

Package Title: Testbank
Course Title: PAP14
Chapter Number: 02

Question type: Multiple Choice

1) What are the four major elements found in the chemicals that comprise the human body?

- a) nitrogen, oxygen, calcium, sodium
- b) hydrogen, carbon, phosphorus, calcium
- c) carbon, hydrogen, oxygen and nitrogen
- d) oxygen, nitrogen, potassium, calcium
- e) potassium, phosphorus, sodium, hydrogen

Answer: c

Difficulty: Easy

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

2) The three types of subatomic particles that are important for understanding chemical reactions in the human body are

- a) neutrons, quarks, and muons.
- b) protons, neutrons, and electrons.
- c) muons, positons, and neutrons.
- d) electrons, quarks, and protons.
- e) positons, protons, and neutrons.

Answer: b

Difficulty: Easy

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

3) Which of the following subatomic particles has a neutral charge?

- a) neutron
- b) electron
- c) proton
- d) Both neutron and electron.
- e) All of these choices.

Answer: a

Difficulty: Easy

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

4) What region of an atom contains the protons and neutrons?

- a) cloud
- b) nucleus
- c) element
- d) ring
- e) shell

Answer: b

Difficulty: Easy

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

5) The number of protons in an atom is represented by an element's

- a) mass number.
- b) atomic number.
- c) atomic mass.
- d) valence number.
- e) None of these choices.

Answer: b

Difficulty: Easy

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

6) The nucleus of unstable _____ of an element will decay leading to emission of radiation.

- a) compounds
- b) cations
- c) anions
- d) isotopes
- e) molecules

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

7) This refers to a weighted average of the atomic weights of all naturally occurring isotopes of an element.

- a) mass number
- b) atomic number
- c) atomic mass
- d) ionic mass
- e) covalent mass

Answer: c

Difficulty: Medium

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Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

Question type: Essay

8) Describe a beneficial use of radiation.

Answer:

Difficulty: Medium

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Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

Solution: Radiation can be used for medical imaging, as tracers to follow chemicals in the body, and as treatments for certain types of cancers.

9) Briefly describe the octet rule.

Answer:

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

Solution: One atom is more likely to interact with another atom if doing so will leave both atoms with eight electrons in their valence shells.

Question type: Multiple Choice

10) Which of the following subatomic particles are shared by two atoms to form covalent bonds?

1. neutron
2. electron
3. proton

- a) 1 only
- b) 2 only
- c) 3 only
- d) 2 & 3 only
- e) 1, 2 & 3

Answer: b

Difficulty: Medium

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Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

11) This is the name given to a negatively charged atom.

- a) superoxide
- b) isotope
- c) catalyst
- d) anion
- e) cation

Answer: d

Difficulty: Easy

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Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

12) A chemical that can conduct electrical current when dissolved in water is called a(n)

- a) isotope.
- b) isomer.
- c) compound.
- d) electrolyte
- e) valence molecule.

Answer: d

Difficulty: Easy

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

13) This type of chemical bond involves the sharing of valence electrons between two atoms.

- a) covalent
- b) ionic
- c) hydrogen
- d) atomic
- e) electronic

Answer: a

Difficulty: Easy

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

14) The chemical bonds formed between the atoms in a water molecule are called

- a) nonpolar covalent bonds.
- b) polar covalent bonds.
- c) hydrogen bonds.
- d) ionic bonds.
- e) atomic bonds.

Answer: b

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

Question type: Essay

15) Describe a hydrogen bond.

Answer:

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

Solution: Hydrogen bonds form between a hydrogen atom that has partial positive charge and another atom, like oxygen or nitrogen, carrying partial negative charge.

Question type: Multiple Choice

16) This relatively weak type of bond helps stabilize the three dimensional structure of large molecules like proteins and DNA?

- a) nonpolar covalent
- b) polar covalent
- c) hydrogen
- d) ionic
- e) atomic

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

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Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

17) A chemical reaction involves interactions between the _____ of two different atoms.

- a) neutrons
- b) protons
- c) isotopes
- d) valence electrons
- e) ions

Answer: d

Difficulty: Easy

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

18) This is defined as the capacity to do work.

- a) metabolism
- b) electrolytes
- c) chemical reaction
- d) concentration
- e) energy

Answer: e

Difficulty: Medium

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Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

Question type: Essay

19) Describe the law of conservation of energy.

Answer:

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

Solution: Energy cannot be created or destroyed but it may be converted from one form to another form.

Question type: Multiple Choice

20) This type of chemical reaction will absorb more energy than it releases.

- a) exergonic
- b) endergonic
- c) potential
- d) kinetic
- e) activation

Answer: b

Difficulty: Easy

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.3 Chemical reactions

21) An enzyme acts to

- a) raise the activation energy needed to start the reaction.
- b) lower the activation energy needed to start the reaction.
- c) convert the activation energy into potential energy.
- d) convert the activation energy into kinetic energy.
- e) stop a chemical reaction.

Answer: b

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.3 Chemical reactions

Question type: Essay

22) List three factors that increase the rate of chemical reactions.

Answer:

Difficulty: Hard

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.3 Chemical reactions

Solution: Three factors that increase reaction rates are the presence of enzymes (catalysts), increased concentration of reactants, and increased temperature.

Question type: Multiple Choice

23) This type of chemical reaction combines reactants to produce larger products.

- a) synthesis
- b) decomposition
- c) potential
- d) exchange
- e) activated

Answer: a

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.3 Chemical reactions

24) This type of chemical reaction breaks larger reactants into smaller products.

- a) synthesis
- b) decomposition
- c) potential
- d) exchange
- e) activated

Answer: b

Difficulty: Medium

Learning Objective 1: LO 2.3 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.3.5 Describe synthesis, decomposition, exchange, and reversible reactions.

Section Reference 1: 2.3 Chemical reactions

25) This is the most abundant and most important inorganic compound in the body.

