

# Test Bank

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## Essentials of Anatomy & Physiology

SIXTH EDITION

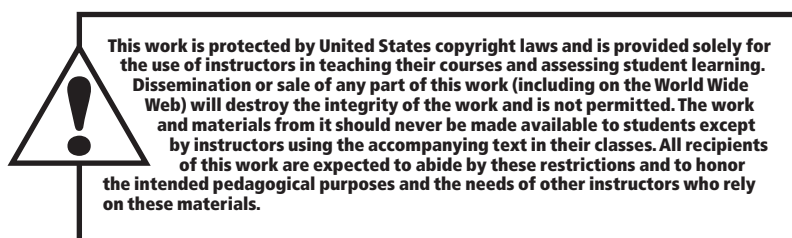
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# Chapter 1 An Introduction to Anatomy and Physiology

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## Multiple-Choice Questions

- 1) Characteristics of most living organisms include the ability to
- A) repair and completely restore itself during any type of injury.
  - B) respond and adapt to their environment.
  - C) control the external environment.
  - D) form positive feedback loops.
  - E) create a protective covering over themselves.

Answer: B

*Learning Outcome: 1-1*

*Bloom's Taxonomy: Knowledge*

- 2) The waste products of metabolism are eliminated through the process of
- A) assimilation.
  - B) absorption.
  - C) excretion.
  - D) digestion.
  - E) resorption.

Answer: C

*Learning Outcome: 1-1*

*Bloom's Taxonomy: Knowledge*

- 3) All of the chemical operations underway in the body refer to
- A) systemic physiology.
  - B) special physiology.
  - C) cell physiology.
  - D) metabolism.
  - E) physiological chemistry.

Answer: D

*Learning Outcome: 1-1*

*Bloom's Taxonomy: Knowledge*

- 4) Which of the following is an accurate characteristic of humans?
- A) Nutrients are absorbed directly from the environment.
  - B) Excretion involves movement across exposed surfaces.
  - C) Body cells must travel to one part of the body for nutrients and to another for waste product removal.
  - D) Excretion is a simpler process than it is in smaller organisms.
  - E) Respiration is more complicated than it is in very small organisms.

Answer: E

*Learning Outcome: 1-1*

*Bloom's Taxonomy: Comprehension*

- 5) Surface anatomy is a topic in the study of
- A) systemic physiology.
  - B) cytology.
  - C) histology.
  - D) cell physiology.
  - E) macroscopic anatomy.

Answer: E

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Knowledge*

- 6) Studying all the superficial and internal features in one specific area of the body is called
- A) gross anatomy.
  - B) surface anatomy.
  - C) systemic anatomy.
  - D) regional anatomy.
  - E) surgical anatomy.

Answer: D

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Knowledge*

- 7) The study of function is to \_\_\_\_\_ as the study of form is to anatomy.
- A) physiology
  - B) histology
  - C) microscopic anatomy
  - D) systemic anatomy
  - E) cytology

Answer: A

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Knowledge*

- 8) The study of cells and cellular structures is called
- A) gross anatomy.
  - B) cytology.
  - C) histology.
  - D) organology.
  - E) microbiology.

Answer: B

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Knowledge*

- 9) Which of the following involves the study of events focused at the molecular level?
- A) pathological physiology
  - B) systemic physiology
  - C) cytology
  - D) histology
  - E) cell physiology

Answer: E

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Knowledge*

10) The study of body structure is called \_\_\_\_\_.

- A) physiology
- B) homeostasis
- C) anatomy
- D) positive feedback
- E) negative feedback

Answer: C

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Knowledge*

11) The branch of biological science that deals with how the kidney functions is called \_\_\_\_\_.

- A) endocrine physiology
- B) histology
- C) adrenal anatomy
- D) cytology
- E) renal physiology

Answer: E

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Knowledge*

12) Which division of anatomy focuses on the form and structure of the heart, blood, and blood vessels?

- A) regional anatomy
- B) surface anatomy
- C) cytology
- D) histology
- E) systemic anatomy

Answer: E

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Comprehension*

13) In dealing with physiology, function is related to

- A) form.
- B) location.
- C) size.
- D) cavity.
- E) system.

Answer: A

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Comprehension*

14) A cardiologist studies the human body mainly with an approach resembling

- A) gross anatomy.
- B) surface anatomy.
- C) microscopic anatomy.
- D) systemic anatomy.
- E) regional anatomy.

Answer: D

*Learning Outcome: 1-2*

*Bloom's Taxonomy: Comprehension*

15) Which of the following is an organ?

- A) blood
- B) heart
- C) peritoneum
- D) connective tissue
- E) mitochondrion

Answer: B

*Learning Outcome: 1-3*

*Bloom's Taxonomy: Knowledge*

16) A collection of cells that work together designates a(n)

- A) chemical.
- B) organ.
- C) tissue.
- D) organ system.
- E) molecule.

Answer: C

*Learning Outcome: 1-3*

*Bloom's Taxonomy: Knowledge*

17) Which of the following is the simplest level of organization?

- A) cellular
- B) chemical
- C) organ
- D) system
- E) tissue

Answer: B

*Learning Outcome: 1-3*

*Bloom's Taxonomy: Knowledge*

18) The heart, blood, and blood vessels combine to form which of the following?

- A) a group of cells
- B) an organ system
- C) the smallest level of organization
- D) an organ
- E) an individual living entity

Answer: B

*Learning Outcome: 1-3*

*Bloom's Taxonomy: Knowledge*

19) Contractile protein fibers of the heart are considered to belong to which level of organization?

- A) tissue
- B) organism
- C) cellular
- D) chemical
- E) organ

Answer: D

*Learning Outcome: 1-3*

*Bloom's Taxonomy: Comprehension*



- 20) Which of the following is an accurate description of the cellular level of organization?
- A) Cells consist of two or more different tissues working together to perform specific functions.
  - B) Cells are considered to be the largest living units in the body.
  - C) Cells are comprised of different molecules that interact to form larger structures, each type of which has a specific function.
  - D) Cells combine to form molecules with complex shapes, which determine their function(s).
  - E) Cardiac muscle is an example of the cellular level of organization.

Answer: C

*Learning Outcome: 1-3*

*Bloom's Taxonomy: Comprehension*

- 21) The fact that a single defective protein causes cystic fibrosis, a **multisystemic** illness, proves that
- A) all organisms are composed of cells.
  - B) all levels of organization within an organism are interdependent.
  - C) chemical molecules make up cells.
  - D) all cells are independent of each other.
  - E) congenital defects can be life threatening.

Answer: B

*Learning Outcome: 1-3*

*Bloom's Taxonomy: Application*

- 22) The production of another human organism is the function of which of the following systems?
- A) skeletal
  - B) reproductive
  - C) respiratory
  - D) lymphoid
  - E) cardiovascular

Answer: B

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Knowledge*

- 23) Coordinating the activities of other organ systems in order to direct immediate responses to stimuli is characteristic of the
- A) integumentary system.
  - B) endocrine system.
  - C) nervous system.
  - D) cardiovascular system.
  - E) None of these is correct.

Answer: C

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Knowledge*

- 24) The trachea and lungs are components of the
- A) endocrine system.
  - B) digestive system.
  - C) respiratory system.
  - D) urinary system.
  - E) lymphoid system.

