Chapter 02
The Chemical Basis of Life

Multiple Choice Questions

1. The four most abundant elements in the human body are
A. carbon, hydrogen, oxygen, and iron.
B. carbon, hydrogen, oxygen, and nitrogen.
C. calcium, hydrogen, sodium, and potassium.
D. carbon, oxygen, magnesium, and zinc.
E. carbon, sulfur, calcium, and potassium.

Bloom's Level: 1. Remember
HAPS Objective: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.
Learning Outcome: 02.01B. Distinguish between an element and an atom and state the four most abundant elements in the body.
Section: 02.01
Topic: Chemistry

2. The smallest particle of an element that still exhibits the chemical characteristics of that element is a(n)
A. electron.
B. atom.
C. chemical bond.
D. orbital.
E. proton.

Bloom's Level: 1. Remember
HAPS Objective: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.
Learning Outcome: 02.01B. Distinguish between an element and an atom and state the four most abundant elements in the body.
Section: 02.01
Topic: Chemistry

3. Subatomic particles located around the nucleus of an atom are
A. protons.
B. electrons.
C. neutrons.
D. neutrinos.
E. photons.

Bloom's Level: 1. Remember
HAPS Objective: C01.01a Describe the charge, mass, and relative location of electrons, protons and neutrons with respect to the structure of an atom.
Learning Outcome: 02.01C. Name the subatomic particles of an atom, and indicate their mass, charge and location in an atom.
Section: 02.01
Topic: Chemistry

4. A neutral atom contains
A. more protons than electrons.
B. more electrons than protons.
C. the same number of electrons and protons.
D. only neutrons.
E. None of these choices is correct.

Bloom's Level: 1. Remember
HAPS Objective: C01.01a Describe the charge, mass, and relative location of electrons, protons and neutrons with respect to the structure of an atom.
Learning Outcome: 02.01C. Name the subatomic particles of an atom, and indicate their mass, charge and location in an atom.
Section: 02.01
Topic: Chemistry

5. Which of the following best describes a proton?
A. one negative charge, no mass, found in orbitals
B. no charge, mass of one, found in nucleus
C. one positive charge, mass of one, found in nucleus
D. subatomic particle with no electric charge
E. None of these choices is correct.

Bloom's Level: 2. Understand
HAPS Objective: C01.01a Describe the charge, mass, and relative location of electrons, protons and neutrons with respect to the structure of an atom.
Learning Outcome: 02.01C. Name the subatomic particles of an atom, and indicate their mass, charge and location in an atom.
Section: 02.01
Topic: Chemistry

6. The mass number of an atom is the number of
A. protons in the atom.
B. neutrons in the atom.
C. protons plus electrons in the atom.
D. electrons plus neutrons in the atom.
E. neutrons plus protons in the atom.

Bloom's Level: 1. Remember
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

7. An atom has an atomic number of 19 and a mass number of 39. This atom will have
A. 19 neutrons.
B. 20 neutrons.
C. 39 neutrons.
D. 58 neutrons.
E. 20 electrons.

Bloom's Level: 2. Understand
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

8. An atom of chlorine has 17 protons and 18 neutrons. Which of the following statements is true?
A. Chlorine atoms have 18 electrons.
B. Chlorine has a mass number of 35.
C. Chlorine has an atomic number of 18.
D. Chlorine has 35 electrons.
E. Chlorine has an atomic number of 35.

Bloom's Level: 2. Understand
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

9. Isotopes of the same element have
A. the same number of neutrons but different numbers of protons.
B. different numbers of protons and electrons.
C. the same mass number.
D. the same atomic number but differ in their mass numbers.
E. no mass number.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

10. The amount of matter in an object is its
A. mass.
B. weight.
C. density.
D. volume.
E. size.

Bloom's Level: 1. Remember
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01A. Define matter, mass, and weight.
Section: 02.01
Topic: Chemistry

11. The number of atoms in exactly 12 grams of carbon-12 is called
A. Dalton's number.
B. Socrates's number.
C. Avogadro's number.
D. Pasteur's number.
E. Le Chatelier's number.

Bloom's Level: 1. Remember
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: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

12. Electrons
A. comprise the majority of the mass of an atom.
B. are located in the nucleus of an atom.
C. have a positive charge of one.
D. are the subatomic particles most involved in bonding behavior of atoms.
E. do not participate in the bonding of atoms.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.01C. Name the subatomic particles of an atom, and indicate their mass, charge and location in an atom.
Section: 02.01
Topic: Chemistry

13. A neutral atom will become a cation if it
A. gains electrons.
B. gains protons.
C. loses electrons.
D. loses protons.
E. gains neutrons.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.01C. Name the subatomic particles of an atom, and indicate their mass, charge and location in an atom.
Section: 02.01
Topic: Chemistry

14. In ionic bonding,
A. only non-polar molecules are involved.
B. a "sea of electrons" forms.
C. electrons are transferred from one atom to another.
D. two hydrogen atoms share one pair of electrons.
E. the charge of the ion does not play a role in the bond.

Bloom's Level: 1. Remember
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Section: 02.01
Topic: Chemistry

15. Covalent bonds form when
A. atomic nuclei fuse.
B. molecules become ionized.
C. neutrons are transferred from one atom to another.
D. protons are lost from atoms.
E. electrons are shared between two atoms.

Bloom's Level: 1. Remember
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Section: 02.01
Topic: Chemistry

16. Molecules that form when electrons are shared unequally between atoms are called
A. salt molecules.
B. polar molecules.
C. nonpolar molecules.
D. lopsided molecules.
E. None of these choices are correct.

Bloom's Level: 1. Remember
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Section: 02.01
Topic: Chemistry

17. A substance composed of two or more different types of atoms is a(n)
A. compound.
B. element.
C. ion.
D. molecule.
E. compound and a molecule.

Bloom's Level: 1. Remember
HAPS Objective: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.
Learning Outcome: 02.01F. Differentiate between a molecule and a compound.
Section: 02.01
Topic: Chemistry

18. Sodium chloride is considered a(n)
A. molecule.
B. compound.
C. molecule and a compound.
D. element.
E. ion.

Bloom's Level: 1. Remember
HAPS Objective: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.
HAPS Objective: C02.01c Provide biologically significant examples of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
Learning Outcome: 02.01F. Differentiate between a molecule and a compound.
Section: 02.01
Topic: Chemistry

19. Carbon dioxide is considered a(n)
A. molecule.
B. compound.
C. molecule and a compound.
D. element.
E. ion.

Bloom's Level: 1. Remember
HAPS Objective: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.
HAPS Objective: C02.01c Provide biologically significant examples of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
Learning Outcome: 02.01F. Differentiate between a molecule and a compound.
Section: 02.01
Topic: Chemistry

20. When ionic compounds dissolve in water, their ions
A. cling tightly together.
B. dissociate or separate from one another.
C. lose their charge.
D. get lost in the solvent.
E. settle to the bottom of the container.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

21. Cations and anions that dissociate in water are sometimes called
A. nonelectrolytes, because they do not conduct an electrical current.
B. molecules
C. electrolytes, because they can conduct an electrical current.
D. nonelectrolytes and solutes.
E. molecules and electrolytes.

Bloom's Level: 1. Remember
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

22. Electrolytes are substances that
A. form covalent bonds with water.
B. conduct electricity when dissolved in water.
C. cannot conduct electricity in solution.
D. are NOT found in the human body in any appreciable amounts.
E. are NOT charged particles.

