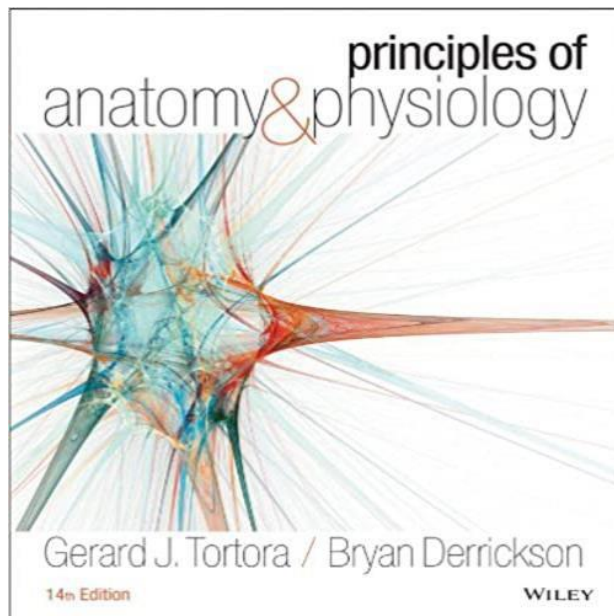


# Test Bank for Principles of Anatomy and Physiology 14th Edition Tortora Derrickson 1118345002 9781118345009



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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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of the atoms, ions, molecules, and compounds.

Study Objective 2: SO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: Sec 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of the atoms, ions, molecules, and compounds.

Study Objective 2: SO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: Sec 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of the atoms, ions, molecules, and compounds.

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

Section Reference 1: Sec 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of the atoms, ions, molecules, and compounds.

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

Section Reference 1: Sec 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of the atoms, ions, molecules, and compounds.

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

Section Reference 1: Sec 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of the atoms, ions, molecules, and compounds.

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

Section Reference 1: Sec 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of the atoms, ions, molecules, and compounds.

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

Section Reference 1: Sec 2.1 How Matter is Organized

Question type: Essay

8) Briefly describe the octet rule.

Answer:

Difficulty: Medium

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

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

Question type: Multiple Choice

9) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

10) What is the name given to a negatively charged atom?

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

Answer: d

Difficulty: Easy

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

11) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

12) Which 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

13) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

Question type: Essay

14) Describe a hydrogen bond.

Answer:

Difficulty: Medium

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 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

15) Which 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

16) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

17) Which term is defined as the capacity to do work?

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

Answer: e

Difficulty: Medium

Study Objective 1: SO 2.3 Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.

Study Objective 2: SO 2.3.1 Define a chemical reaction.

Study Objective 3: SO 2.3.2 Describe the various forms of energy.

Section Reference 1: Sec 2.3 Chemical Reactions

Question type: Essay



18) Describe the law of conservation of energy.

Answer:

Difficulty: Medium

Study Objective 1: SO 2.3 Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.

Study Objective 2: SO 2.3.1 Define a chemical reaction.

Study Objective 3: SO 2.3.2 Describe the various forms of energy.

Section Reference 21: 2.3 Chemical Reactions

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

Question type: Multiple Choice

19) Which 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

Study Objective 1: SO 2.3 Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.

Study Objective 2: SO 2.3.1 Define a chemical reaction.

Study Objective 3: SO 2.3.2 Describe the various forms of energy.

Section Reference 1: Sec 2.3 Chemical Reactions

20) 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

Study Objective 1: SO 2.3 Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.

Study Objective 2: SO 2.3.1 Define a chemical reaction.

Study Objective 3: SO 2.3.2 Describe the various forms of energy.

Study Objective 4: SO 2.3.4 Describe the role of activation energy and catalysts in chemical reactions.

Section Reference 1: Sec 2.3 Chemical Reactions

Question type: Essay

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

Answer:

Difficulty: Hard

Study Objective 1: SO 2.3 Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.

Study Objective 2: SO 2.3.1 Define a chemical reaction.

Study Objective 3: SO 2.3.2 Describe the various forms of energy.

Study Objective 4: SO 2.3.4 Describe the role of activation energy and catalysts in chemical reactions.

Section Reference 1: Sec 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

22) Which type of chemical reaction combines reactants to produce larger products?

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

Answer: a

Difficulty: Medium

Study Objective 1: SO 2.3 Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.

Study Objective 2: SO 2.3.1 Define a chemical reaction.

Study Objective 3: SO 2.3.5 Describe synthesis, decomposition, exchange, and reversible reactions.

Section Reference 1: Sec 2.3 Chemical Reactions

23) Which type of chemical reaction breaks larger reactants into smaller products?