- a) water
- b) oxygen gas
- c) carbon dioxide
- d) glucose
- e) DNA

Answer: a

Difficulty: Easy

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.4.1 Describe the properties of water and those of inorganic acids, bases, and salts.

Section Reference 1: 2.4 Inorganic Compounds and Solutions

26) A solute that readily dissolves in water is

- a) hydrophobic.
- b) hydrostatic.
- c) lipophilic.
- d) hydrophilic.
- e) hydrozone.

Answer: d

Difficulty: Easy

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.4.1 Describe the properties of water and those of inorganic acids, bases, and salts.

Section Reference 1: 2.4 Inorganic Compounds and Solutions

27) In the body fluid compartments found in the human body, the solvent is

- a) glucose.
- b) lipids.
- c) carbon dioxide.
- d) water.
- e) electrolyte.

Answer: d

Difficulty: Easy

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.4.1 Describe the properties of water and those of inorganic acids, bases, and salts.

Section Reference 1: 2.4 Inorganic Compounds and Solutions

Question type: Essay

28) Describe the functions of water in the body.

Answer:

Difficulty: Hard

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.4.1 Describe the properties of water and those of inorganic acids, bases, and salts.

Section Reference 1: 2.4 Inorganic Compounds and Solutions

Solution: Water is a solvent that allows transportation of solutes. Water acts in hydrolysis reactions to split reactants. Water can transport heat in the body and can be used to release heat from the body as occurs in sweating. Water is used as a lubricant, particularly in serous fluids like those surrounding the lungs and on mucosal membranes like those lining the gastrointestinal tract.

Question type: Multiple Choice

29) A solution with a pH value less than 7 is

- a) basic.
- b) neutral.
- c) acidic.
- d) alkaline.
- e) concentrated.

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.4.3 Define pH and explain the role of buffer systems in homeostasis.
Section Reference 1: 2.4 Inorganic Compounds and Solutions

30) A chemical compound that helps control the pH of a solution by adding or removing hydrogen ions is a(n)

- a) electrolyte.
- b) salt.
- c) cation.
- d) colloid.
- e) buffer.

Answer: e

Difficulty: Medium

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems. Learning Objective 2: LO 2.4.3 Define pH and explain the role of buffer systems in homeostasis. Section Reference 1: 2.4 Inorganic Compounds and Solutions

31) Which of the following is a proton donor?

- a) acid
- b) base
- c) salt
- d) organic compound
- e) colloid

Answer: a

Difficulty: Medium

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems. Learning Objective 2: LO 2.4.3 Define pH and explain the role of buffer systems in homeostasis. Section Reference 1: 2.4 Inorganic Compounds and Solutions

32) Specific arrangements of atoms within an organic molecule that confer characteristic chemical properties upon that molecule are called

- a) hydrocarbon chains.
- b) polymers.
- c) carbon skeleton.
- d) functional groups.

e) isomers.

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.1 Describe the functional groups of organic molecules.

Section Reference 1: 2.5 Organic Compounds

33) Glucose and fructose both have the chemical formula ($C_6H_{12}O_6$) so they are considered

a) isotopes.

b) polymers.

c) monomers.

d) isomers.

e) isogenic.

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

34) Which of the following is a monosaccharide that is used by cells to produce energy?

a) glucose

b) sucrose

c) lactose

d) glycogen

e) maltose

Answer: a

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

35) Which of the following is a polysaccharide that serves as a storage form of energy in muscle and liver cells?

- a) cellulose
- b) ribose
- c) lipids
- d) glucose
- e) glycogen

Answer: e

Difficulty: Easy

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

36) This type of fatty acid contains more than one double bond in its hydrocarbon chain.

- a) saturated
- b) monounsaturated
- c) polyunsaturated
- d) volatile
- e) short chain

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

37) This type of lipid is the body's primary long-term energy storage molecule.

- a) steroid
- b) phospholipid
- c) cholesterol
- d) triglyceride
- e) lipoprotein

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

38) This lipid is used by the body as a precursor for the production of steroid hormones.

- a) arachidonic acid
- b) phospholipid
- c) cholesterol
- d) triglyceride
- e) lipoprotein

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

39) Which of the following is NOT true about phospholipids?

- a) They contain a glycerol backbone.
- b) The head group is polar.
- c) The molecule is an important part of cell membranes.
- d) The tail groups are nonpolar.
- e) They are a major form of energy storage.

Answer: e

Difficulty: Hard

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

40) Prostaglandins and leukotrienes are
1 synthesized from cholesterol.
2 lipids.
3 eicosanoids.

- a) 1 only
- b) 2 only
- c) 3 only
- d) Both 2 and 3
- e) 1, 2 and 3

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Question type: Essay

41) Describe the structural characteristics of an amino acid.

Answer:

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Solution: Amino acids contain a central carbon atom with 1) a hydrogen atom, 2) an amino group, 3) an acidic carboxyl group, and 4) a side chain attached to it.

42) List the six major functions of proteins.

Answer:

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Solution: Proteins have 1) structural, 2) regulatory, 3) contractile, 4) immunological, 5) transport, and 6) catalytic functions.

Question type: Multiple Choice

43) The primary structure of a protein consists of

- a) alpha helices.
- b) beta-pleated sheets.
- c) three dimensional folded conformation.
- d) a sequence of amino acids linked by peptide bonds.
- e) the overall folded conformation of the protein's subunits.

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

44) Which of the following is NOT a property of enzymes?

- a) Enzymes are catalytic proteins.
- b) Enzymes are highly specific.
- c) Enzymes are efficient.
- d) Enzymes are subject to a variety of cellular controls.
- e) Enzymes are irreversibly changed by the reactions that they catalyze.

Answer: e

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Question type: Essay

45) Describe what happens to a protein's structure and function when it is denatured.

Answer:

Difficulty: Hard

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Solution: During denaturation, the folded conformation of a protein unravels and loses its unique shape. Loss of that shape destroys the protein's ability to accomplish its function.

Question type: Multiple Choice

46) Which of the following is a purine base?