Answer: C

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Knowledge*

- 25) The pituitary and thyroid glands are components of the
- A) endocrine system.
  - B) cardiovascular system.
  - C) respiratory system.
  - D) lymphoid system.
  - E) digestive system.

Answer: A

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Knowledge*

- 26) Gas exchange is a function of the
- A) cardiovascular system.
  - B) lymphoid system.
  - C) respiratory system.
  - D) urinary system.
  - E) endocrine system.

Answer: C

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Knowledge*

- 27) Which structure(s) is/are a component of the digestive system?
- A) pituitary gland
  - B) ligaments
  - C) urethra
  - D) arteries
  - E) liver

Answer: E

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Knowledge*

- 28) Covering, protection, and thermoregulation are functions of which organ system of the human body?
- A) integumentary
  - B) muscular
  - C) skeletal
  - D) nervous
  - E) endocrine

Answer: A

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Comprehension*

29) The thymus is associated with which organ system?

- A) nervous
- B) lymphatic
- C) digestive
- D) urinary
- E) endocrine

Answer: E

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Comprehension*

30) Which of the following is characteristic of the endocrine system?

- A) It releases chemical messengers called neurotransmitters.
- B) It produces a more rapid response to body changes than the nervous system.
- C) It can produce effects that last for days or longer.
- D) It can produce an effect that involves only one tissue at a time.
- E) It is an important thermoregulatory system.

Answer: C

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Comprehension*

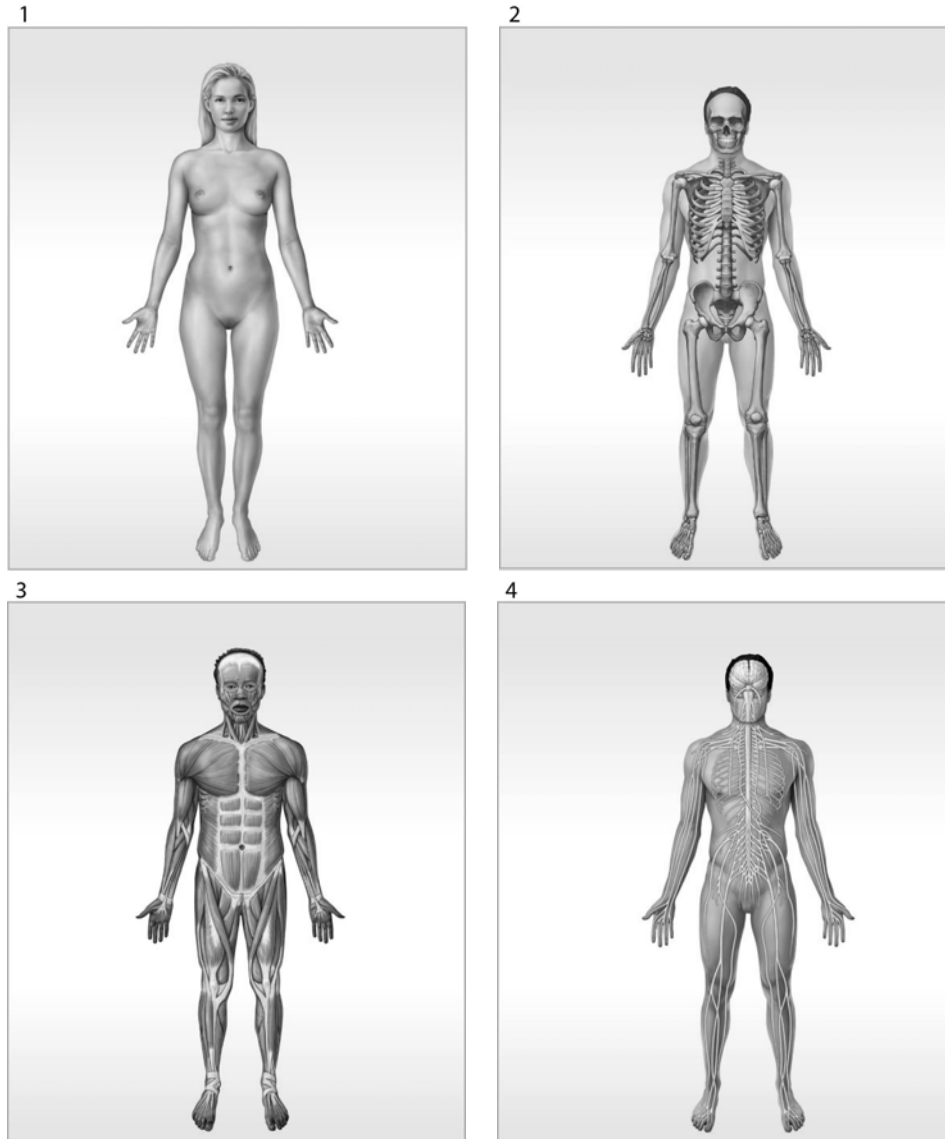
31) What is/are the primary function(s) of the skeletal system?

- A) protection from environment
- B) internal transport of materials
- C) support, protection, and mineral storage
- D) delivery of air for gas exchange
- E) locomotion and heat production

Answer: C

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Comprehension*



**Figure 1-1 The Organ Systems of the Human Body**

*Use Figure 1-1 to answer the following question(s):*

- 32) Which organ system is labeled #1?
- A) nervous system
  - B) reproductive system
  - C) integumentary system
  - D) lymphatic system
  - E) muscular system

Answer: C

Learning Outcome: 1-4

Bloom's Taxonomy: Knowledge

33) What is(are) the function(s) of the organ system labeled #3?

- A) help control body temperature
- B) provides support; produces heat
- C) provides support; protects tissues; stores minerals
- D) directs immediate responses to stimuli
- E) defends against infection and disease

Answer: B

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Comprehension*

34) Lungs are to the respiratory system as the spleen is to the

- A) lymphatic system.
- B) urinary system.
- C) digestive system.
- D) cardiovascular system.
- E) muscular system.

Answer: A

*Learning Outcome: 1-4*

*Bloom's Taxonomy: Application*

35) A structure that senses change is called a(n) \_\_\_\_\_.

- A) stimulus
- B) receptor
- C) effector
- D) integration center
- E) control center

Answer: B

*Learning Outcome: 1-5*

*Bloom's Taxonomy: Knowledge*

36) The tendency for physiological systems to stabilize internal conditions with respect to the external environment is called \_\_\_\_\_.

- A) integration
- B) internal regulation
- C) responsiveness
- D) homeostasis
- E) external regulation

Answer: D

*Learning Outcome: 1-5*

*Bloom's Taxonomy: Knowledge*

37) Which component of a homeostatic regulation is characterized by activity that opposes or enhances the stimulus?

- A) balance
- B) control center
- C) integration center
- D) positive feedback loop
- E) effector

Answer: E

*Learning Outcome: 1-5*

*Bloom's Taxonomy: Application*

- 38) It's the middle of winter and a typically healthy person starts to exit a building without a coat, but re-enters the building to retrieve her coat. This regulation mechanism is an example of
- A) negative feedback.
  - B) positive feedback.
  - C) homeostatic regulation.
  - D) diagnostic regulation.
  - E) a behavioral change and is not related to the internal environment.