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

Answer: b

Difficulty: Medium

Study Objective 1: SO 2.3 Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.

Study Objective 2: SO 2.3.1 Define a chemical reaction.

Study Objective 3: SO 2.3.5 Describe synthesis, decomposition, exchange, and reversible reactions.

Section Reference 1: Sec 2.3 Chemical Reactions

24) What 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

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

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

Section Reference 1: Sec 2.4 Inorganic Compounds and Solutions

25) A solute that readily dissolves in water is

- a) hydrophobic.

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

Answer: d

Difficulty: Easy

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

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

Section Reference 1: Sec 2.4 Inorganic Compounds and Solutions

26) 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

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

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

Section Reference 1: Sec 2.4 Inorganic Compounds and Solutions

Question type: Essay

27) Describe the functions of water in the body.

Answer:

Difficulty: Hard

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

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

Section Reference 1: Sec 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

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

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

Answer: c

Difficulty: Medium

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

Study Objective 2: SO 2.4.3 Define pH and explain the role of buffer systems in homeostasis.

Section Reference 1: Sec 2.4 Inorganic Compounds and Solutions

29) 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

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

Study Objective 2: SO 2.4.3 Define pH and explain the role of buffer systems in homeostasis.

Section Reference 1: Sec 2.4 Inorganic Compounds and Solutions

30) Which of the following is a proton donor?

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

Answer: a

Difficulty: Medium

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

Study Objective 2: SO 2.4.3 Define pH and explain the role of buffer systems in homeostasis.

Section Reference 1: Sec 2.4 Inorganic Compounds and Solutions

31) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

Study Objective 2: SO 2.5.1 Describe the functional groups of organic molecules.

Section Reference 1: Sec 2.5 Organic Compounds

32) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

33) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

34) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

35) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

36) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

37) 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



Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

Question type: Essay

38) Describe the structural characteristics of an amino acid.

Answer:

Difficulty: Medium

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 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.

39) List the six major functions of proteins.

Answer:

Difficulty: Medium

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 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

40) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

41) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

Question type: Essay

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

Answer:

Difficulty: Hard

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 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

43) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

44) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

45) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

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

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

Answer: e

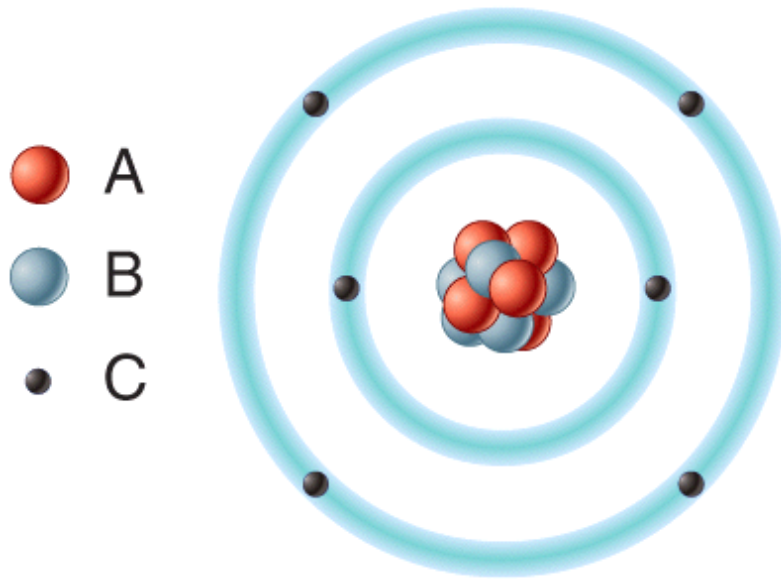
Difficulty: Medium

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

47) 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

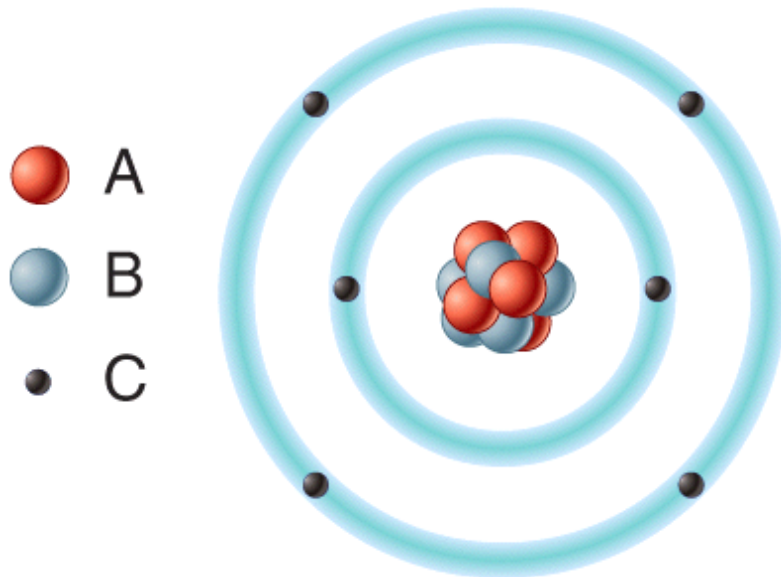
Difficulty: Easy

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of atoms, ions, molecules, and compounds.