- a) cytosine
- b) guanine
- c) thymine
- d) uracil
- e) None of these choices.

Answer: b

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

47) Which of the following is a common function of RNA?

- a) produce electrical impulses
- b) storage of energy
- c) transfer information for protein synthesis
- d) long-term storage of information for protein synthesis
- e) transport of fluids

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

48) Which of the following is the major function of DNA?

- a) catalyzes metabolic reactions
- b) storage of energy
- c) transfer information for protein synthesis
- d) long-term storage of information for protein synthesis
- e) transport of electrolytes

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

49) Which of the following describes the major function of ATP in cells?

- a) building block for the synthesis of proteins.
- b) transfers energy for cell functions
- c) transfers information for protein synthesis
- d) stores information for protein synthesis
- e) transports fluids

Answer: b

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

50) Which monomer is used to build RNA and DNA?

- a) fatty acid
- b) amino acid
- c) monosaccharide
- d) glycerol
- e) nucleotide

Answer: e

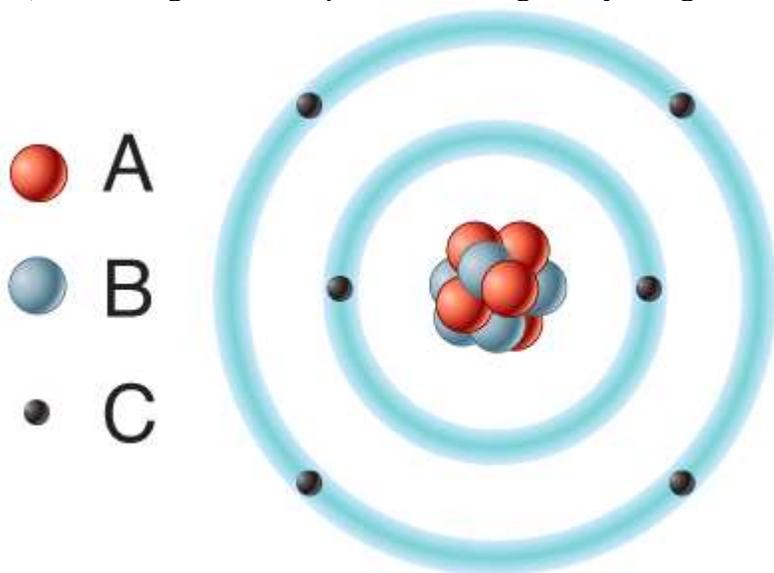
Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

51) In the diagram which particles are negatively charged?



- a) A
- b) B
- c) C
- d) All of these choices.
- e) None of these choices.

Answer: c

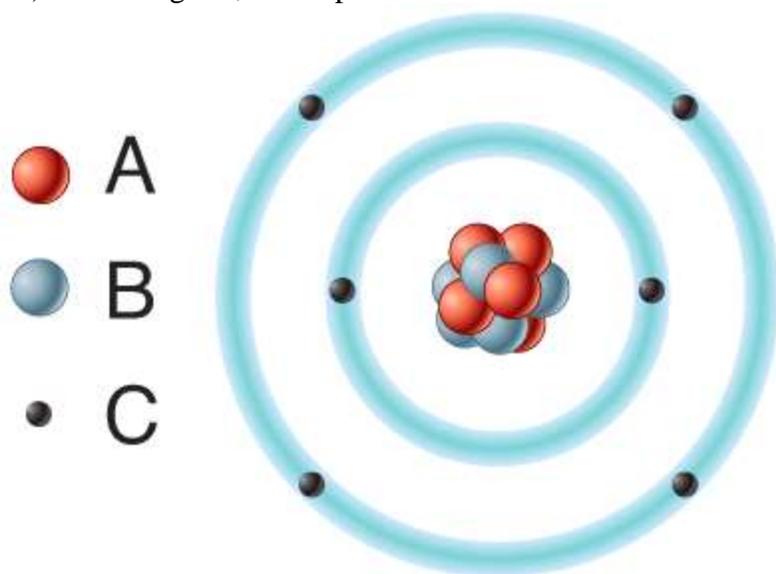
Difficulty: Easy

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

52) In the diagram, which particles are found in the atom's nucleus?



- a) A
- b) B
- c) C
- d) Both A and B.
- e) None of these choices.

Answer: d

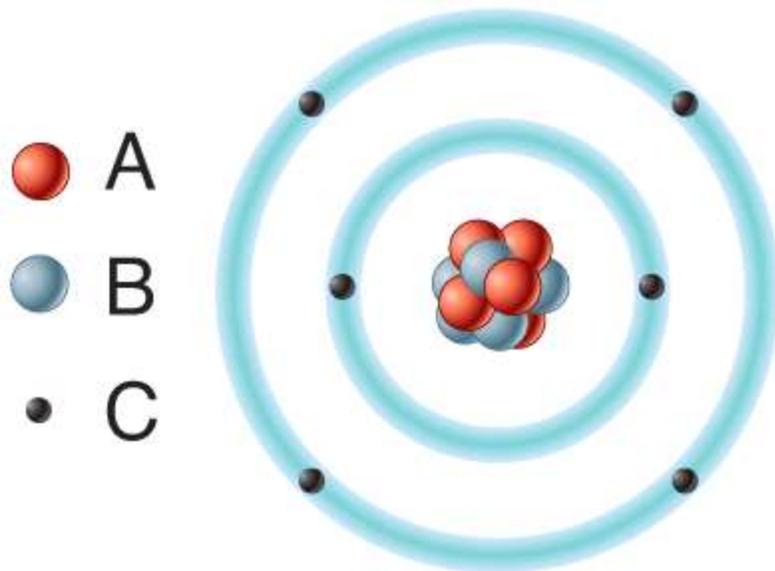
Difficulty: Easy

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

53) In the diagram, removal of one or more of this type of subatomic particle would result in the formation of a cation?



- a) A
- b) B
- c) C
- d) All of these choices.
- e) None of these choices.