Answer: E

*Learning Outcome: 1-5*

*Bloom's Taxonomy: Application*

- 39) The prevention of change, by ignoring minor variations and maintaining a normal range rather than a fixed value, is characteristic of
- A) positive feedback.
  - B) stimulus reinforcement.
  - C) negative feedback.
  - D) effector control.
  - E) both positive and negative feedback loops.

Answer: C

*Learning Outcome: 1-6*

*Bloom's Taxonomy: Comprehension*

- 40) The increasingly forceful labor contractions that lead to childbirth are an example of which type of mechanism?
- A) receptor activation
  - B) effector shutdown
  - C) negative feedback
  - D) positive feedback
  - E) thermoregulation

Answer: D

*Learning Outcome: 1-6*

*Bloom's Taxonomy: Comprehension*

- 41) An initial stimulus produces a response that reinforces the stimulus in \_\_\_\_\_.
- A) positive feedback
  - B) homeostasis
  - C) negative feedback
  - D) regulation
  - E) integration

Answer: A

*Learning Outcome: 1-6*

*Bloom's Taxonomy: Comprehension*

42) Which of the following describes a mechanism that brings the internal environment back to normal?

- A) integration
- B) regulation
- C) positive feedback
- D) negative feedback
- E) homeostasis

Answer: D

*Learning Outcome: 1-6*

*Bloom's Taxonomy: Comprehension*

43) Which of the following is an example of negative feedback?

- A) An increase in normal body temperature triggers heat loss through enhanced blood flow to the skin and increased sweating.
- B) An increase in ambient room temperature triggers the thermostat to turn on the heater.
- C) A severe cut triggers accelerated blood clotting until the bleeding stops.
- D) Increased blood sugar stimulates the release of a hormone from the pancreas that stimulates the liver to release blood sugar.
- E) An increase in body temperature triggers a neural response that initiates physiological changes to increase body temperature.

Answer: A

*Learning Outcome: 1-6*

*Bloom's Taxonomy: Application*

44) Regarding components of negative feedback in thermoregulation, what is the correlative of the skeletal muscles?

- A) effector
- B) control center
- C) receptor
- D) integrator
- E) stimulus

Answer: A

*Learning Outcome: 1-6*

*Bloom's Taxonomy: Analysis*

45) A person who is lying on his or her stomach is said to be in the

- A) supine position.
- B) prone position.
- C) transverse position.
- D) frontal position.
- E) sagittal position.

Answer: B

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

46) Which directional term indicates the back of the body?

- A) lateral
- B) proximal
- C) dorsal
- D) ventral
- E) medial

Answer: C

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

47) Which of the following anatomical landmarks corresponds to the groin?

- A) inguinal
- B) cephalon
- C) gluteus
- D) lumbus
- E) thoracis

Answer: A

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

48) Which of the following regions corresponds to the foot?

- A) cervicis
- B) brachium
- C) antebrachium
- D) femur
- E) pes

Answer: E

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

49) A person lying face up in the anatomical position is said to be in the \_\_\_\_\_ position.

- A) coronal
- B) supine
- C) prone
- D) sagittal
- E) lateral

Answer: B

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

50) The forearm is called the \_\_\_\_\_.

- A) acromial
- B) olecranon
- C) antebrachium
- D) lumbus
- E) brachium

Answer: C

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*



51) Which term refers to the posterior of the knee?

- A) popliteus
- B) patella
- C) antecubitis
- D) inguinal
- E) lumbus

Answer: A

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

52) The term \_\_\_\_\_ refers to the wrist.

- A) pes
- B) tarsus
- C) manus
- D) palmar
- E) carpus

Answer: E

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

53) Describe the regional term "antecubitis."

- A) back of knee
- B) midline of back
- C) eye
- D) front of elbow
- E) forearm

Answer: D

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

54) A cut parallel to the long axis of the body would produce a(n) \_\_\_\_\_ section.

- A) coronal
- B) sagittal
- C) frontal
- D) transverse
- E) horizontal

Answer: B

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

55) Using anatomical terms of direction, supply the word that would make the sentence correct.

The stomach is \_\_\_\_\_ to the lungs.

- A) ventral
- B) dorsal
- C) superior
- D) inferior
- E) deep

Answer: D

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

56) Which of the following is medial to the breast?

- A) sternum
- B) shoulder
- C) elbow
- D) digits
- E) knee

Answer: A

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

57) The wrist is \_\_\_\_\_ to the elbow.

- A) proximal
- B) distal
- C) lateral
- D) medial
- E) deep

Answer: B

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

58) The navel is \_\_\_\_\_ to the chin.

- A) anterior
- B) superior
- C) posterior
- D) inferior
- E) medial

Answer: D

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

59) In the terminology of planes and sections, which example includes two terms with identical meanings?

- A) frontal/coronal
- B) coronal/horizontal
- C) equatorial/coronal
- D) sagittal/midsagittal
- E) caudal/cranial

Answer: A

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

60) Anterior is to \_\_\_\_\_ as posterior is to dorsal.

- A) cranial
- B) ventral
- C) caudal
- D) inferior
- E) medial

Answer: B

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

61) A cut passing parallel to the long axis of the body that divides it into **unequal** left and right halves is known as which type of sectional plane?

- A) frontal
- B) coronal
- C) transverse
- D) sagittal
- E) horizontal

Answer: D

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

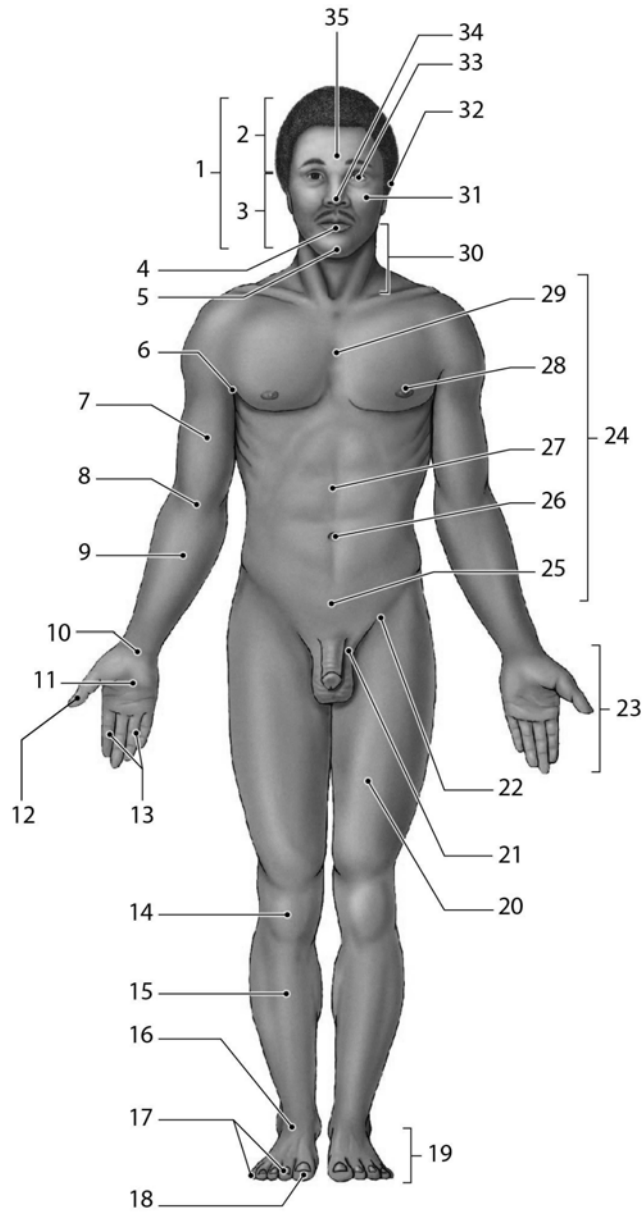
62) A diagnostic technique that employs a radiopaque dye injected into blood vessels is called a(n)

- A) digital subtractive angiography (DSA).
- B) radiograph.
- C) CT scan.
- D) MRI.
- E) ultrasound.

