02.08 Identify the differences between covalent, ionic, and hydrogen bonds.	4
Learning Outcome: 02.09 Summarize the concepts of valence, polarity, and diatomic elements.	5
Learning Outcome: 02.10 Describe ionization and distinguish between anions and cations.	4
Learning Outcome: 02.11 Compare oxidation and reduction and their effects.	2
Learning Outcome: 02.12 Classify different forms of chemical shorthand and types of reactions.	3
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.	4
Learning Outcome: 02.14 Differentiate between hydrophilic and hydrophobic.	4
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.	4
Learning Outcome: 02.16 Describe the chemistry of carbon and the difference between inorganic and organic compounds.	3
Learning Outcome: 02.17 Identify functional groups and give some examples.	2
Learning Outcome: 02.18 Define macromolecule, polymer, and monomer.	3
Learning Outcome: 02.19 Define carbohydrate and know the functional groups that characterize carbohydrates.	5
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.	7
Learning Outcome: 02.21 Discuss the functions of carbohydrates in cells.	3
Learning Outcome: 02.22 Define lipid, triglyceride, phospholipid, fatty acid, and cholesterol.	4
Learning Outcome: 02.23 Describe how an ester bond is formed.	2
Learning Outcome: 02.24 Discuss major functions of lipids in cells.	3
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.	8
Learning Outcome: 02.26 Characterize the four levels of protein structure and describe the pattern of folding.	6
Learning Outcome: 02.27 Summarize some of the essential functions of proteins.	4
Learning Outcome: 02.28 Identify a nucleic acid and differentiate between DNA and RNA.	6
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.	7
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.	4
Section: 02.01	16
Section: 02.02	14