Answer: b

Difficulty: Hard

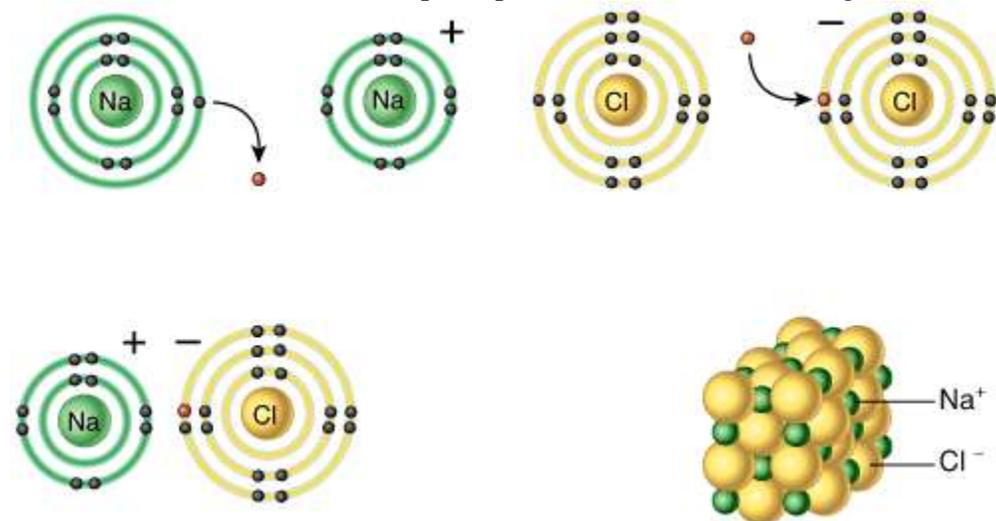
Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

Question type: Essay

54) Describe the basic chemical principle that is shown in this diagram?



Answer:

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

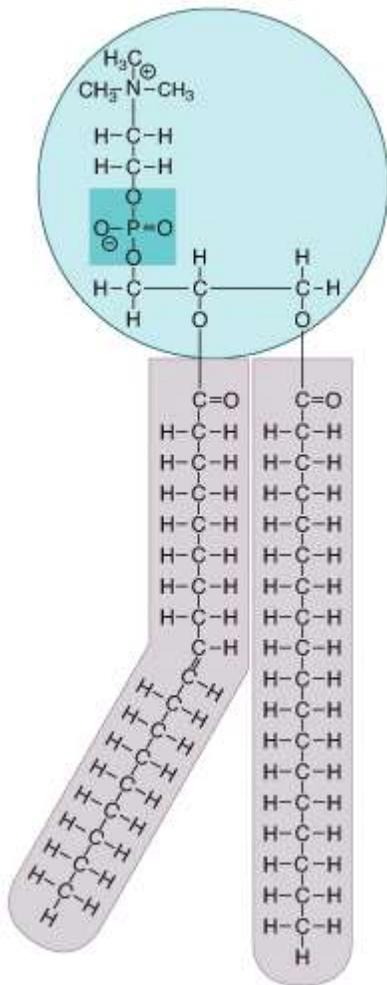
Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

Solution: This diagram represents the octet rule in chemical bonding. The octet rule states that two atoms will tend to bond if doing so means that they will both be left with eight electrons in their valence shells.

55) What type of molecule is shown in the diagram? Where in a eukaryotic cell would this type of molecule be commonly found? What special chemical properties does this molecule possess

that allows it to accomplish its functions?



Answer:

Difficulty: Medium

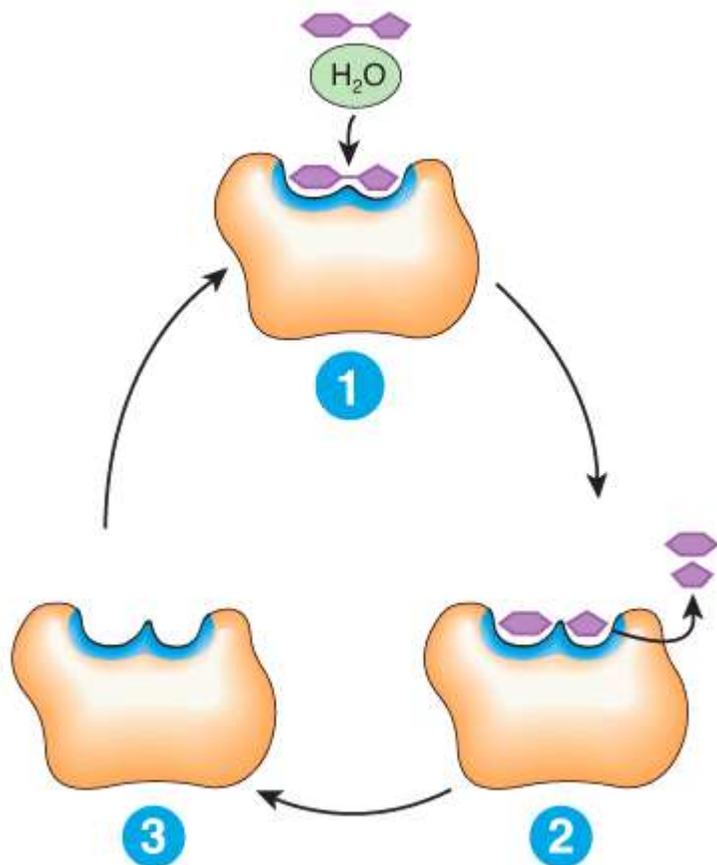
Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Solution: This is a phospholipid found in the plasma membranes of eukaryotic cells. It has a polar hydrophilic head group and a nonpolar hydrophobic tail group making it amphipathic. This chemical property allows it to form the lipid bilayer of the membrane with its polar group oriented on the surface of the membrane and its hydrophobic tails oriented away from the surrounding water in the interior of the lipid bilayer.

56) Describe what is happening at places 1, 2 and 3 in the diagram.