Bloom's Level: 1. Remember
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

23. Chemical substances that dissolve in water or react with water to release ions are known as
A. buffers.
B. enzymes.
C. bases.
D. inorganic compounds.
E. electrolytes.

Bloom's Level: 1. Remember
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

24. Intermolecular forces
A. form dissociated ions.
B. are electrostatic attractions between different molecules.
C. evenly distribute electrical charge among all atoms in a sample.
D. separate atoms and ions from one another.
E. are found within molecules.

Bloom's Level: 1. Remember
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

25. A cation is
A. a combination of atoms held together by chemical bonds.
B. a positively charged ion.
C. a negatively charged ion.
D. a molecule that conducts electricity when placed in solution.
E. an alteration in the three-dimensional structure of a protein.

Bloom's Level: 1. Remember
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

26. An anion is
A. a combination of atoms held together by chemical bonds.
B. a positively charged ion.
C. a negatively charged ion.
D. a molecule that conducts electricity when placed in solution.
E. an alteration in the three-dimensional structure of a protein.

Bloom's Level: 1. Remember
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

27. An electrolyte is
A. a combination of atoms held together by chemical bonds.
B. a positively charged ion.
C. a negatively charged ion.
D. a substance that conducts electricity when placed in solution.
E. the alteration in the three-dimensional structure of a protein.

Bloom's Level: 1. Remember
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

28. A molecule is
A. a combination of atoms held together by chemical bonds.
B. a positively charged ion.
C. a negatively charged ion.
D. a substance that conducts electricity when placed in solution.
E. an alteration in the three-dimensional structure of a protein.

Bloom's Level: 1. Remember
HAPS Objective: C01.03 Compare and contrast the terms atoms, molecules, elements, and compounds.
Learning Outcome: 02.01F. Differentiate between a molecule and a compound.
Section: 02.01
Topic: Chemistry

29. Solubility refers to the ability of one substance to _____ in another.
A. react
B. dissolve
C. precipitate
D. conduct
E. None of these choices are correct.

Bloom's Level: 1. Remember
HAPS Objective: C03.02 Distinguish among the terms solution, solute, solvent, colloid suspension, and emulsion.
Learning Outcome: 02.01H. Describe solubility and the process of dissociation, and predict if a compound or molecule is an electrolyte or a nonelectrolyte.
Section: 02.01
Topic: Chemistry

30. Which of the following pairs is mismatched?
A. synthesis reaction - two reactants combine to form a larger product
B. decomposition reaction - large reactant broken into smaller products
C. oxidation - gain of electrons
D. dehydration reaction - water is a product of the reaction
E. hydrolysis - water is used in decomposition reaction

Bloom's Level: 2. Understand
HAPS Objective: C04.03 Define and give examples of dehydration synthesis and hydrolysis reactions.
Learning Outcome: 02.02A. Summarize the characteristics of synthesis, decomposition, reversible reactions, and oxidation-reduction reactions.
Section: 02.02
Topic: Chemistry

31. Which of the following is a synthesis reaction?
A. Two amino acids are bonded together to form a dipeptide.
B. Sucrose is chemically separated to form one molecule of glucose and one molecule of fructose.
C. Sodium chloride is dissolved in water.
D. Several dipeptide chains are formed from digestion of a long polypeptide chain.
E. ATP is converted to ADP.

Bloom's Level: 2. Understand
HAPS Objective: C04.03 Define and give examples of dehydration synthesis and hydrolysis reactions.
Learning Outcome: 02.02A. Summarize the characteristics of synthesis, decomposition, reversible reactions, and oxidation-reduction reactions.
Section: 02.02
Topic: Chemistry

32. Which of the following factors will influence the rate of chemical reactions?
A. temperature
B. concentration of reactants
C. presence of catalysts
D. presence of enzymes
E. All of these factors will influence the rate of chemical reactions.

Bloom's Level: 1. Remember
HAPS Objective: C04.03 Define and give examples of dehydration synthesis and hydrolysis reactions.
Learning Outcome: 02.02F. Describe the factors that can affect the rate of chemical reactions.
Section: 02.02
Topic: Chemistry

33. Energy
A. has mass.
B. is the capacity to do work.
C. has weight.
D. takes up space.
E. cannot be stored.

Bloom's Level: 1. Remember
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.
Learning Outcome: 02.02D. Contrast potential and kinetic energy.
Section: 02.02
Topic: Chemistry

34. Chemical energy
A. moves matter.
B. results from the position or movement of objects.
C. is a form of potential energy within chemical bonds.
D. comes from the sun.
E. is not important in physiological processes.

Bloom's Level: 1. Remember
Learning Outcome: 02.02D. Contrast potential and kinetic energy.
Section: 02.02
Topic: Chemistry

35. If the potential energy in the chemical bonds of the reactants is greater than the potential energy in the chemical bonds of the product,
A. energy must be supplied for the reaction to occur.
B. energy is released by the reaction.
C. the chemical reaction equalizes the potential energy levels.
D. energy has not been gained or lost.
E. energy is not a factor in the reaction.

Bloom's Level: 2. Understand
Learning Outcome: 02.02E. Distinguish between chemical reactions that release energy and those that take in energy.
Section: 02.02
Topic: Chemistry

36. The energy stored in ATP is a form of _____ energy.
A. mechanical
B. chemical
C. kinetic
D. heat
E. electrical

Bloom's Level: 1. Remember
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.
Learning Outcome: 02.02E. Distinguish between chemical reactions that release energy and those that take in energy.
Section: 02.02
Topic: Chemistry

37. Potential energy is
A. the form of energy that actually does work.
B. movement of ions or electrons.
C. energy that flows between objects with different temperatures.
D. stored energy that could do work but is not doing so.
E. energy that moves in waves.

Bloom's Level: 1. Remember
Learning Outcome: 02.02D. Contrast potential and kinetic energy.
Section: 02.02
Topic: Chemistry

38. Kinetic energy is
A. the form of energy that actually does work.
B. movement of ions or electrons.
C. energy that flows between objects with different temperatures.
D. stored energy that could do work but is not doing so.
E. energy that moves in waves.

Bloom's Level: 1. Remember
Learning Outcome: 02.02D. Contrast potential and kinetic energy.
Section: 02.02
Topic: Chemistry

39. Heat energy is
A. the form of energy that actually does work.
B. movement of ions or electrons.
C. energy that flows between objects with different temperatures.
D. stored energy that could do work but is not doing so.
E. energy that moves in waves.

Bloom's Level: 1. Remember
Learning Outcome: 02.02E. Distinguish between chemical reactions that release energy and those that take in energy.
Section: 02.02
Topic: Chemistry

40. The minimum amount of energy that reactants must have to start a chemical reaction is called
A. kinetic energy.
B. mechanical energy.
C. activation energy.
D. electromagnetic energy.
E. potential energy.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.02E. Distinguish between chemical reactions that release energy and those that take in energy.
Section: 02.02
Topic: Chemistry

41. All of the synthesis reactions in the body are called
A. catabolism.
B. hydrolysis.
C. oxidation-reduction.
D. anabolism.
E. dissociation.