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

Section Reference 1: Sec 2.1 How Matter is Organized

48) 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of atoms, ions, molecules, and compounds.

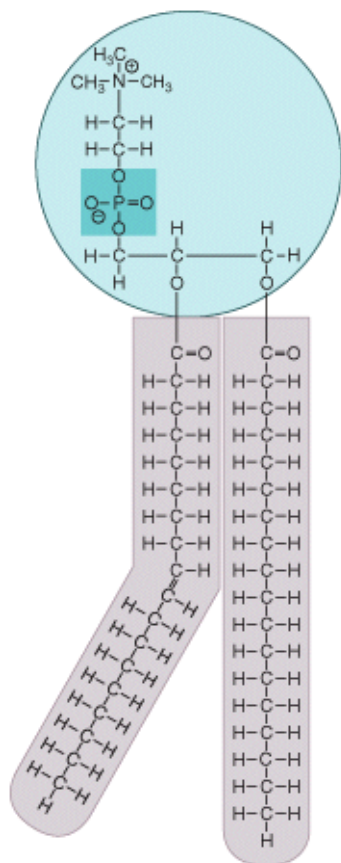
Study Objective 2: SO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds.

Section Reference 1: Sec 2.1 How Matter is Organized

Question type: Essay

49) 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

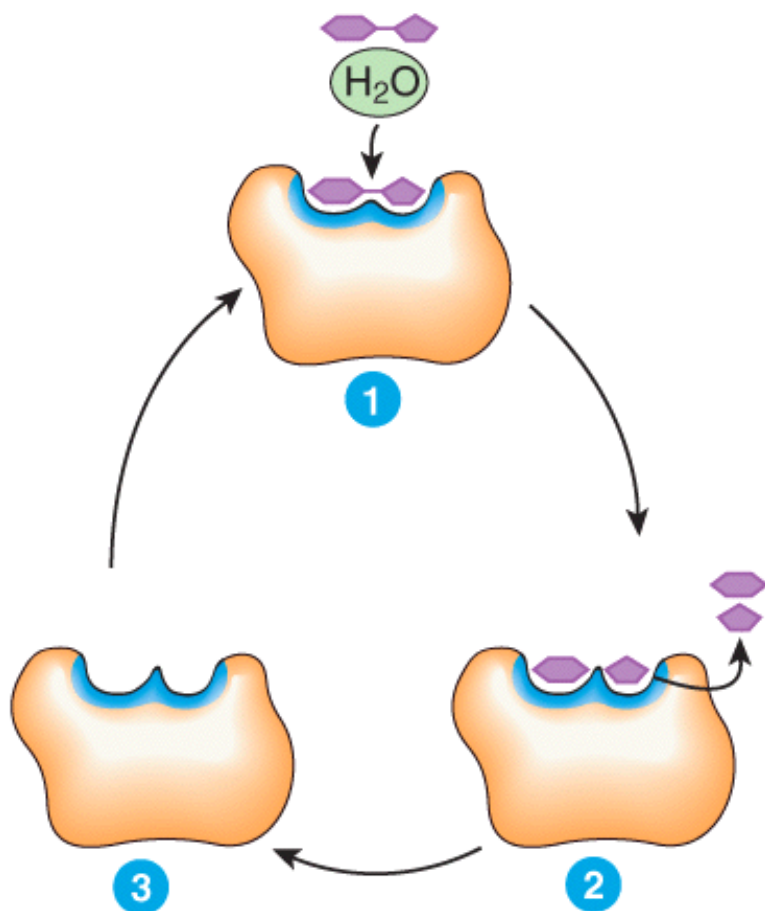
Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic compounds.

Study Objective 2: SO 2.5.1 Describe the functional groups of organic compounds.

Section Reference 1: Sec 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.

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



Answer:

Difficulty: Hard

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

Study Objective 2: SO 2.5.1 Describe the functional groups of organic molecules.