Answer: A

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*



**Figure 1-2 Anatomical Landmarks**

Use Figure 1-2 to answer the following question(s):

63) Which number identifies the cephalon?

- A) 24
- B) 30
- C) 23
- D) 10
- E) 1

Answer: E

Learning Outcome: 1-7

Bloom's Taxonomy: Knowledge

64) Which of the following structures is located superior to the nasus?

- A) 35
- B) 4
- C) 32
- D) 5
- E) 30

Answer: A

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

65) Which number identifies the tarsal region?

- A) 16
- B) 29
- C) 10
- D) 20
- E) 9

Answer: A

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

66) The leg region (#15) is also known by its anatomical term, \_\_\_\_\_.

- A) tarsal
- B) pedal
- C) patellar
- D) crural
- E) carpal

Answer: D

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

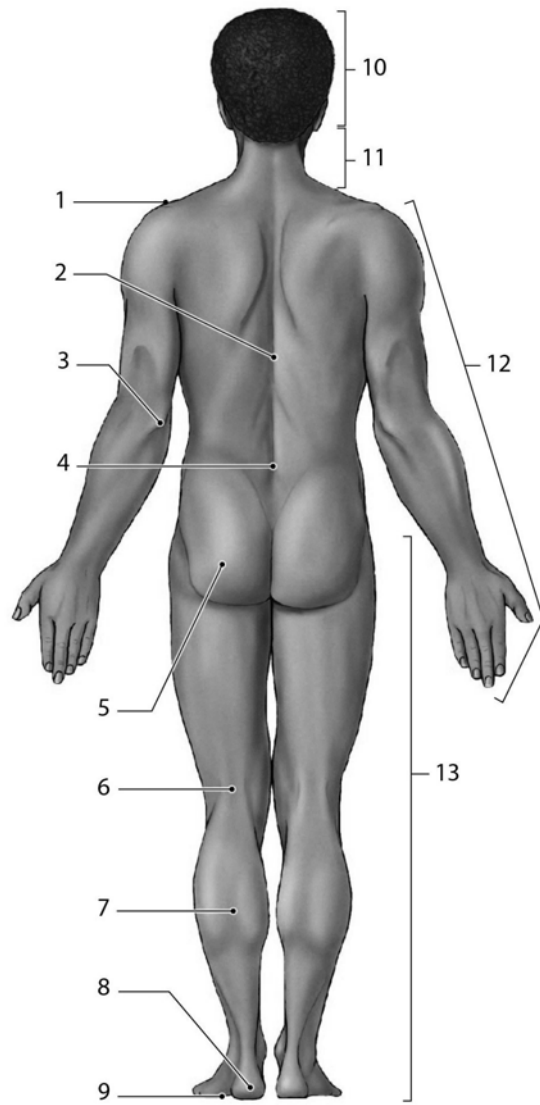
67) The pollex is located in which region?

- A) 18
- B) 23
- C) 12
- D) 14
- E) 16

Answer: C

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*



**Figure 1-3 Anatomical Landmarks**

Use Figure 1-3 to answer the following question(s):

- 68) Which number identifies the olecranal region of the body?
- A) 2
  - B) 3
  - C) 4
  - D) 12
  - E) 13

Answer: B

Learning Outcome: 1-7

Bloom's Taxonomy: Knowledge

69) Which number identifies the acromial region?

- A) 3
- B) 13
- C) 2
- D) 12
- E) 1

Answer: E

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

70) The kneecap is patellar, whereas the back of the knee is \_\_\_\_\_.

- A) crural
- B) pedal
- C) manual
- D) popliteal
- E) pubic

Answer: D

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Knowledge*

71) What is the anatomical term for the calf?

- A) crural
- B) plantar
- C) calcaneal
- D) sural
- E) tarsal

Answer: D

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Comprehension*

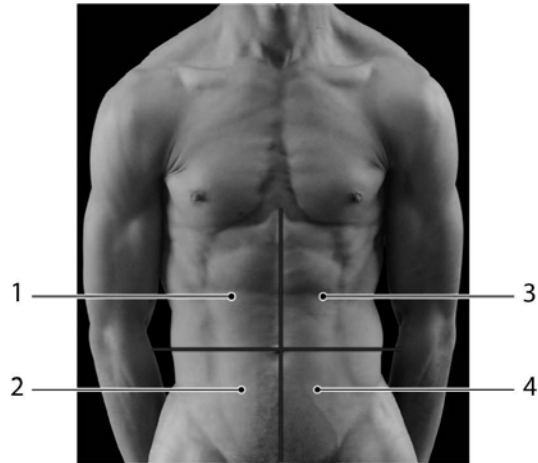


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**Figure 1-4 Abdominopelvic Quadrants**

Use Figure 1-4 to answer the following question(s):

72) Tenderness in which region(s) may be an indication of gallbladder or liver problems?

- A) 2
- B) 4
- C) 1
- D) 3 & 4
- E) 3

Answer: C

Learning Outcome: 1-7

Bloom's Taxonomy: Comprehension

73) The appendix is typically located in which region(s)?

- A) 2
- B) 4
- C) 1
- D) 3
- E) 1 & 3

Answer: A

Learning Outcome: 1-7

Bloom's Taxonomy: Comprehension



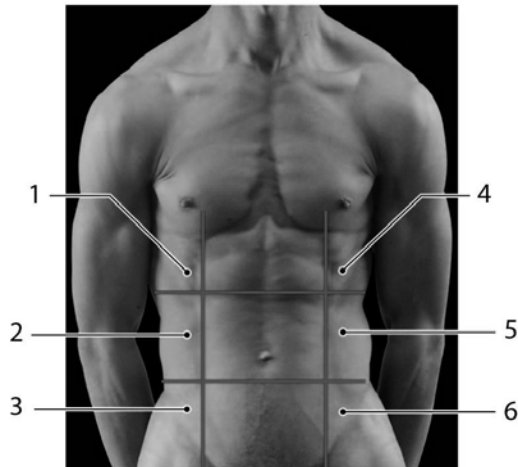


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**Figure 1-5 Abdominopelvic Regions**

Use Figure 1-5 to answer the following question(s):

74) Which of the following is the hypogastric region?