Answer:

Difficulty: Hard

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

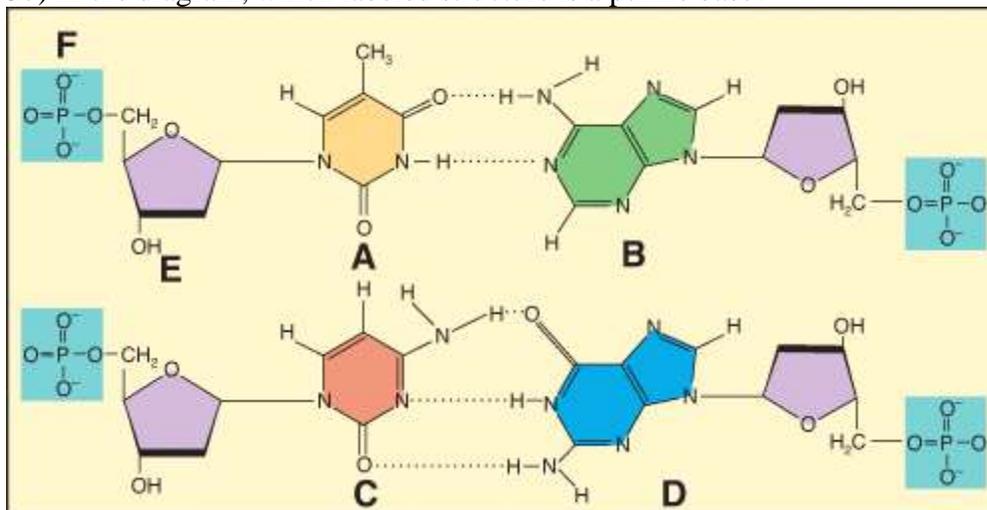
Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Solution: This figure represents how an enzyme works. At number one, the enzyme and substrate come together at the active site of the enzyme forming the enzyme-substrate complex. At number two, the enzyme catalyzes the reaction and transforms the substrate into products, which are then released from the enzyme. At number three, the reaction is complete and the enzyme remains unchanged and free to catalyze the same reaction again on a new substrate.

Question type: Multiple Choice

57) In the diagram, which labeled structure is a purine base?



- a) A
- b) B
- c) E
- d) Both A and B.
- e) All of these choices

Answer: b

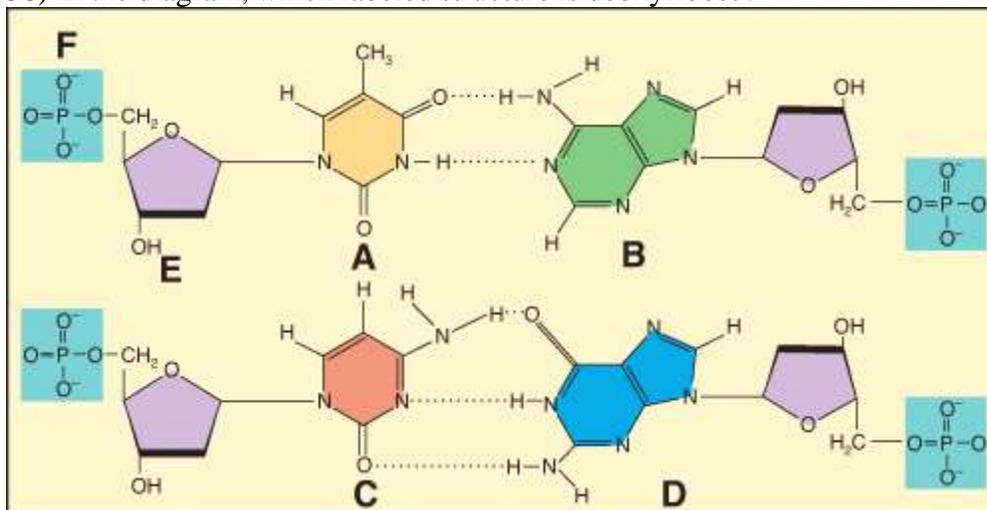
Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

58) In the diagram, which labeled structure is deoxyribose?



- a) B
- b) E
- c) F
- d) None of these choices.
- e) The entire structure is considered a deoxyribose molecule.

Answer: b

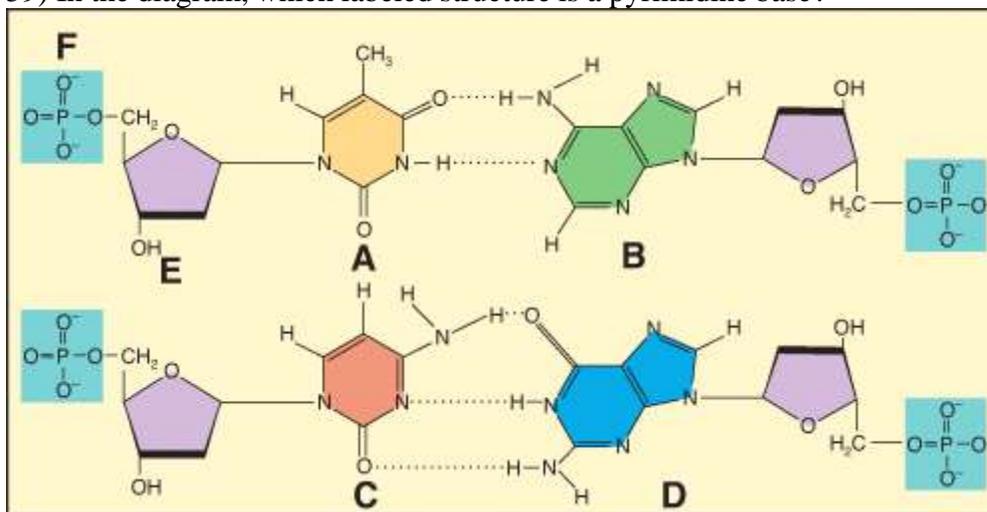
Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

59) In the diagram, which labeled structure is a pyrimidine base?