Bloom's Level: 1. Remember
HAPS Objective: C04.03 Define and give examples of dehydration synthesis and hydrolysis reactions.
Learning Outcome: 02.02A. Summarize the characteristics of synthesis, decomposition, reversible reactions, and oxidation-reduction reactions.
Section: 02.02
Topic: Chemistry

42. Reactions that use water to split molecules apart are called _____ reactions.
A. dehydration
B. synthesis
C. hydrolysis
D. reversible
E. oxidation

Bloom's Level: 1. Remember
HAPS Objective: C04.03 Define and give examples of dehydration synthesis and hydrolysis reactions.
Learning Outcome: 02.02A. Summarize the characteristics of synthesis, decomposition, reversible reactions, and oxidation-reduction reactions.
Learning Outcome: 02.02B. Illustrate what occurs in dehydration and hydrolysis reactions.
Section: 02.02
Topic: Chemistry

43. In the reversible reaction, $CO_2 + H_2O \leftrightarrow H_2CO_3 \leftrightarrow H^+ + HCO_3^-$, a decrease in respiration rate will increase the concentration of CO_2 in the blood. What will this do to the amount of H^+ in the blood?
A. H^+ will increase.
B. H^+ will decrease.
C. H^+ will be unchanged.

Bloom's Level: 2. Understand
Learning Outcome: 02.02F. Describe the factors that can affect the rate of chemical reactions.
Section: 02.02
Topic: Chemistry

44. The hydrogen and oxygen atoms in a molecule of water are held together by
A. ionic bonds.
B. peptide bonds.
C. savings bonds.
D. polar covalent bonds.
E. nonpolar bonds.

Bloom's Level: 1. Remember
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.03
Topic: Chemistry

45. A group of water molecules are held together by
A. salt.
B. hydrogen bonds.
C. ionic bonds.
D. double covalent bonds.
E. polar covalent bonds.

Bloom's Level: 1. Remember
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.03
Topic: Chemistry

46. The molecular formula H_2O means
A. 1 hydrogen atom and 2 oxygen atoms.
B. 1 hydrogen atom and 1 oxygen atom.
C. 2 hydrogen atoms and 1 oxygen atom.
D. 2 hydrogen atoms and 2 oxygen atoms.
E. None of these choices is correct.

Bloom's Level: 2. Understand
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.03
Topic: Chemistry

47. For most chemical reactions, an increase in temperature will cause the reaction rate to
A. increase.
B. decrease.
C. remain unchanged.

Bloom's Level: 2. Understand
Learning Outcome: 02.02F. Describe the factors that can affect the rate of chemical reactions.
Section: 02.02
Topic: Chemistry

48. A substance that will increase the rate of a chemical reaction without being permanently changed is called a/an
A. solute.
B. catalyst.
C. oxidator.
D. reducing agent.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.02F. Describe the factors that can affect the rate of chemical reactions.
Section: 02.02
Topic: Chemistry

49. Enzymes are proteins that increase the rate of chemical reactions by
A. increasing the activation energy of the reaction.
B. decreasing the activation energy of the reaction.
C. adjusting the temperature of the reaction.
D. increasing the concentration of the reactants.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.02F. Describe the factors that can affect the rate of chemical reactions.
Section: 02.02
Topic: Chemistry

50. The presence of water in our bodies allows us to
A. cool the body with sweat.
B. maintain a fairly constant body temperature.
C. provide an environment for chemical reactions.
D. keep tissues moist and reduce friction.
E. All of these choices are correct.

Bloom's Level: 1. Remember
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.03
Topic: Chemistry

51. Which of the following statements is false?
A. Water allows the body to resist sudden temperature changes.
B. Water transports nutrients in the body.
C. Water serves as an effective lubricant in our bodies.
D. Water evaporation cools the body.
E. Water evaporation heats the body.

Bloom's Level: 2. Understand
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.03
Topic: Chemistry

52. Substances dissolved in the liquid portion of a solution are called
A. solutes.
B. solvents.
C. catalysts.
D. osmoles.
E. insoluble.

Bloom's Level: 1. Remember
HAPS Objective: C03.02 Distinguish among the terms solution, solute, solvent, colloid suspension, and emulsion.
Section: 02.03
Topic: Chemistry

53. A solution that contains one osmole of solute in one kilogram (kg) of water is called a
A. 1% solution.
B. 1 molar solution.
C. 10% solution.
D. 1 osmolal solution.
E. None of these choices are correct.

Bloom's Level: 1. Remember
HAPS Objective: C03.02 Distinguish among the terms solution, solute, solvent, colloid suspension, and emulsion.
Section: 02.03
Topic: Chemistry

54. Two solutions, A and B, have the same osmolality.
A. Solution A has more solute particles than solution B.
B. Solution B has more solute particles than solution A.
C. Both solutions have the same number of solute particles.
D. Solution A is water and sugar, solution B is water and salt.
E. Solution A is pure water and solution B is water and salt.

Bloom's Level: 2. Understand
HAPS Objective: C03.02 Distinguish among the terms solution, solute, solvent, colloid suspension, and emulsion.
Section: 02.03
Topic: Chemistry

55. Why is water involved in most metabolic reactions in the human body?
A. It can dissolve many chemical compounds.
B. It can absorb and release heat without changing temperature very much.
C. It has a high surface tension.
D. Its bonds are nonpolar.
E. It is a solute.

Bloom's Level: 1. Remember
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.03
Topic: Chemistry

56. Hyperventilation causes the loss of large amounts of carbon dioxide from the body, decreasing the amount of hydrogen ions in solution. As a result,
A. the pH of body fluids will rise.
B. the pH of body fluids will fall.
C. the pH of body fluids will become neutral.
D. the pH of body fluids will not be affected.
E. None of these choices is correct.

Bloom's Level: 2. Understand
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03C. Describe the pH scale and its relationship to acidic, basic and neutral solutions.
Section: 02.03
Topic: Chemistry

57. A base is a proton
A. donor.
B. converter.
C. acceptor.
D. creator.
E. Both acceptor and creator.

Bloom's Level: 1. Remember
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03C. Describe the pH scale and its relationship to acidic, basic and neutral solutions.
Section: 02.03
Topic: Chemistry

58. Which of the following is a proton donor?
A. an acid
B. a base
C. a salt
D. glucose
E. a neutral substance

Bloom's Level: 1. Remember
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03C. Describe the pH scale and its relationship to acidic, basic and neutral solutions.
Section: 02.03
Topic: Chemistry

59. Solution A increases its acidity. This means that the
A. solution is closer to neutrality.
B. pH of the solution has increased.
C. solution will now accept more protons.
D. number of hydrogen ions has decreased.
E. number of hydrogen ions has increased.

Bloom's Level: 2. Understand
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03C. Describe the pH scale and its relationship to acidic, basic and neutral solutions.
Section: 02.03
Topic: Chemistry

60. The pH value
A. increases with acidity.
B. is measured on a scale from 0 to 10.
C. is determined by the concentration of hydrogen ions.
D. reflects the sodium content of body fluids.
E. decreases with alkalinity.

Bloom's Level: 1. Remember
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03C. Describe the pH scale and its relationship to acidic, basic and neutral solutions.
Section: 02.03
Topic: Chemistry

61. Solution A has a pH of 10 and solution B has a pH of 2. Which of the following statements about these solutions is true?
A. Solution A and solution B are both basic.
B. Solution B is basic.
C. Solution A is acidic.
D. Solution B has a higher hydrogen ion concentration than solution A.
E. Solution A has a higher hydrogen ion concentration than solution B.

Bloom's Level: 3. Apply
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03C. Describe the pH scale and its relationship to acidic, basic and neutral solutions.
Section: 02.03
Topic: Chemistry

62. A buffer will
A. enhance changes in the pH of the solutions.
B. resist drastic changes in the pH of the solutions.
C. have no effect on the pH of the solutions.
D. make a solution more acidic.
E. make a solution more basic.

