Chapter 02
The Chemistry of Biology

Multiple Choice Questions

1. Anything that occupies space and has mass is called
A. an electron.
B. living.
C. matter.
D. energy.
E. space.

Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Learning Outcome: 02.02 Characterize elements and their isotopes.
Topic: Basic Chemistry

2. The electrons of an atom are
A. always equal 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.

Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.

3. 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. mass number is 14.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Learning Outcome: 02.05 Describe electron orbitals and energy shells and how they are filled.
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
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Topic: Basic Chemistry

5. 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
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.
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
Learning Outcome: 02.02 Characterize elements and their isotopes.
Topic: Basic Chemistry

7. 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
Learning Outcome: 02.05 Describe electron orbitals and energy shells and how they are filled.
Topic: Basic Chemistry

8. 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
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.
Topic: Basic Chemistry

9. 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
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.
Topic: Basic Chemistry

10. 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
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.
Topic: Basic Chemistry

11. Reactions involving electron release are called _____ reactions.
A. oxidation.
B. reduction.
C. ionization.
D. decomposition.
E. dissolution.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.11 Compare oxidation and reduction and their effects.
Topic: Basic Chemistry

12. 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. $AB + XY \leftrightarrow AX + BY$
E. None of the choices are correct.

ASM Topic: Module 02 Structure and Function
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.
Topic: Basic Chemistry

13. 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
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.
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
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.
Topic: Basic Chemistry

15. A solution of pH 7 compared to a solution of pH 9
A. is more basic.
B. has no OH^- ions.
C. has more H^+ ions.
D. has a higher pH.
E. All of the choices are correct.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.
Topic: Basic Chemistry

16. 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
Learning Outcome: 02.16 Describe the chemistry of carbon and the difference between inorganic and organic compounds.
Topic: Basic Chemistry

17. 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
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 know some examples.
Learning Outcome: 02.19 Define carbohydrate and know the functional groups that characterize carbohydrates.
Topic: Basic Chemistry
Topic: Biochemistry

18. 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
Learning Outcome: 02.18 Define what macromolecules, polymers, and monomers are.
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.
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
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
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
Learning Outcome: 02.22 Define lipid, triglyceride, phospholipid, fatty acid, and cholesterol.
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
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.
Topic: Biochemistry

22. One nucleotide contains
A. one phosphate.
B. one pentose.
C. one nitrogen base.
D. All of the choices are correct.
E. None of the choices are correct.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
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
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
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
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.
Topic: Biochemistry

25. What part of a phospholipid forms hydrophobic tails?
A. fatty acids
B. glycerol
C. phosphate
D. alcohol
E. All of the choices are correct.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.22 Define lipid, triglyceride, phospholipid, fatty acid, and cholesterol.
Topic: Biochemistry

26. An amino acid contains all of the following *except:*
A. an amino grou.
B. a carboxyl group
C. a variable R group
D. a carbon atom
E. a nitrogenous base

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Topic: Biochemistry

27. Which pertains to DNA but *not* to RNA?
A. contains ribose
B. contains adenine
C. contains thymine
D. contains uracil
E. contains nucleotides

ASM Topic: Module 02 Structure and Function
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.
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 the choices are correct.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Topic: Biochemistry

29. Which is *not* true about enzymes?
A. found in all cells
B. are catalysts
C. participate in the cell's chemical reactions
D. can be denaturated by heat and other agents
E. have high-energy bonds between phosphates

ASM Topic: Module 02 Structure and Function
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.
Topic: Biochemistry

30. Which amino acid contains sulfur atoms that form covalent disulfide bonds in its tertiary structure?
A. valine
B. cysteine
C. serine
D. alanine
E. tyrosine

ASM Topic: Module 02 Structure and Function
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.
Topic: Biochemistry

31. The nucleic acid that delivers the correct amino acid for protein synthesis is
A. rRNA.
B. DNA.
C. tRNA.
D. mRNA.
E. ATP.

ASM Topic: Module 02 Structure and Function
ASM Topic: Module 04 Information Flow
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.
Topic: Biochemistry

32. 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
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Topic: Biochemistry

33. A weak, attractive force between nearby molecules is called a/an
A. hydrogen bond.
B. covalent bond.
C. ionic bond.
D. peptide bond.
E. glycosidic bond.

ASM Topic: Module 02 Structure and Function
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.
Topic: Basic Chemistry

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
Learning Outcome: 02.19 Define carbohydrate and know the functional groups that characterize carbohydrates.
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Topic: Biochemistry

35. $C_6H_{12}O_6 + C_6H_{12}O_6 \rightarrow C_{12}H_{22}O_{11} + H_2O$ represents
A. formation of a peptide bond.
B. a decomposition reaction.
C. denaturation.
D. formation of a polysaccharide.
E. dehydration synthesis.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.12 Classify different forms of chemical shorthand and types of reactions.
Learning Outcome: 02.18 Define what macromolecules, polymers, and monomers are.
Learning Outcome: 02.20 Distinguish among mono-, di-, and polysaccharides, and describe how their bonds are made.
Topic: Basic Chemistry
Topic: Biochemistry

36. The atomic number equals the number of _____ an atom possesses.
A. neutrons
B. protons
C. protons plus electrons
D. neutrons plus protons
E. electrons plus protons

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.03 Explain the differences between atomic number, mass number, and atomic weight.
Topic: Basic Chemistry

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. impossible to determine

ASM Topic: Module 02 Structure and Function
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.
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
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
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. $AB + XY \leftrightarrow AX + BY$
E. None of the choices are correct.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.12 Classify different forms of chemical shorthand and types of reactions.
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
E. None of the choices are correct.