- a) A
- b) B
- c) E
- d) F
- e) None of these choices.

Answer: a

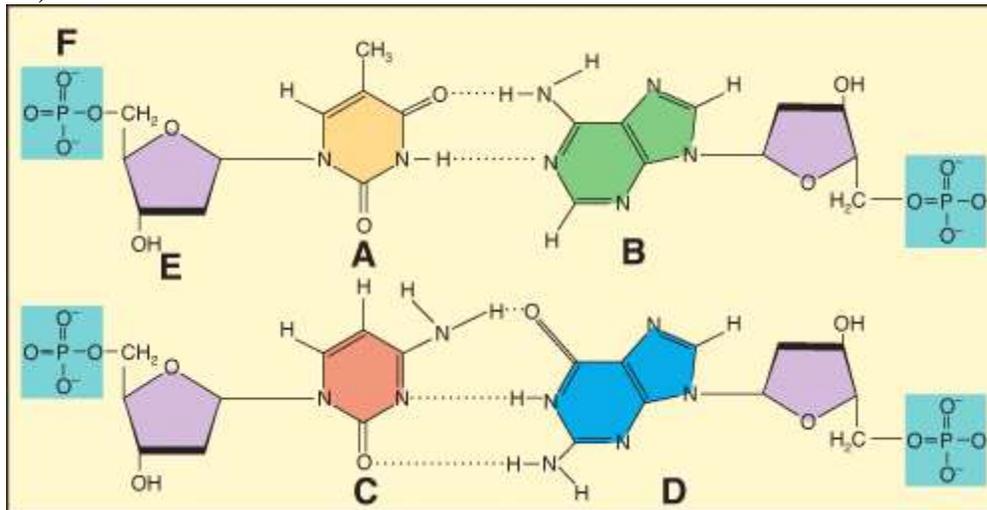
Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

60) Which of the labeled structures are found in DNA but not RNA?



- 1 A
- 2 B
- 3 C
- 4 E

- a) 1 only
- b) 2 only
- c) 3 only
- d) 4 only
- e) 1 and 4

Answer: e

Difficulty: Hard

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.3 Describe the structure and functions of deoxyribonucleic acid (DNA), ribonucleic acid (RNA), and adenosine triphosphate (ATP).

Section Reference 1: 2.5 Organic Compounds

Question type: Essay

61) What is the difference between atomic mass, mass number and atomic number?

Answer:

Difficulty: Medium

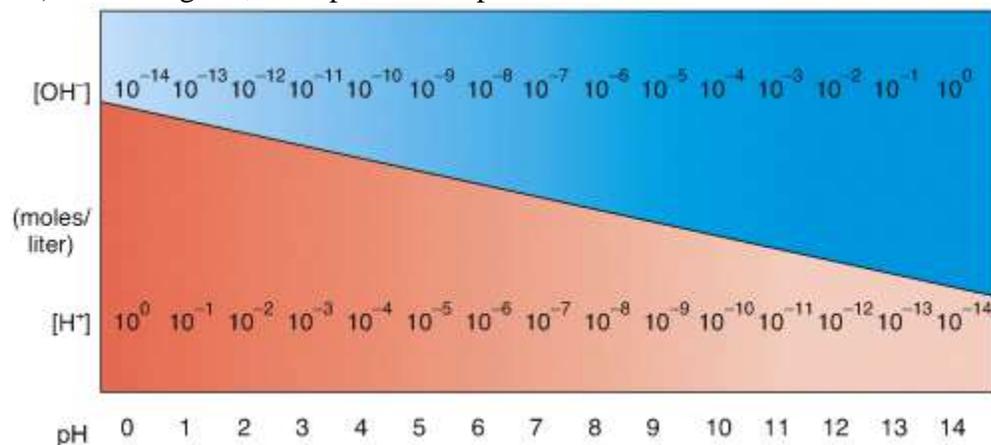
Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

Solution: Atomic number is the number of protons found in the nucleus of an atom. Atomic mass is the weighted average mass of all naturally occurring isotopes of the atom. Mass number is the sum of protons and neutrons found in an atom.

62) In the diagram, what pH value represents an acidic solution?



- a) 12
- b) 10
- c) 8
- d) 6
- e) None of these choices.

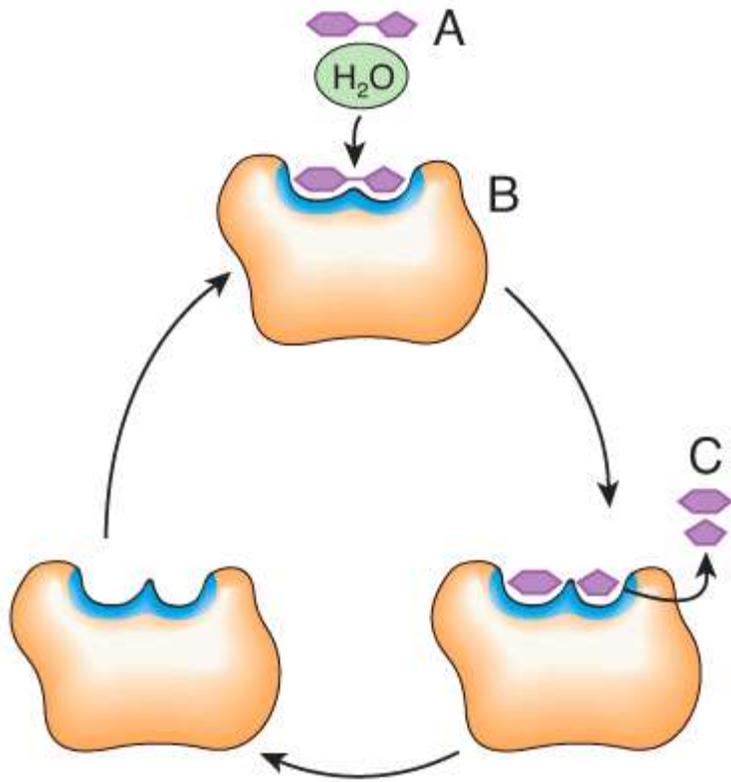
Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.4.3 Define pH and explain the role of buffer systems in homeostasis. Section Reference 1: 2.4 Inorganic Compounds and Solutions

63) In the diagram, what would happen to the concentration of C if the concentration of A increases?