Bloom's Level: 1. Remember
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03D. Explain the importance of buffers in organisms.
Section: 02.03
Topic: Chemistry

63. Normal blood pH is maintained within a range of
A. 7.35 - 8.5.
B. 7.35 - 7.45.
C. 4.5 - 5.5.
D. 1.0 - 14.0.
E. 6.5 - 9.5.

Bloom's Level: 1. Remember
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03D. Explain the importance of buffers in organisms.
Section: 02.03
Topic: Chemistry

64. Normal pH range for blood is 7.35 to 7.45. If blood pH falls below 7.35,
A. an imbalance called alkalosis results.
B. nothing happens as this is an acceptable deviation.
C. an imbalance called acidosis results.
D. the blood becomes saltier.
E. the number of red blood cells decreases.

Bloom's Level: 1. Remember
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03D. Explain the importance of buffers in organisms.
Section: 02.03
Topic: Chemistry

65. Normal pH for blood is 7.35 to 7.45. Maintenance of the pH in this range is
A. critical because enzymes work best within narrow ranges of pH.
B. not critical because extreme pH values do not affect enzyme function.
C. called denaturation.
D. not required.
E. None of these choices is correct.

Bloom's Level: 1. Remember
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03D. Explain the importance of buffers in organisms.
Section: 02.03
Topic: Chemistry

66. What particle is formed when an acid loses a proton (H+)?
A. buffer
B. conjugate acid
C. salt
D. conjugate base

Bloom's Level: 1. Remember
HAPS Objective: C03.04 Define the terms pH, acid, base, and buffer and give examples of physiological significance.
Learning Outcome: 02.03C. Describe the pH scale and its relationship to acidic, basic and neutral solutions.
Section: 02.03
Topic: Chemistry

67. What molecule is produced as a waste product of the metabolism of glucose by cells?
A. water
B. oxygen
C. carbon dioxide
D. carbon monoxide
E. nitrogen

Bloom's Level: 1. Remember
Learning Outcome: 02.03E. Compare the roles of oxygen and carbon dioxide in the body.
Section: 02.03
Topic: Chemistry

68. Which of the following is an organic compound?
A. hydrochloric acid (HCl)
B. salt (NaCl)
C. sucrose ($C_{12}H_{22}O_{11}$)
D. water (H_2O)
E. None of these choices are correct.

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

69. Large carbohydrates are formed from smaller units called
A. phosphate groups.
B. monosaccharides.
C. amino acids.
D. steroids.
E. lipids.

Bloom's Level: 1. Remember
HAPS Objective: C04.04a Identify the monomers and polymers of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

70. Which of the following is a carbohydrate?
A. triglyceride
B. hemoglobin
C. cholesterol
D. animal fat
E. sucrose

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

71. Polysaccharides
A. are formed when sucrose and glucose combine.
B. are the smallest carbohydrates.
C. contain carbon, hydrogen, and phosphate atoms.
D. contain long chains of monosaccharides.
E. are not found in plants.

Bloom's Level: 1. Remember
HAPS Objective: C04.04a Identify the monomers and polymers of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

72. Consider the following five terms. Which term does not belong with the other four terms?

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

Bloom's Level: 2. Understand
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

73. Which of the following lists includes only monosaccharides that are isomers of one another?
A. glycogen, glucose, sucrose
B. starch, glycogen, cellulose
C. glucose, fructose, galactose
D. ribose, glycogen, glucose
E. deoxyribose, glycogen, starch

Bloom's Level: 1. Remember
HAPS Objective: C04.04a Identify the monomers and polymers of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

74. The molecule used most frequently by cells as a fuel belongs to which of the following groups?
A. prostaglandins
B. carbohydrates
C. nucleic acids
D. steroids
E. phospholipids

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

75. Glucose is the
A. storage carbohydrate in animals.
B. storage carbohydrate in plants.
C. nondigestible plant polysaccharide.
D. major nutrient for most body cells.
E. sugar found in RNA.

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

76. Glycogen is the
A. storage carbohydrate in animals.
B. storage carbohydrate in plants.
C. nondigestible plant polysaccharide.
D. major nutrient for most body cells.
E. sugar found in RNA.

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

77. Ribose is the
A. storage carbohydrate in animals.
B. storage carbohydrate in plants.
C. nondigestible plant polysaccharide.
D. major nutrient for most body cells.
E. sugar found in RNA and ATP.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

78. Starch is the
A. storage carbohydrate in animals.
B. storage carbohydrate in plants.
C. nondigestible plant polysaccharide.
D. major nutrient for most body cells.
E. sugar found in RNA.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

79. Cellulose is the
A. storage carbohydrate in animals.
B. storage carbohydrate in plants.
C. nondigestible plant polysaccharide.
D. major nutrient for most body cells.
E. sugar found in RNA.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

80. Deoxyribose is a sugar found in
A. glycogen.
B. starch.
C. DNA.
D. RNA.
E. ATP.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

81. Which of the following is NOT a function of carbohydrates in the body?
A. structural component of DNA
B. protection
C. bulk in feces
D. energy
E. structural component of RNA

Bloom's Level: 2. Understand
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

82. Lipids
A. are subunits of carbohydrates.
B. serve as buffers.
C. are an important component of cell membranes.
D. tend to be water soluble.
E. are polarized.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

83. Triglycerides are composed of
A. monosaccharides.
B. amino acids.
C. nucleotides.
D. glycerol and fatty acids.
E. None of these choices are correct.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

84. Fatty acid A has 10 double covalent bonds scattered throughout its carbon chain while fatty acid B has only single covalent bonds between the carbons in its chain.
A. Fatty acid A is saturated.
B. Fatty acid B is unsaturated.
C. Both fatty acids are saturated.
D. Both fatty acids are unsaturated.
E. Fatty acid B is saturated.

Bloom's Level: 2. Understand
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

85. Which of the following would be classified as a lipid?
A. cholesterol-a steroid
B. alanine-an amino acid
C. starch-a polysaccharide
D. catalase-an enzyme
E. sucrose-a disaccharide

Bloom's Level: 2. Understand
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

86. All of the following terms relate to lipids. Which does not belong with the other four?
A. cholesterol
B. estrogen
C. steroid
D. triglyceride
E. bile salts

Bloom's Level: 2. Understand
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

87. Phospholipids
A. contain subunits called amino acids.
B. are water-soluble.
C. are a type of steroid.
D. are fat-soluble vitamins.
E. are found in cell membranes.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C07.01 Describe how lipids are distributed in a cell membrane, and explain their functions.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

88. Lipids
A. can insulate and help prevent heat loss.
B. yield little energy per unit of weight.
C. function as enzymes.
D. are all water soluble.
E. comprise the genetic material of cells.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

89. Eicosanoids
A. are structural proteins.
B. are fat-soluble vitamins.
C. are components of the plasma membrane.
D. comprise the genetic material.
E. play a role in the response of tissues to injuries.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

90. An example of a fat-soluble vitamin is
A. vitamin C.
B. vitamin D.
C. vitamin B.
D. vitamin F.
E. vitamin H.

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples 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.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

91. Which of the following molecules is NOT made from cholesterol?
A. estrogen
B. bile salts
C. testosterone
D. prostaglandins
E. progesterone

Bloom's Level: 2. Understand
HAPS Objective: C04.04c Provide specific examples 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.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

92. Phospholipids have a hydrophilic end which is
A. polar and water-insoluble.
B. polar and water-soluble.
C. nonpolar and water -insoluble.
D. nonpolar and water-soluble.