- A) 3
- B) 6
- C) 9
- D) 4
- E) 8

Answer: B

Learning Outcome: 1-7

Bloom's Taxonomy: Knowledge

75) The majority of the stomach and the liver, together, are typically located in which region?

- A) 5
- B) 4
- C) 1
- D) 7
- E) 6

Answer: B

Learning Outcome: 1-7

Bloom's Taxonomy: Analysis

76) The spleen is normally found in which abdominopelvic region?

- A) hypogastric
- B) left inguinal region
- C) right hypochondriac
- D) right lumbar region
- E) left hypochondriac

Answer: E

Learning Outcome: 1-7

Bloom's Taxonomy: Application

77) Choose the directional term to make the following sentence correct.

The knee is \_\_\_\_\_ to the foot.

- A) lateral
- B) medial
- C) superficial
- D) distal
- E) proximal

Answer: E

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Application*

78) The arm is to brachium as the cheek is to \_\_\_\_\_.

- A) cranial
- B) facial
- C) cervical
- D) ocular
- E) buccal

Answer: E

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Application*

79) Mary, who is six months pregnant, goes to her obstetrician for a test to check the development of her fetus. She uses a device that employs sound waves to produce an image of the fetus.

This technique is known as

- A) an X-ray.
- B) a CT scan.
- C) an MRI.
- D) an ultrasound.
- E) radiography.

Answer: D

*Learning Outcome: 1-7*

*Bloom's Taxonomy: Analysis*

80) The heart is surrounded by the \_\_\_\_\_ membrane.

- A) pericardial
- B) peritoneal
- C) visceral
- D) serous
- E) pleural

Answer: A

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Knowledge*

81) The membrane covering the surface of the stomach is named the

- A) parietal pleura.
- B) visceral pleura.
- C) pericardial sac.
- D) visceral peritoneum.
- E) serous membrane.

Answer: D

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Knowledge*

82) The membrane covering the surface of the lung is referred to as the

- A) visceral pericardium.
- B) parietal peritoneum.
- C) visceral pleura.
- D) serous membrane.
- E) mediastinum.

Answer: C

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Knowledge*

83) The heart, lungs, and small intestine would collectively be found in the

- A) dorsal body cavity.
- B) peritoneal cavity.
- C) pleural cavity.
- D) ventral body cavity.
- E) abdominopelvic cavity.

Answer: D

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Comprehension*

84) The diaphragm separates the \_\_\_\_\_ cavity from the \_\_\_\_\_ cavity.

- A) pleural; mediastinum
- B) thoracic; abdominopelvic
- C) pericardial; pleural
- D) abdominal; pelvic
- E) pericardial sac; pericardial

Answer: B

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Comprehension*

85) The main function of a serous membrane is to

- A) reduce friction.
- B) protect organs.
- C) allow blood to pass.
- D) hold organs together.
- E) fill empty spaces.

Answer: A

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Comprehension*

- 86) The peritoneal cavity contains the
- A) heart.
  - B) small intestine.
  - C) lungs.
  - D) diaphragm.
  - E) thymus.

Answer: B

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Comprehension*

- 87) The inner surface of the abdominal body wall is lined by which serous membrane?
- A) visceral pleura
  - B) visceral pericardium
  - C) visceral peritoneum
  - D) parietal pleura
  - E) parietal peritoneum

Answer: E

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Comprehension*

- 88) The mediastinum separates \_\_\_\_\_ from the \_\_\_\_\_.
- A) the pleural cavity; coelom
  - B) the thoracic cavity; peritoneal cavity
  - C) one pleural cavity; other pleural cavity
  - D) the abdominal cavity; pelvic cavity
  - E) the pericardial sac; pericardial cavity

Answer: C

*Learning Outcome: 1-8*

*Bloom's Taxonomy: Comprehension*

## Essay Questions

- 89) It is a warm day and you feel a little chilled. On checking your temperature, you find that your body temperature is 1.5 degrees below normal. Suggest some possible reasons for this situation.

Answer: There are several reasons why your body temperature may have dropped. Your body may be losing heat faster than it is being produced. This, however, is more likely to occur on a cool day. Various chemical factors, such as hormones, may have caused a decrease in your metabolic rate, and thus your body is not producing as much heat as it normally would. Alternatively, you may be suffering from an infection that has temporarily changed the set point of the body's "thermostat." This would seem to be the most likely explanation considering the circumstances given in the question.

*Learning Outcome: 1-5*

*Bloom's Taxonomy: Analysis*

## Chapter 2 The Chemical Level of Organization

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### Multiple-Choice Questions

- 1) The branch of science that investigates matter and its interactions is
- A) biology.
  - B) pathology.
  - C) botany.
  - D) geology.
  - E) chemistry.

Answer: E

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 2) The uncharged subatomic particles are called
- A) atoms.
  - B) molecules.
  - C) protons.
  - D) neutrons.
  - E) electrons.

Answer: D

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 3) Which of the following would have a negative charge?
- A) an atom
  - B) a molecule
  - C) a proton
  - D) a neutron
  - E) an electron

Answer: E

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 4) Atoms that are of the same element but contain different numbers of neutrons are called
- A) isomers.
  - B) cations.
  - C) isotopes.
  - D) anions.
  - E) None of these are correct.

Answer: C

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 5) The atomic number of an atom is determined by the
- A) number of protons.
  - B) number of neutrons.
  - C) number and arrangement of electrons.
  - D) size of the atom.
  - E) mass of the atom.

Answer: A

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 6) Positively charged subatomic particles are called
- A) isotopes.
  - B) neutrons.
  - C) electrons.
  - D) protons.
  - E) radioactivity.

Answer: D

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 7) A(n) \_\_\_\_\_ contains atoms with the same atomic number.
- A) base
  - B) element
  - C) cation
  - D) anion
  - E) enzyme

Answer: B

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 8) The area around the center of an atom, which contains negatively charged subatomic particles, is called the electron \_\_\_\_\_.
- A) cloud
  - B) nucleus
  - C) active site
  - D) buffering zone
  - E) double helix

Answer: A

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 9) Which of the following elements is found in **all** organic molecules?
- A) nitrogen
  - B) oxygen
  - C) iron
  - D) carbon
  - E) copper

Answer: D

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Knowledge*

- 10) Atoms of the same element have the same number of \_\_\_\_\_ but may have a different number of \_\_\_\_\_.

A) protons; electrons  
B) electrons; protons  
C) electrons; neutrons  
D) neutrons; electrons  
E) protons; neutrons

Answer: E

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Comprehension*

- 11) The mass number represents the number of

A) protons in an atom.  
B) electrons in an ion.  
C) neutrons in an atom.  
D) protons and neutrons.  
E) neutrons and electrons.

Answer: D

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Comprehension*

- 12) Which of the following is sometimes used in diagnostic imaging?

A) a radioisotope  
B) a proton  
C) an ion  
D) an atom  
E) an electrolyte

Answer: A

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Comprehension*

- 13) How many electrons do **most** atoms need in their second outer shell in order to be stable?

A) two  
B) three  
C) four  
D) six  
E) eight

Answer: E

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Comprehension*

- 14) If an element is composed of atoms with an atomic number of 8 and a mass number of 14, then an electrically neutral atom of this element contains

A) 6 protons.  
B) 6 neutrons.  
C) 6 electrons.  
D) 14 protons.  
E) 14 electrons.