- a) increases
- b) decreases
- c) no change

Answer: a

Difficulty: Medium

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems. Learning Objective 2: LO 2.4.3 Define pH and explain the role of buffer systems in homeostasis. Section Reference 1: 2.4 Inorganic Compounds and Solutions

Question type: Multiple Choice

64) Which of the following illustrates the use of a radioisotope as a tracer?

- a) monitor blood flow through the heart
- b) shrink a tumor by killing tumor cells with emitted radiation
- c) destroy overactive thyroid gland
- d) treat prostate cancer

e) treat advanced cervical cancer

Answer: a

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

65) Which of the following describes the major significance of the element carbon in the human body?

- a) ionized form makes body fluids acidic
- b) constituent of water
- c) forms backbone of all organic molecules
- d) required to harden the structure of bones and teeth
- e) ionized form is the part of hemoglobin that carries oxygen

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

66) Which of the following describes the major significance of the element iron in the human body?

- a) ionized form makes body fluids acidic
- b) used to generate ATP
- c) forms backbone of all organic molecules
- d) required for bone and tooth structure
- e) ionized forms are part of hemoglobin

Answer: e

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

67) Which of the following describes the major significance of the element chlorine in the human body?

- a) ionized form makes body fluids acidic
- b) ionized form is most plentiful anion in extracellular fluid
- c) forms backbone of all organic molecules
- d) required for bone and tooth structure
- e) ionized form is most plentiful cation in extracellular fluid

Answer: b

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

68) Which of the following describes the major significance of the element magnesium in the human body?

- a) ionized form makes body fluids acidic
- b) ionized form is most plentiful anion in extracellular fluid
- c) ionized form is needed for action of many enzymes
- d) is a component of all proteins and nucleic acids
- e) ionized form is most plentiful cation in extracellular fluid

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

69) Which of the following describes the major significance of the element nitrogen in the human body?

- a) ionized form makes body fluids acidic
- b) ionized form is most plentiful anion in extracellular fluid
- c) ionized form is needed for action of many enzymes
- d) is a component of all proteins and nucleic acids
- e) ionized form is most plentiful cation in extracellular fluid

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

70) Which of the following chemical elements present in the body is NOT considered a lesser element?

- a) sulfur
- b) oxygen
- c) magnesium
- d) potassium
- e) calcium

Answer: b

Difficulty: Hard

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

71) Which of the following chemical elements present in the body is considered a lesser element?

- a) phosphorus
- b) oxygen
- c) nitrogen
- d) aluminum
- e) copper

Answer: a

Difficulty: Hard

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

72) Which of the following chemical elements present in the body is considered a lesser element?

- a) nitrogen
- b) oxygen
- c) calcium
- d) iodine
- e) chromium

Answer: c

Difficulty: Hard

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

73) Which of the following chemical elements present in the body is considered a trace element?

- a) chlorine
- b) oxygen
- c) iron
- d) iodine
- e) nitrogen

Answer: d

Difficulty: Hard

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

74) Which of the following chemical elements present in the body is NOT a trace element?

- a) chlorine
- b) zinc
- c) selenium
- d) iodine
- e) boron

Answer: a

Difficulty: Hard

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: 2.1 How Matter is Organized

75) Which of the following can lower the amount of free radicals in the body?

- a) x-rays
- b) ultraviolet radiation
- c) oxygen
- d) carbon tetrachloride
- e) antioxidants

Answer: e

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

76) Which of the following is NOT an antioxidant?

- a) selenium
- b) zinc
- c) superoxide
- d) vitamin C
- e) beta-carotene

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.1 Understand how the structures of atoms, ions, molecules, free radicals and compounds are related to the main chemical elements of the human body.

Learning Objective 2: LO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: 2.1 How Matter is Organized

77) Which of the following substances has a pH closest to 7.0?

- a) lye
- b) vaginal fluid

- c) gastric juice
- d) cerebrospinal fluid
- e) milk of magnesia

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems. Learning Objective 2: LO 2.4.3 Define pH and explain the role of buffer systems in homeostasis. Section Reference 1: 2.4 Inorganic Compounds and Solutions

78) Which of the following substances has a pH closest to 7.0?

- a) lye
- b) vaginal fluid
- c) semen
- d) gastric juice
- e) milk of magnesia

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems. Learning Objective 2: LO 2.4.3 Define pH and explain the role of buffer systems in homeostasis. Section Reference 1: 2.4 Inorganic Compounds and Solutions

79) Which of the following carbohydrates is a disaccharide?

- a) ribose
- b) lactose
- c) galactose
- d) glycogen
- e) cellulose

Answer: b

Difficulty: Easy

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids. Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins. Section Reference 1: 2.5 Organic Compounds

80) Which of the following carbohydrates is a polysaccharide?

- a) ribose
- b) lactose
- c) glycogen
- d) maltose
- e) galactose

Answer: c

Difficulty: Easy

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

81) This type of lipid is used by the body for insulation.

- a) phospholipids
- b) triglycerides
- c) bile salts
- d) sex hormones
- e) carotenes

Answer: b

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

82) This type of lipid is involved in blood clotting.

- a) phospholipids
- b) cholesterol
- c) bile salts
- d) sex hormones
- e) eicosanoids

Answer: e

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

83) This type of protein is involved with shortening of muscle cells to produce movement.

- a) contractile
- b) structural
- c) regulatory
- d) catalytic
- e) transport

Answer: a

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

84) This type of protein protects against pathogens.

- a) contractile
- b) immunological
- c) regulatory
- d) catalytic
- e) transport

Answer: b

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

85) Surface tension of an aqueous solution is generated by the presence of _____ between water molecules.