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

93. Which function of proteins is NOT correctly matched with the example?
A. transport – hemoglobin
B. structure – collagen and keratin
C. regulation – enzymes and hormones
D. protection – packing around organs and glands
E. contraction – actin and myosin in muscles

Bloom's Level: 2. Understand
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

94. Which of the following is NOT true of enzymes?
A. They are catalysts that increase the rate of a reaction.
B. One enzyme can have many reactions.
C. They may need a cofactor to be functional.
D. The active site has a specific shape to match the reactant(s).
E. A slight change in shape can effect function.

Bloom's Level: 2. Understand
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.
Learning Outcome: 02.04B. Explain how enzymes work.
Section: 02.04
Topic: Chemistry

95. An organic molecule consists of carbon, hydrogen, oxygen, nitrogen, and sulfur; the molecule is probably
A. carbon dioxide.
B. an amino acid.
C. a triglyceride (fat).
D. a monosaccharide.
E. a phospholipid.

Bloom's Level: 2. Understand
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

96. The building blocks of proteins are
A. triglycerides.
B. phospholipids.
C. amino acids.
D. monosaccharides.
E. eicosanoids.

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

97. Proteins
A. are the body's source of immediate energy.
B. are the building blocks of nucleotides.
C. provide much of the structure of body cells and tissues.
D. contain the genetic information of the cell.
E. insulate and cushion the body.

Bloom's Level: 1. Remember
HAPS Objective: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

98. Adjacent amino acids in a polypeptide chain are held together by
A. hydrogen bonds.
B. ionic bonds.
C. Van der Waals bonds.
D. peptide bonds.
E. high energy bonds.

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

99. Which of the following is a source of nitrogen for the body?
A. carbohydrates
B. water
C. proteins
D. glucose
E. lipids

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

100. The primary structure of a protein is
A. the number of polypeptide chains in the molecule.
B. the sequence of amino acids in the polypeptide chain.
C. the folded, helical nature of the molecule.
D. represented by multiple polypeptide chains.
E. the hydrogen bonds between amino acids.

Bloom's Level: 1. Remember
HAPS Objective: C04.05 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

101. Denaturation is
A. a combination of atoms held together by chemical bonds.
B. a positively charged ion.
C. a negatively charged ion.
D. a substance that conducts electricity when placed in solution.
E. a change in the three-dimensional structure of a protein.

Bloom's Level: 1. Remember
HAPS Objective: C04.05 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

102. The minimum energy required to start a chemical reaction
A. moves in energy surges.
B. results from random molecular movement.
C. comes from ionic energy motion.
D. is elevated by a catalyst.
E. can be lowered by enzymes.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.04B. Explain how enzymes work.
Section: 02.04
Topic: Chemistry

103. An enzyme
A. has a two-dimensional shape.
B. is permanently changed in a chemical reaction.
C. increases the activation energy needed in a chemical reaction.
D. is a protein catalyst.
E. cannot be denatured.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.04B. Explain how enzymes work.
Section: 02.04
Topic: Chemistry

104. Which of the following is the correct sequence from largest to smallest?
A. amino acid, cell, protein, atom
B. amino acid, atom, cell, protein
C. cell, protein, amino acid, atom
D. atom, amino acid, protein, cell
E. protein, cell, amino acid, atom

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

105. Which of the following is determined by sequence of amino acids bound by peptide bonds?
A. amino acid
B. peptide bond
C. primary structure of protein
D. secondary structure of protein
E. denaturation

Bloom's Level: 1. Remember
HAPS Objective: C04.05 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

106. Which of the following means a change in shape of a protein?
A. amino acid
B. peptide bond
C. primary structure of protein
D. secondary structure of protein
E. denaturation

Bloom's Level: 1. Remember
HAPS Objective: C04.05 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

107. What type of covalent bond is formed between amino acid molecules during protein synthesis?
A. amino bond
B. peptide bond
C. primary bond
D. hydrogen bond
E. electrovalent bond

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

108. What is the building block molecule of a protein?
A. amino acid
B. nucleic acid
C. monosaccharide
D. glycerol
E. fatty acid

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

109. What protein structure results from folding or coiling of a polypeptide chain caused by hydrogen bonds between amino acids?
A. quaternary structure
B. tertiary structure
C. secondary structure
D. primary structure
E. peptide structure

Bloom's Level: 1. Remember
HAPS Objective: C04.05 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

110. Which of the following is mismatched?
A. ribose--RNA
B. enzyme--protein
C. cholesterol--nucleic acid
D. triglyceride--fat
E. eicosanoid--prostaglandin

Bloom's Level: 2. Understand
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

111. An organic molecule such as a vitamin that makes an enzyme functional is called a/an
A. buffer.
B. coactivator.
C. catalyst.
D. coenzyme.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.04B. Explain how enzymes work.
Section: 02.04
Topic: Chemistry

112. The model that helps explain how an enzyme works is the
A. activation model.
B. lock-and-key model.
C. three-dimensional model.
D. denaturation model.

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.04B. Explain how enzymes work.
Section: 02.04
Topic: Chemistry

113. Nucleotides
A. are part of DNA molecules but not RNA molecules.
B. hold the nucleus together.
C. are the building blocks of nucleic acids.
D. are proteins that function as enzymes.
E. have nothing to do with the genetic information in the nucleus.

Bloom's Level: 1. Remember
HAPS Objective: C04.04a Identify the monomers and polymers of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

114. Which of the following is a component of a nucleotide?
A. adenine--a nitrogen base
B. glucose--a monosaccharide
C. cholesterol--a steroid
D. calcium ions
E. ATP

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

115. DNA
A. must travel to ribosomes to function.
B. contains the sugar deoxyribose.
C. is a single-stranded molecule.
D. is one of several amino acids.
E. assembles amino acids to make proteins..

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

116. Which of the following nitrogen bases is found in RNA but not DNA?
A. adenine
B. guanine
C. thymine
D. uracil
E. cytosine

Bloom's Level: 1. Remember
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

117. Arrange the following from largest to smallest:
(1) nucleus
(2) DNA molecule
(3) skin cell
(4) chicken eggs
A. 1, 2, 3, 4
B. 4, 3, 1, 2
C. 3, 4, 2, 1
D. 2, 3, 1, 4
E. 4, 2, 3, 1

Bloom's Level: 2. Understand
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

118. Which of the following statements best describes RNA?
A. RNA is found outside a cell.
B. RNA contains the base thymine.
C. RNA is a single-stranded molecule.
D. RNA molecules are antiparallel.
E. RNA is a double helix.

Bloom's Level: 2. Understand
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

119. Which of the following lists the components of a nucleotide?
A. phosphate—lipid—organic base
B. monosaccharide—organic base—sucrose
C. phosphate—monosaccharide—organic base
D. phosphate—sucrose—amino acid
E. monosaccharide—amino acid—phosphate

Bloom's Level: 1. Remember
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.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

120. Which of the following is the correct complementary strand to CATGTC?
A. GTACAG
B. CATGTC
C. GUACAG
D. AGCACA
E. TCGTAT

Bloom's Level: 3. Apply
HAPS Objective: C04.04b Compare and contrast general molecular structure of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

121. ATP
A. is a nucleotide found in DNA.
B. stores genetic information.
C. is a sugar found in transfer RNA.
D. serves as the energy currency of the cell.
E. can store, but cannot release energy in the cell.