Answer: B

*Learning Outcome: 2-1*

*Bloom's Taxonomy: Application*

- 15) Which is the correct description of a molecule?
- A) It is an electrically charged atom.
  - B) It cannot be broken down physically.
  - C) It is comprised of two or more elements bonded together.
  - D) It is the smallest unit of matter.
  - E) It is comprised of two or more atoms sharing electrons.

Answer: E

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Knowledge*

- 16) Combinations of atoms that contain two or more different elements are called
- A) molecules.
  - B) compounds.
  - C) mixtures.
  - D) isotopes.
  - E) None of these are correct.

Answer: B

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Knowledge*

- 17) Ions with a negative charge are called
- A) cations.
  - B) anions.
  - C) radicals.
  - D) polyatomic ions.
  - E) None of these are correct.

Answer: B

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Knowledge*

- 18) Covalent bonds are formed when
- A) atoms share electrons.
  - B) cations and anions are held together by their opposite charges.
  - C) electrons are exchanged between atoms.
  - D) hydrogen forms bonds with negatively charged atoms in the same or different molecules.
  - E) two or more atoms lose electrons at the same time.

Answer: A

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Knowledge*

- 19) When an anion and a cation are electrically attracted to each other, \_\_\_\_\_ is formed.
- A) an ion
  - B) a molecule
  - C) a hydrogen bond
  - D) an ionic bond
  - E) a covalent bond

Answer: D

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Knowledge*



20) A molecule containing two atoms of hydrogen and one atom of oxygen in combination is called a(n) \_\_\_\_\_.

- A) oxygen molecule
- B) carbon dioxide molecule
- C) water molecule
- D) hydroxyl molecule
- E) hydroxide molecule

Answer: C

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Knowledge*

21) Ions with a positive charge are called \_\_\_\_\_.

- A) anions
- B) bases
- C) metabolites
- D) cations
- E) acids

Answer: D

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Knowledge*

22) Which of the following is a characteristic of hydrogen bonds?

- A) Hydrogen bonds are strong attractive forces between hydrogen atoms and negatively charged atoms.
- B) Hydrogen bonds occur only in water.
- C) Hydrogen bonds can form between adjacent molecules.
- D) Hydrogen bonds are part of fatty-acid structure.
- E) Hydrogen bonds are part of carbohydrate structure.

Answer: C

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Comprehension*

23) Which of the following is an example of anions?

- A) magnesium
- B) potassium
- C) calcium
- D) chloride
- E) sodium

Answer: D

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Comprehension*

- 24) Matter containing two atoms of the same element that are bonded together by shared electrons are called
- A) molecules.
  - B) cells.
  - C) compounds.
  - D) elements.
  - E) None of these are correct.

Answer: A

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Comprehension*

- 25) Which of the following is a **weak** electrical attraction between molecules?
- A) ionic bond
  - B) covalent bond
  - C) polar bond
  - D) metallic bond
  - E) hydrogen bond

Answer: E

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Comprehension*

- 26) In a molecule of hydrogen, a pair of electrons is shared equally. Such a bond is called a(n)
- A) ionic bond.
  - B) polar covalent bond.
  - C) nonpolar covalent bond.
  - D) oxygen covalent bond.
  - E) hydrogen bond.

Answer: C

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Comprehension*

- 27) If two pairs of electrons are shared between two atoms, what type of bond occurs?
- A) single covalent bond
  - B) double covalent bond
  - C) triple covalent bond
  - D) polar covalent bond
  - E) hydrogen bond

Answer: B

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Comprehension*

- 28) Chlorine atoms have seven electrons in the outermost shell. As a result, one would expect chlorine to form ions with a charge of
- A) +1.
  - B) +2.
  - C) 0.
  - D) -2.
  - E) -1.

Answer: E

*Learning Outcome: 2-2*

*Bloom's Taxonomy: Application*

29) The term that applies to all of the decomposition reactions that occur in metabolism is \_\_\_\_\_.

- A) anabolism
- B) dehydration synthesis
- C) catabolism
- D) ionization
- E) homeostasis

Answer: C

*Learning Outcome: 2-3*

*Bloom's Taxonomy: Knowledge*

30) Reactions that ultimately result in larger molecules formed from smaller ones are called \_\_\_\_\_ reactions.

- A) hydrolysis
- B) reversible
- C) exergonic
- D) dissociation
- E) synthesis

Answer: E

*Learning Outcome: 2-3*

*Bloom's Taxonomy: Knowledge*

31) Which statement about the reaction  $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$  is correct?

- A)  $\text{H}_2$  and  $\text{Cl}_2$  are the products.
- B)  $\text{HCl}$  is the product.
- C) One molecule of hydrogen contains one atom.
- D) One molecule of chlorine contains one atom.
- E) The reaction is unbalanced.

Answer: B

*Learning Outcome: 2-3*

*Bloom's Taxonomy: Comprehension*

32) When two monosaccharides undergo a dehydration synthesis,

- A) a new monosaccharide is formed.
- B) a starch is formed.
- C) a polysaccharide is formed.
- D) a condensation reaction occurs.
- E) hydrolysis occurs.

Answer: D

*Learning Outcome: 2-3*

*Bloom's Taxonomy: Comprehension*

33) Hydrolysis is an example of which type of reaction?

- A) exchange
- B) reversible reaction
- C) anabolism
- D) synthesis reaction
- E) decomposition reaction

Answer: E

*Learning Outcome: 2-3*

*Bloom's Taxonomy: Comprehension*

34) Choose the most accurate definition of *chemical reaction*.

- A) It is a process in which bonds between atoms are formed or broken.
- B) It is the energy of motion.
- C) It is an increase in random molecular motion.
- D) It is movement or a change in the physical structure of matter.
- E) It is the capacity to perform work.

Answer: A

*Learning Outcome: 2-3*

*Bloom's Taxonomy: Comprehension*

35) The reaction  $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$  would be an example of a(n)

- A) exchange reaction.
- B) decomposition reaction.
- C) synthesis reaction.
- D) enzyme reaction.
- E) metabolic reaction.

Answer: C

*Learning Outcome: 2-3*

*Bloom's Taxonomy: Analysis*

36)  $\text{AB} \rightarrow \text{A} + \text{B}$  is to decomposition as  $\text{A} + \text{B} \leftrightarrow \text{AB}$  is to

- A) exchange.
- B) reversible.
- C) combustion.
- D) replacement.
- E) metabolism.

Answer: B

*Learning Outcome: 2-3*

*Bloom's Taxonomy: Analysis*

37) Chemical reactions that occur in the human body are catalyzed by special protein molecules called \_\_\_\_\_.

- A) electrolytes
- B) enzymes
- C) metabolites
- D) steroids
- E) buffers

Answer: B

*Learning Outcome: 2-4*

*Bloom's Taxonomy: Knowledge*

- 38) The addition of energy to start a reaction is called the energy of
- A) endergonic control.
  - B) activation.
  - C) exergonic control.
  - D) release.
  - E) equilibrium.