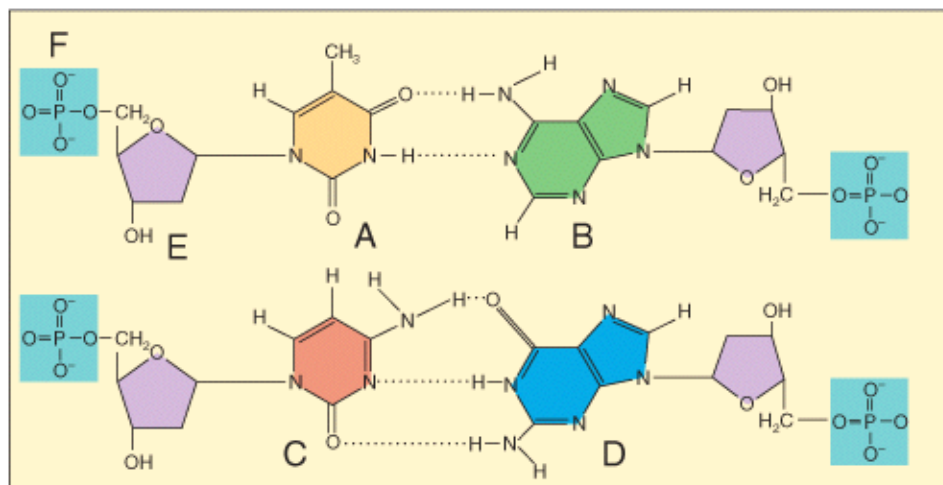
Section Reference: 1. 2.5 Organic Compounds

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



51) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

Study Objective 2: SO 2.5.1 Describe the functional groups of organic molecules.

Section Reference 1: Sec 2.5 Organic Compounds

Question type: Essay

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

Answer:

Difficulty: Medium

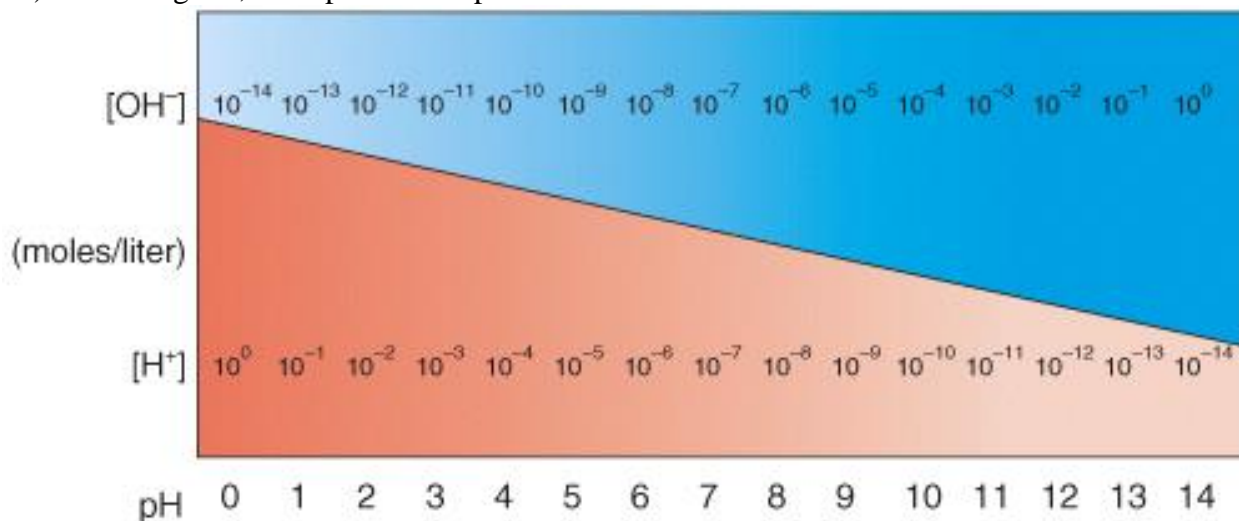
Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of atoms, ions, molecules, and compounds.

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

Section Reference 1: Sec 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.