Bloom's Level: 1. Remember
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

122. ATP
A. can be synthesized from ADP.
B. stores and releases energy in the cell.
C. is associated with a reversible reaction.
D. is associated with anabolism and catabolism.
E. All of these choices are correct.

Bloom's Level: 1. Remember
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

123. Which of the following chemical reactions best represents the synthesis of ATP?
A. $ATP + H_2O \rightarrow ADP + P_i + energy$
B. $ADP + P_i + energy \rightarrow ATP + H_2O$
C. $ADP + ADP + ADP \rightarrow ATP + energy$
D. $ATP + energy \rightarrow ADP + H_2O$
E. $ATP + ADP \rightarrow ATP$

Bloom's Level: 2. Understand
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

124. Which of the following chemical reactions best represents the decomposition of ATP?
A. ATP + ADP $\rightarrow$ ATP
B. ADP + ADP + ADP $\rightarrow$ ATP
C. ATP + energy $\rightarrow$ ADP + H_2O
D. ADP + P_i + energy $\rightarrow$ ATP + H_2O
E. ATP + H_2O $\rightarrow$ ADP + P_i + energy

Bloom's Level: 2. Understand
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.
Learning Outcome: 02.04C. Describe the roles of nucleotides in the structures and functions of DNA, RNA, and ATP.
Section: 02.04
Topic: Chemistry

125. Which of the following organic groups does an enzyme belong to?
A. carbohydrate
B. protein
C. lipid
D. nucleic acid
E. vitamin

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04B. Explain how enzymes work.
Section: 02.04
Topic: Chemistry

126. Which of the following organic groups does a steroid belong to?
A. carbohydrate
B. protein
C. lipid
D. nucleic acid
E. vitamin

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

127. Which of the following organic groups does lactose belong to?
A. carbohydrate
B. protein
C. lipid
D. nucleic acid
E. vitamin

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

128. Which of the following organic groups does DNA belong to?
A. carbohydrate
B. protein
C. lipid
D. nucleic acid
E. vitamin

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

129. Which of the following organic groups does hemoglobin belong to?
A. carbohydrate
B. protein
C. lipid
D. nucleic acid
E. vitamin

Bloom's Level: 1. Remember
HAPS Objective: C04.04c Provide specific examples of carbohydrates, proteins, lipids and nucleic acids.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

130. Which of the following is NOT a possible product of a nuclear reaction to form a more stable nucleus?
A. gamma ray
B. alpha particle
C. X-ray
D. beta particle

Bloom's Level: 2. Understand
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01C. Name the subatomic particles of an atom, and indicate their mass, charge and location in an atom.
Section: 02.01
Topic: Chemistry

131. Which of the following is a use of radioactive isotopes?
A. treat cancer
B. diagnose disorders
C. sterilize materials
D. All of these choices are correct.

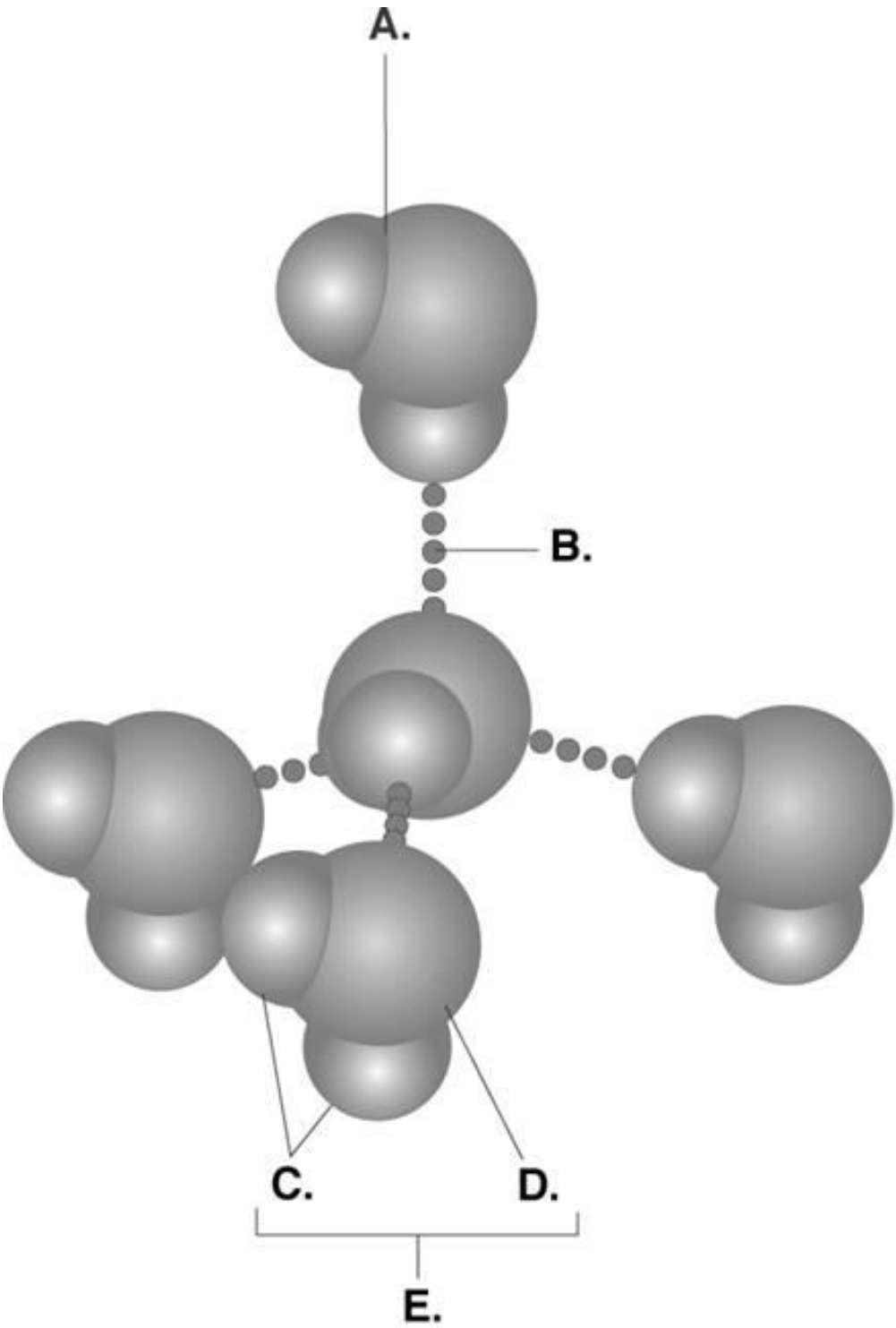
Bloom's Level: 1. Remember
HAPS Objective: C01.02 Compare and contrast the terms ions, electrolytes, free radicals, isotopes and radioisotopes.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

132. X-rays can be used to view bones because
A. x-rays pass through bone.
B. x-rays react with bone.
C. x-rays can not pass through bone.
D. bones are less dense than soft tissue.

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

133. Why are cyanide compounds lethal to humans?
A. They interfere with protein synthesis.
B. They interfere with nerve impulses.
C. They interfere with the production of ATP.
D. They interfere with muscle contraction.
E. All of these occur with cyanide poisoning.