Answer: B

*Learning Outcome: 2-4*

*Bloom's Taxonomy: Knowledge*

- 39) Chemical reactions that release energy are categorized as \_\_\_\_\_.
- A) endergonic
  - B) catabolic
  - C) anabolic
  - D) hydrolytic
  - E) exergonic

Answer: E

*Learning Outcome: 2-4*

*Bloom's Taxonomy: Knowledge*

- 40) In an endergonic reaction,
- A) large molecules are broken down into smaller ones.
  - B) small molecules are assembled into larger ones.
  - C) molecules are rearranged to form new molecules.
  - D) molecules move from reactants to products and back.
  - E) energy is consumed during the reaction.

Answer: E

*Learning Outcome: 2-4*

*Bloom's Taxonomy: Comprehension*

- 41) Which is the mechanism of enzyme functioning?
- A) Enzymes raise the activation energy of a reaction.
  - B) Enzymes remove hydrogen ions.
  - C) Enzymes lower the activation energy of a reaction.
  - D) Enzymes replace hydrogen ions.
  - E) Enzymes promote complementary base-pairing.

Answer: C

*Learning Outcome: 2-4*

*Bloom's Taxonomy: Comprehension*

- 42) All of the elements and compounds that are eaten and used by the body for some function are called
- A) inorganic compounds.
  - B) organic compounds.
  - C) nutrients.
  - D) metabolites.
  - E) enzymes.

Answer: C

*Learning Outcome: 2-5*

*Bloom's Taxonomy: Knowledge*

43) Which of the following is an essential component of organic compounds?

- A) hydrogen
- B) carbon dioxide
- C) water
- D) calcium
- E) oxygen

Answer: A

*Learning Outcome: 2-5*

*Bloom's Taxonomy: Knowledge*

44) What is the primary composition of organic compounds?

- A) carbon and oxygen atoms
- B) oxygen and hydrogen atoms
- C) oxygen and nitrogen atoms
- D) carbon and hydrogen atoms
- E) nitrogen and carbon atoms

Answer: D

*Learning Outcome: 2-5*

*Bloom's Taxonomy: Knowledge*

45) Which of the following pairs of elements can be classified as inorganic **only**?

- A) sodium and hydrogen
- B) carbon and oxygen
- C) calcium and carbon
- D) hydrogen and carbon
- E) sodium and calcium

Answer: E

*Learning Outcome: 2-5*

*Bloom's Taxonomy: Comprehension*

46) The best definition of organic material is anything that contains

- A) carbon and oxygen covalently bonded.
- B) carbon, oxygen, and hydrogen covalently bonded.
- C) carbon and hydrogen covalently bonded.
- D) hydrogen covalently bonded.
- E) carbon, nitrogen, and hydrogen covalently bonded.

Answer: C

*Learning Outcome: 2-5*

*Bloom's Taxonomy: Comprehension*

47) Which of the following is inorganic?

- A) fatty acid
- B) protein
- C) hydrogen
- D) sodium
- E) glycogen

Answer: D

*Learning Outcome: 2-5*

*Bloom's Taxonomy: Comprehension*

48) Which of the following constitutes most of the total body weight in humans?

- A) water
- B) acids
- C) bases
- D) salts
- E) organic molecules

Answer: A

*Learning Outcome: 2-6*

*Bloom's Taxonomy: Knowledge*

49) A mixture of water and a salt would result in breaking down the salt into a mixture of cations and anions. This process is called \_\_\_\_\_.

- A) dehydration synthesis
- B) dissociation
- C) hydrolysis
- D) condensation reaction
- E) equilibrium

Answer: B

*Learning Outcome: 2-6*

*Bloom's Taxonomy: Knowledge*

50) When individual anions or cations interact with the positive or negative ends of polar water molecules breaking bonds apart, what is this process called?

- A) condensation
- B) anabolism
- C) ionization
- D) equilibrium
- E) saturation

Answer: C

*Learning Outcome: 2-6*

*Bloom's Taxonomy: Comprehension*

51) A solution containing more hydrogen ions than hydroxide ions is

- A) acidic.
- B) basic.
- C) neutral.
- D) alkaline.
- E) organic.

Answer: A

*Learning Outcome: 2-7*

*Bloom's Taxonomy: Knowledge*

52) The most acidic solution would have a pH of \_\_\_\_\_.

- A) 0
- B) 7
- C) 14
- D) 4
- E) 10

Answer: A

*Learning Outcome: 2-7*

*Bloom's Taxonomy: Comprehension*

53) Which of the following substances would be nearest the pH of human blood?

- A) milk, pH  $\approx$ 6.5
- B) pure water, pH  $\approx$ 7
- C) tomato juice, pH  $\approx$ 4
- D) wine, pH  $\approx$ 3
- E) stomach secretions, pH  $\approx$ 1

Answer: B

*Learning Outcome:* 2-7

*Bloom's Taxonomy:* Application

54) Why is it important to precisely regulate the pH of blood or other body fluids?

- A) Blood functions as an excellent solvent.
- B) Blood and other body fluids have a very high heat capacity.
- C) Dehydration synthesis of large molecules occurs.
- D) Hydrogen ions are extremely reactive.
- E) Some organic molecules have polar covalent bonds.

Answer: D

*Learning Outcome:* 2-7

*Bloom's Taxonomy:* Analysis

55) If a substance resists changes in pH, either by removing or replacing hydrogen ions, it is called

- A) neutral.
- B) acidic.
- C) alkaline.
- D) a buffer.
- E) a salt.

Answer: D

*Learning Outcome:* 2-8

*Bloom's Taxonomy:* Knowledge

56) \_\_\_\_\_ are compounds that maintain the pH of solutions within given limits.

- A) Enzymes
- B) Electrolytes
- C) Metabolites
- D) Isotopes
- E) Buffers

Answer: E

*Learning Outcome:* 2-8

*Bloom's Taxonomy:* Knowledge

57) Which of the following are defined as soluble inorganic compounds whose ions will conduct an electric current in solutions?

- A) catalysts
- B) electrolytes
- C) strong acids
- D) buffers
- E) steroid hormones

Answer: B

*Learning Outcome:* 2-8

*Bloom's Taxonomy:* Knowledge



58) During ionization, water molecules disrupt the ionic bonds of a solute, resulting in a mixture of ions that can conduct an electrical current in solution. These ions are called

- A) cations.
- B) anions.
- C) isotopes.
- D) electrolytes.
- E) reactants.

Answer: D

*Learning Outcome: 2-8*

*Bloom's Taxonomy: Knowledge*

59) Why is table salt considered to be a "neutral" solute?

- A) Its dissociation releases hydrogen ions.
- B) Its dissociation does not affect the concentrations of hydrogen ions or hydroxide ions.
- C) It removes or replaces hydrogen ions.
- D) It contains more hydroxide ions than hydrogen ions.
- E) It has a very high heat capacity.

Answer: B

*Learning Outcome: 2-8*

*Bloom's Taxonomy: Comprehension*

60) Which of the following is an example of a strong base?

- A) NaCl
- B) NaOH
- C) HCl
- D) KF
- E) H<sub>2</sub>O

Answer: B

*Learning Outcome: 2-8*

*Bloom's Taxonomy: Comprehension*

61) When placed in solution, an inorganic substance dissociates completely, forming hydrogen ions and anions. This substance would be a

- A) strong base.
- B) weak base.
- C) strong acid.
- D) weak acid.
- E) salt.