53) 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

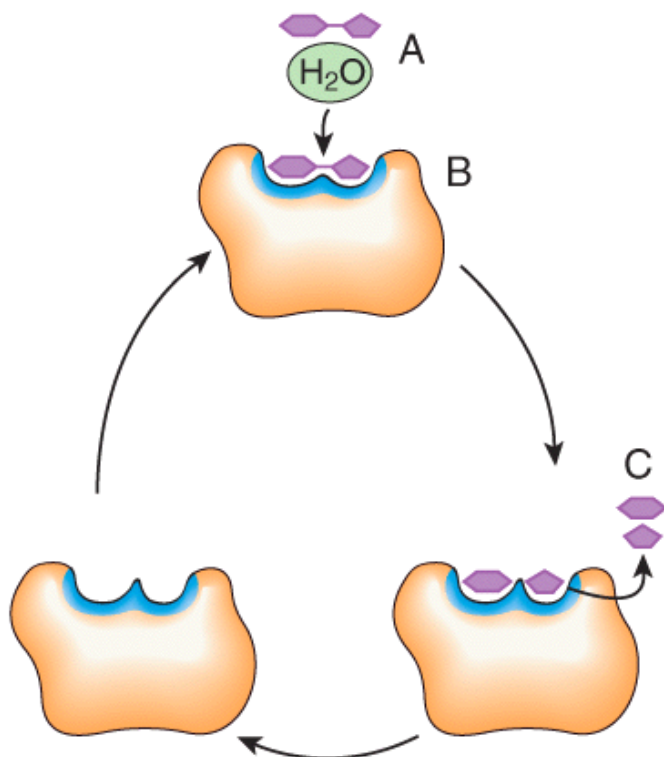
Difficulty: Medium

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

Study Objective 2: SO 2.4.3 Define pH and explain the role of buffer systems in homeostasis.

Section Reference 1: Sec 2.4 Inorganic Compounds and Solutions

54) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

Study Objective 2: SO 2.5.1 Describe the functional groups of organic molecules.

Section Reference: 1. 2.5 Organic Compounds

Question type: Multiple Choice

55) 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of atoms, ions, molecules, and compounds.

Study Objective 2: SO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: Sec 2.1 How Matter is Organized

56) 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of atoms, ions, molecules, and compounds.

Study Objective 2: SO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: Sec 2.1 How Matter is Organized

57) 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of atoms, ions, molecules, and compounds.

Study Objective 2: SO 2.1.1 Identify the main chemical elements of the human body.

Section Reference 1: Sec 2.1 How Matter is Organized

58) 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

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of atoms, ions, molecules, and compounds.

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

Section Reference 1: Sec 2.1 How Matter is Organized

59) 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

Study Objective 1: SO 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.

Study Objective 2: SO 2.4.3 Define pH and explain the role of buffer systems in homeostasis.

Section Reference 1: Sec 2.4 Inorganic Compounds and Solutions

60) Which of the following carbohydrates is a disaccharide?

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

Answer: b

Difficulty: Easy

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

61) Which of the following carbohydrates is a polysaccharide?

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

Answer: c

Difficulty: Easy

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

62) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

63) 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

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

64) This type of protein protects against pathogens.

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

Answer: b

Difficulty: Medium

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 2.5 Organic Compounds

65) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

Question type: Essay

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

Answer:

Difficulty: Medium

Study Objective 1: SO 2.4 Explain the importance of water, salts, acids, and bases in the functioning of the human body.

Study Objective 2: SO 2.4.2 Distinguish among solutions, colloids, and suspensions.

Section Reference 1: Sec 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

67) An atom or group of atoms with an unpaired electron in the outermost shell is called a(n)

- a) compound.
- b) free radical.
- c) ion.
- d) molecule.

Answer: b

Difficulty: Easy

Study Objective 1: SO 2.1 Describe the main chemicals of the human body and the structures of atoms, ions, molecules, and compounds.

Study Objective 2: SO 2.1.2 Describe the structures of atoms, ions, molecules, free radicals, and compounds

Section Reference 1: Sec 2.1 How Matter is Organized



Question type: Essay

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

Answer:

Difficulty: Hard

Study Objective 1: SO 2.5 Describe the importance of carbon and functional groups in the structure of organic molecules.

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

Section Reference 1: Sec 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

69) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

70) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

71) 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

Study Objective 1: SO 2.2. Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.1 Describe how valence electrons form chemical bonds.

Study Objective 3: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.2 Chemical Bonds

72) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.  
Section Reference 1: Sec 2.3 Chemical Reactions

73) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.3 Chemical reactions

74) 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

Study Objective 1: SO 2.2 Explain how atoms form molecules and compounds, and describe the nature of the various types of bonds that join them.

Study Objective 2: SO 2.2.2 Distinguish among ionic, covalent, and hydrogen bonds.

Section Reference 1: Sec 2.3 Chemical reactions

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

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

Answer: c

Difficulty: Medium

Study Objective 1: SO 2.3 Explain what happens when atoms combine with or separate from other atoms during a chemical reaction.

Study Objective 2: SO 2.3.5 Describe synthesis, decomposition, exchange, and reversible reactions.

Section Reference 1: Sec 2.3 Chemical reactions