- a) covalent bonds
- b) ionic bonds
- c) hydrogen bonds
- d) ester links
- e) None of these choices.

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

Question type: Essay

86) Define mixture and then distinguish between the three types of mixtures called solutions, colloids and suspensions.

Answer:

Difficulty: Medium

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.4.2 Distinguish among solutions, colloids, and suspensions.

Section Reference 1: 2.4 Inorganic Compounds and Solutions

Solution: A mixture is a combination of elements or compounds that are physically blended together but not bound by chemical bonds. A solution is a mixture where the solutes are evenly dispersed among the solvent molecules. Solutions have a clear appearance. Colloids are like solutions except the solutes are big enough to scatter light. A colloid appears translucent or opaque. Suspensions are mixtures where the suspended material will eventually settle out.

Question type: Multiple Choice

87) Frying an egg causes the clear runny part of the egg to turn to white. This process is called

- a) emulsification.

- b) denaturation.
- c) hydrogenation.
- d) hydrolysis.
- e) decomposition.

Answer: b

Difficulty: Hard

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

88) Cellulose is a

- a) protein.
- b) lipid.
- c) monosaccharide.
- d) polysaccharide.
- e) nucleic acid.

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Question type: Essay

89) Why is the human digestive system unable to digest cellulose?

Answer:

Difficulty: Hard

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.2 Identify the building blocks and functions of carbohydrates, lipids, and proteins.

Section Reference 1: 2.5 Organic Compounds

Solution: Human digestive system lacks the enzyme to recognize the structure and break the bonds that hold this polysaccharide together.

Question type: Multiple Choice

90) A triple covalent bond is formed between atoms sharing _____ valence electrons.

- a) one
- b) two
- c) three
- d) six
- e) eight

Answer: d

Difficulty: Hard

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

91) In a polar covalent bond, the atom that has the most electronegativity will have a

- a) full negative charge (-1).
- b) full positive charge (+1).
- c) partial negative charge.
- d) partial positive charge.
- e) neutral charge.

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.1 Describe how valence electrons form chemical bonds.

Learning Objective 3: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.2 Chemical Bonds

92) Which of the following is a general term used to refer to the sum of all the chemical reactions occurring in the body?

- a) anabolism
- b) catabolism
- c) metabolism
- d) catalysis
- e) homeostasis

Answer: c

Difficulty: Easy

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.3 Chemical Reactions

93) The energy stored in the bonds of the molecules in the foods that humans eat is

1. a form of kinetic energy.
2. a form of potential energy.
3. referred to as chemical energy.

- a) 1 only
- b) 2 only
- c) 3 only
- d) 2 and 3
- e) All of these choices

Answer: d

Difficulty: Medium

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.3 Chemical Reactions

94) Which of the following is NOT a common characteristic of the endergonic chemical reactions that occur in the human body?

- a) They absorb more energy than they produce.
- b) They often require ATP to move toward products.
- c) They are often coupled to exergonic reactions.

- d) Breakdown of nutrients is a good example of this type of reaction.
- e) Energy of reactants is lower than energy of products.

Answer: d

Difficulty: Hard

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.3 Chemical reactions

95) The initial energy “investment” needed to start a chemical reaction in a cell is called the

- a) energy of products.
- b) energy of reactants.
- c) potential energy.
- d) Gibb’s free energy.
- e) activation energy.

Answer: e

Difficulty: Easy

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: 2.3 Chemical reactions

96) All of the following are characteristics of anabolism EXCEPT:

- a) It involves synthesizing new biomolecules.
- b) It primarily involves endergonic reactions.
- c) It releases large amounts of energy.
- d) An example of anabolism is linking amino acids together to form proteins.
- e) An example is the formation of two ammonia molecules from one nitrogen molecule and three hydrogen molecules.

Answer: c

Difficulty: Hard

Learning Objective 1: LO 2.2 Apply an understanding of chemical reactions and the various forms of energy to exergonic and endergonic reactions and the role of activation energy and catalysts in these reactions.

Learning Objective 2: LO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.
Section Reference 1: 2.3 Chemical reactions

97) $AB + CD \rightarrow AD + BC$ is a general example of a(n) _____ reaction.

- a) decomposition
- b) synthesis
- c) exchange
- d) reversible
- e) catalyzed

Answer: c

Difficulty: Medium

Learning Objective 1: LO 2.3 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO 2.3.5 Describe synthesis, decomposition, exchange, and reversible reactions.

Section Reference 1: 2.3 Chemical reactions

98) Which of the following statements is true with regard to a one molar solution of NaCl? (atomic mass of chlorine is 35.45 and atomic mass of sodium is 22.99)

- a) The number of grams of sodium and chloride in the solution is identical.
- b) Each liter of this solution weighs 58.44 grams.
- c) NaCl will not dissolve in water so a suspension would result.
- d) The number of sodium atoms and chlorine atoms in this solution are equal.
- e) This solution contains 58.44 kilograms of NaCl in each liter of water.

Answer: d

Difficulty: Hard

Learning Objective 1: LO 2.4 Apply the properties of water, inorganic acids, bases and salts to the properties of solutions, colloids and suspensions and the role of pH in buffer systems.

Learning Objective 2: LO LO2.4.2 Distinguish among solutions, colloids, and suspensions.

Section Reference 1: 2.4 Inorganic Compounds and Solutions

99) Which of following functional groups commonly found on organic molecules in the human body carries a positive charge (+1) at the pH of most body fluids?

- a) sulfhydryl
- b) phosphate
- c) carboxyl

- d) ester
- e) amino

Answer: e

Difficulty: Medium

Learning Objective 1: LO 2.5 Describe the functional groups of organic molecules and apply to the structure and function of carbohydrates, lipids, proteins and nucleic acids.

Learning Objective 2: LO 2.5.1 Describe the functional groups of organic molecules.

Section Reference 1: 2.5 Organic Compounds