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.
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
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.
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
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.
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
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.
Topic: Biochemistry

44. All of the following are correct about triglycerides, *except:*
A. they are insoluble in water
B. they are a concentrated source of energy
C. when they are unsaturated they are solid
D. they dissolve in nonpolar solvents
E. they are digested by lipases

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.22 Define lipid, triglyceride, phospholipid, fatty acid, and cholesterol.
Learning Outcome: 02.24 Discuss major functions of lipids in cells.
Topic: Biochemistry

45. 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
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Topic: Biochemistry

46. The alpha helix and beta pleated sheet are examples of:
A. primary structures
B. secondary structures
C. tertiary structures
D. quaternary structures
E. gamma structures

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.26 Characterize the four levels of protein structure and describe the pattern of folding.
Topic: Biochemistry

47. 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
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.
Topic: Biochemistry

48. Which of the following examples are NOT hydrophobic?
A. Glucose
B. Vegetable oil
C. Butter
D. Cholesterol
E. Choices B, C, and D are correct

ASM Topic: Module 02 Structure and Function
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.
Topic: Biochemistry

True / False Questions

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

ASM Topic: Module 02 Structure and Function
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.
Topic: Biochemistry

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

FALSE

ASM Topic: Module 02 Structure and Function
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.
Topic: Basic Chemistry

51. Only charged atoms can form ionic bonds.
TRUE

ASM Topic: Module 02 Structure and Function
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.
Topic: Basic Chemistry

52. Water molecules are nonpolar molecules.
FALSE

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.09 Summarize the concepts of valence, polarity, and diatomic elements.
Topic: Basic Chemistry

53. Polar molecules have more reactivity compared to nonpolar molecules.
TRUE

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.09 Summarize the concepts of valence, polarity, and diatomic elements.
Topic: Basic Chemistry

54. Elements have predictable chemical properties.
TRUE

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.02 Characterize elements and their isotopes.
Topic: Basic Chemistry

55. The concentration of a solution expresses the amount of solvent present.
FALSE

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.
Topic: Basic Chemistry

56. 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
Learning Outcome: 02.15 Describe the pH scale and how it was derived; define acid, base, and neutral levels.
Topic: Basic Chemistry

57. 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
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Topic: Biochemistry

58. All proteins are enzymes.
FALSE

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.27 Summarize some of the essential functions of proteins.
Topic: Biochemistry

59. Replication is the cellular mechanism for making a copy of its DNA.
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
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.
Topic: Biochemistry

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

ASM Topic: Module 02 Structure and Function
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.
Topic: Biochemistry

Fill in the Blank Questions

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.03 Explain the differences between atomic number, mass number, and atomic weight.
Topic: Basic Chemistry

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.10 Describe ionization and distinguish between anions and cations.
Topic: Basic Chemistry

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.01 Describe the properties of atoms and identify the relationships of the particles that they contain.
Topic: Basic Chemistry

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.13 Explain solutes, solvents, and hydration.
Topic: Basic Chemistry

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.16 Describe the chemistry of carbon and the difference between inorganic and organic compounds.
Topic: Basic Chemistry
Topic: Biochemistry

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.25 Describe the structure of peptides and polypeptides and how their bonds form.
Topic: Biochemistry

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.24 Discuss major functions of lipids in cells.
Topic: Biochemistry

68. Purines and pyrimidines are components in the building block units of all _____.
nucleic acids

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.29 Describe the structures of nucleotides and list the nitrogen bases.
Topic: Biochemistry

69. During protein synthesis, _____ RNA is made to be a copy of a gene from the DNA.
messenger

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
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.
Topic: Biochemistry

70. In _____ reproduction, offspring arise from the division of a single parent cell into two identical progeny cells.
asexual

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
Learning Outcome: 02.30 Explain how the DNA code may be copied, and describe the basic functions of RNA.
Topic: Biochemistry

Short Answer Questions

71. 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 3 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
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.
Topic: Biochemistry

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.02 Characterize elements and their isotopes.
Topic: Basic Chemistry

73. 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
Learning Outcome: 02.28 Identify a nucleic acid and differentiate between DNA and RNA.
Topic: Biochemistry

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

ASM Topic: Module 02 Structure and Function
Learning Outcome: 02.04 List the major elements that are associated with life.
Learning Outcome: 02.18 Define what macromolecules, polymers, and monomers are.
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.
Topic: Biochemistry