Bloom's Level: 1. Remember
HAPS Objective: C05.01 Describe the generalized reversible reaction for release of energy from ATP and explain the role of ATP in the cell.
Section: 02.04
Topic: Chemistry



Bloom's Level: 1. Remember
Figure: 02.07
Section: 02.01
Topic: Chemistry

134. Water accounts for 50% of the weight of a young adult female and 60% of a young adult male. What kind of bond is found at "A"?
A. hydrogen bond
B. water molecule
C. oxygen atom
D. hydrogen atom
E. polar covalent bond

Bloom's Level: 1. Remember
Figure: 02.07
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.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry

135. Water accounts for 50% of the weight of a young adult female and 60% of a young adult male. What kind of bond is found at "B"?
A. hydrogen bond
B. water molecule
C. oxygen atom
D. hydrogen atom
E. polar covalent bond

Bloom's Level: 1. Remember
Figure: 02.07
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.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry

136. Water accounts for 50% of the weight of a young adult female and 60% of a young adult male. What kind of atom is found at "C"?
A. hydrogen bond
B. water molecule
C. oxygen atom
D. hydrogen atom
E. polar covalent bond

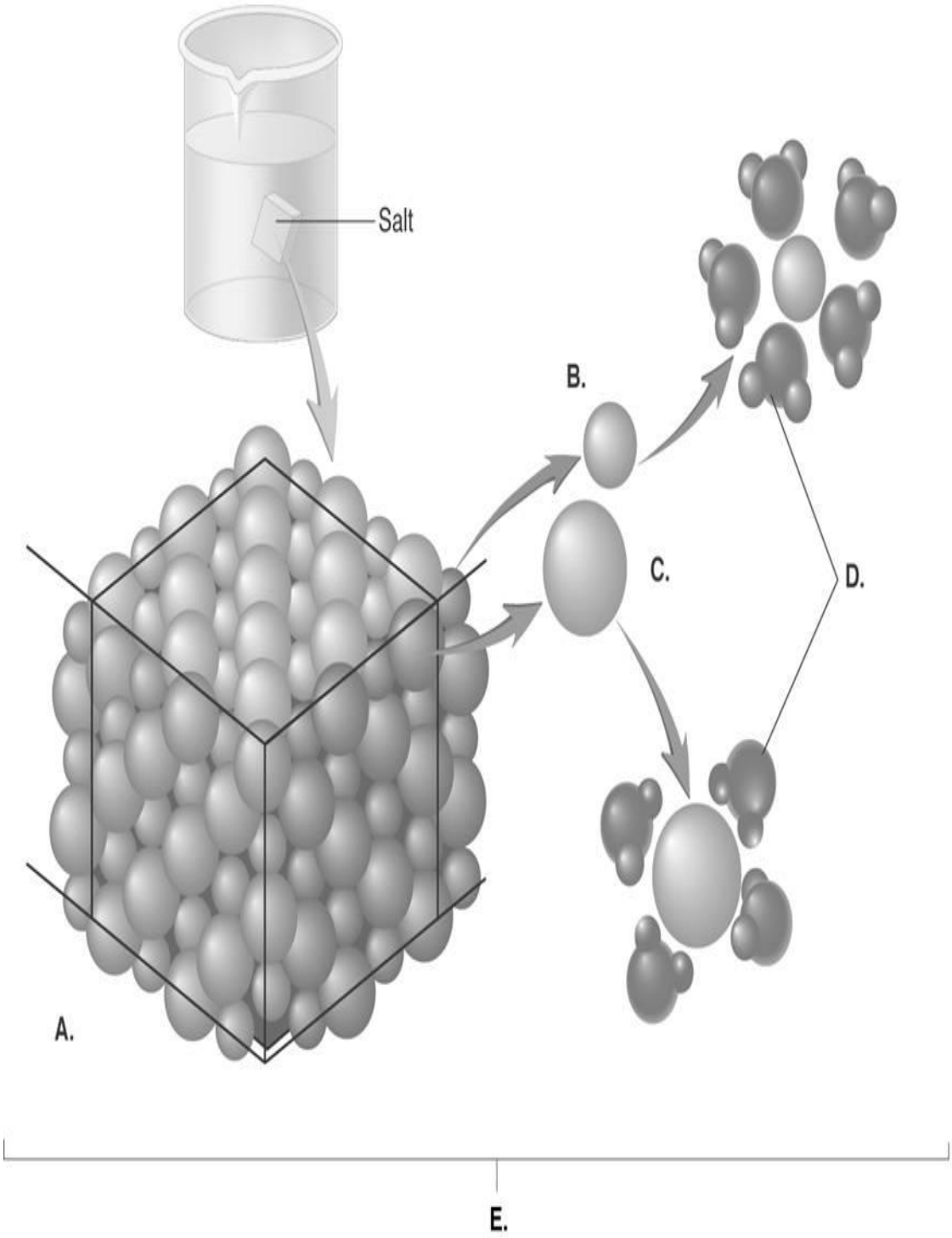
Bloom's Level: 1. Remember
Figure: 02.07
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C02.01c Provide biologically significant examples of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry

137. Water accounts for 50% of the weight of a young adult female and 60% of a young adult male. What kind of atom is found at "D"?
A. hydrogen bond
B. water molecule
C. oxygen atom
D. hydrogen atom
E. polar covalent bond

Bloom's Level: 1. Remember
Figure: 02.07
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.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry

138. Water accounts for 50% of the weight of a young adult female and 60% of a young adult male. What kind of molecule is found at "E"?
A. hydrogen bond
B. water molecule
C. oxygen atom
D. hydrogen atom
E. polar covalent bond

Bloom's Level: 1. Remember
Figure: 02.07
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.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry



Bloom's Level: 1. Remember
Figure: 02.08
Section: 02.01
Topic: Chemistry

139. The sodium chloride molecule breaks apart in water. What does "A" represent?
A. chloride ion
B. dissociation
C. water molecule
D. sodium ion
E. salt crystal

Bloom's Level: 1. Remember
Figure: 02.08
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: C03.03 Define the term salt and give examples of physiological significance.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry

140. The sodium chloride molecule breaks apart in water. What does "B" represent?
A. chloride ion
B. dissociation
C. water molecule
D. sodium ion
E. salt crystal

Bloom's Level: 1. Remember
Figure: 02.08
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: C03.03 Define the term salt and give examples of physiological significance.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry

141. The sodium chloride molecule breaks apart in water. What does "C" represent?
A. chloride ion
B. dissociation
C. water molecule
D. sodium ion
E. salt crystal

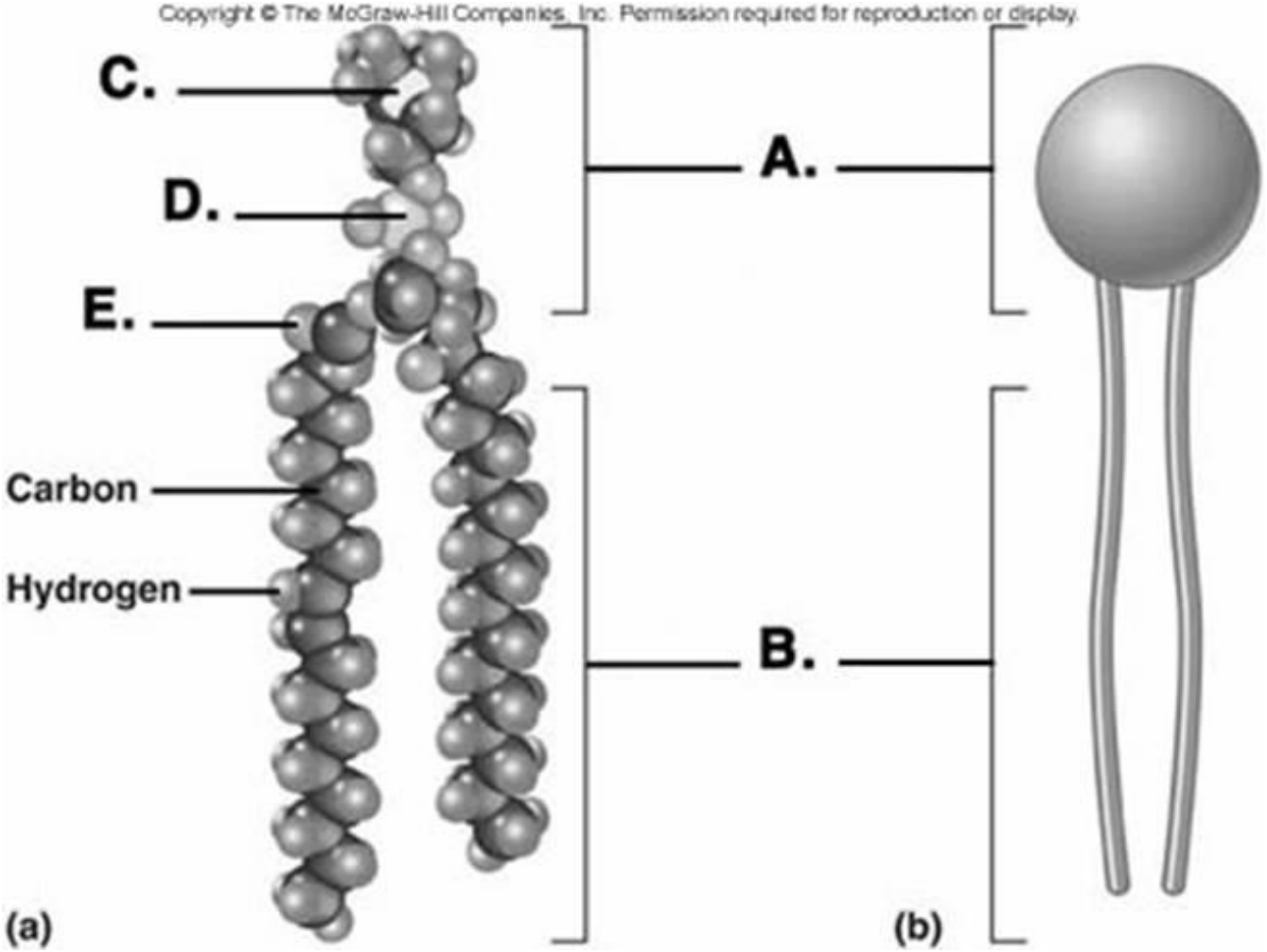
Bloom's Level: 1. Remember
Figure: 02.08
HAPS Objective: C02.01b Explain the mechanism of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C02.01c Provide biologically significant examples of each type of non-polar covalent, polar covalent, ionic, and hydrogen bonds.
HAPS Objective: C03.01 Discuss the physiologically important properties of water.
HAPS Objective: C03.03 Define the term salt and give examples of physiological significance.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry

142. The sodium chloride molecule breaks apart in water. What does "D" represent?
A. chloride ion
B. dissociation
C. water molecule
D. sodium ion
E. salt crystal

Bloom's Level: 1. Remember
Figure: 02.08
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: C03.03 Define the term salt and give examples of physiological significance.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry

143. The sodium chloride molecule breaks apart in water. What does "E" represent (the process)?
A. chloride ion
B. dissociation
C. water molecule
D. sodium ion
E. salt crystal

Bloom's Level: 1. Remember
Figure: 02.08
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: C03.03 Define the term salt and give examples of physiological significance.
Learning Outcome: 02.01E. Compare and contrast ionic and covalent bonds.
Learning Outcome: 02.01G. Explain what creates a hydrogen bond and relate its importance.
Learning Outcome: 02.03B. Describe how the properties of water contribute to its physiological functions.
Section: 02.01
Topic: Chemistry



Bloom's Level: 1. Remember
Figure: 02.18
Section: 02.04
Topic: Chemistry

144. Phospholipids are important components of the plasma membrane. What does "A" represent on the diagram?
A. phosphorus
B. oxygen
C. nitrogen
D. polar (hydrophilic) region
E. nonpolar (hydrophobic) region

Bloom's Level: 1. Remember
Figure: 02.18
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: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C07.01 Describe how lipids are distributed in a cell membrane, and explain their functions.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

145. Phospholipids are important components of the plasma membrane. What does "B" represent on the diagram?
A. phosphorus
B. oxygen
C. nitrogen
D. polar (hydrophilic) region
E. nonpolar (hydrophobic) region

Bloom's Level: 1. Remember
Figure: 02.18
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: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C07.01 Describe how lipids are distributed in a cell membrane, and explain their functions.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

146. Phospholipids are important components of the plasma membrane. What does "C" represent on the diagram?
A. phosphorus
B. oxygen
C. nitrogen
D. polar (hydrophilic) region
E. nonpolar (hydrophobic) region

Bloom's Level: 1. Remember
Figure: 02.18
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: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C07.01 Describe how lipids are distributed in a cell membrane, and explain their functions.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

147. Phospholipids are important components of the plasma membrane. What does "D" represent on the diagram?
A. phosphorus
B. oxygen
C. nitrogen
D. polar (hydrophilic) region
E. nonpolar (hydrophobic) region

Bloom's Level: 1. Remember
Figure: 02.18
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: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C07.01 Describe how lipids are distributed in a cell membrane, and explain their functions.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

148. Phospholipids are important components of the plasma membrane. What does "E" represent on the diagram?
A. phosphorus
B. oxygen
C. nitrogen
D. polar (hydrophilic) region
E. nonpolar (hydrophobic) region

Bloom's Level: 1. Remember
Figure: 02.18
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: C04.04e Discuss physiological and structural roles in the human body of carbohydrates, proteins, lipids and nucleic acids.
HAPS Objective: C07.01 Describe how lipids are distributed in a cell membrane, and explain their functions.
Learning Outcome: 02.04A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.
Section: 02.04
Topic: Chemistry

Fill in the Blank Questions

149. The newly discovered element "zinferon" has a mass number of 425 and contains 125 protons. How many neutrons does an atom of this element contain?
300

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

150. The newly discovered element "zinferon" has a mass number of 425 and contains 125 protons. What is the atomic number of "zinferon"?
125

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

151. The element uranium has a mass number of 238 and contains 92 protons. How many electrons does an atom of uranium have?
92

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

152. The element uranium has a mass number of 238 and contains 92 protons. How many neutrons does an atom of uranium have?
146

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

153. The element uranium has a mass number of 238 and contains 92 protons. What is the atomic number of uranium?
92

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

154. Cobalt—60 is used for radiation treatments of cancer. What is the atomic number of Co-60?
27

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

155. Cobalt—60 is used for radiation treatments of cancer. What is the mass number of Co-60?
60

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

156. Cobalt—60 is used for radiation treatments of cancer. How many electrons does an atom of Co-60 have?
27

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

157. Cobalt—60 is used for radiation treatments of cancer. How many protons does an atom of Co-60 have?
27

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry

158. Cobalt—60 is used for radiation treatments of cancer. How many neutrons does an atom of Co-60 have?
33

Bloom's Level: 3. Apply
HAPS Objective: C01.01d Distinguish among the terms atomic number, mass number and atomic weight with respect to the structure of an atom.
Learning Outcome: 02.01D. Define atomic number, mass number, isotope, atomic mass and mole.
Section: 02.01
Topic: Chemistry