Answer: C

*Learning Outcome: 2-8*

*Bloom's Taxonomy: Comprehension*

62) Functionally, carbohydrates are most important as \_\_\_\_\_.

- A) storage of glucose molecules
- B) a part of nucleic acid structure
- C) sources of energy
- D) receptors of the cell surface
- E) insulation under the skin

Answer: C

*Learning Outcome: 2-9*

*Bloom's Taxonomy: Knowledge*

63) The most important metabolic fuel molecule in the body is

- A) sucrose.
- B) starch.
- C) protein.
- D) vitamin B<sub>12</sub>.
- E) glucose.

Answer: E

*Learning Outcome: 2-9*

*Bloom's Taxonomy: Knowledge*

64) Which of the following is an example of a disaccharide?

- A) starch
- B) glycogen
- C) sucrose
- D) cellulose
- E) fructose

Answer: C

*Learning Outcome: 2-9*

*Bloom's Taxonomy: Knowledge*

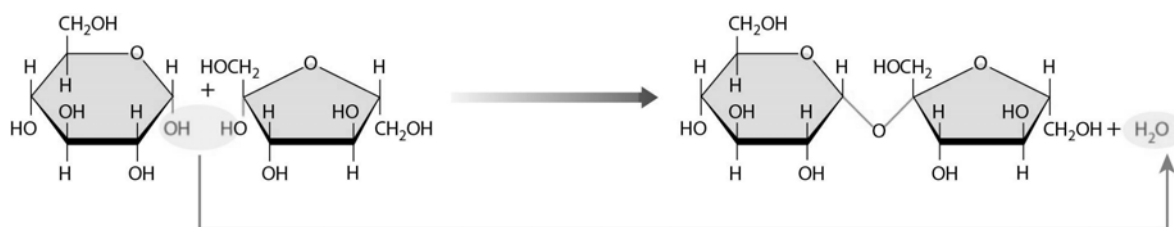
65) Identify the polysaccharide in the following list of molecules.

- A) glycogen
- B) sucrose
- C) glucose
- D) fructose
- E) lactose

Answer: A

*Learning Outcome: 2-9*

*Bloom's Taxonomy: Comprehension*



**Figure 2-1 A Chemical Reaction**

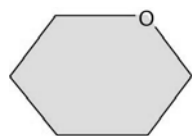
Use Figure 2-1 to answer the following question:

- 66) Determine which reaction is shown in the figure and specify its mechanism of action.
- A) The addition of a water molecule breaks down a complex molecule.
  - B) The removal of a water molecule breaks down a complex molecule.
  - C) Ionic bonds are broken apart as individual ions interact with the positive or negative ends of polar water molecules.
  - D) The removal of a water molecule facilitates the union of two molecules.
  - E) The addition of a water molecule facilitates the union of two molecules.

Answer: D

Learning Outcome: 2-9

Bloom's Taxonomy: Analysis



**Figure 2-2 A Molecule**

Use Figure 2-2 to answer the following question:

- 67) The molecule shown in the figure is considered to be the most important metabolic "fuel" in the body. Choose the best category of molecules to which it belongs.
- A) steroid
  - B) saturated fatty acid
  - C) monoglyceride
  - D) cholesterol
  - E) monosaccharide

Answer: E

Learning Outcome: 2-9

Bloom's Taxonomy: Analysis

68) Lipids are used for which of the following?

- A) to form essential structural components of cells
- B) to provide roughly 10 times as much energy as carbohydrates
- C) to help reduce body temperature
- D) to help protect the skeleton
- E) to carry genetic information

Answer: A

*Learning Outcome: 2-10*

*Bloom's Taxonomy: Comprehension*

69) A class of lipids used as chemical messengers, to signal cells to undergo changes, is called

- A) polysaccharides.
- B) phospholipids.
- C) triglycerides.
- D) steroids.
- E) monoglycerides.

Answer: D

*Learning Outcome: 2-10*

*Bloom's Taxonomy: Comprehension*

70) The group of organic compounds containing mostly carbon and hydrogen with small amounts of oxygen is defined as a(n)

- A) carbohydrate.
- B) lipid.
- C) protein.
- D) nucleic acid.
- E) fatty acid.

Answer: B

*Learning Outcome: 2-10*

*Bloom's Taxonomy: Comprehension*

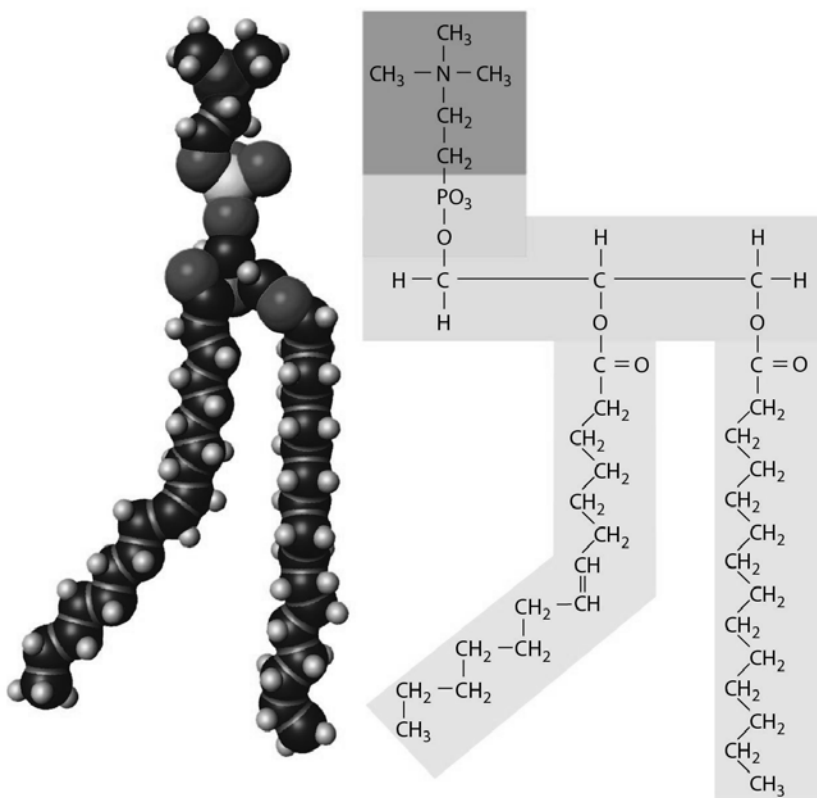
71) A fatty acid that contains only single covalent bonds in its carbon chain is said to be

- A) saturated.
- B) polyunsaturated.
- C) monounsaturated.
- D) hydrogenated.
- E) carboxylated.

Answer: A

*Learning Outcome: 2-10*

*Bloom's Taxonomy: Comprehension*



**Figure 2-3 A Structure**

Use Figure 2-3 to answer the following question:

- 72) Indicate the primary function(s) of the structure shown in the figure.
- A) structural component of cell membranes
  - B) storage of glucose molecules
  - C) energy source
  - D) structural component of cell membranes, hormones, and digestive secretions in bile
  - E) energy source, energy storage, and insulation

Answer: A

Learning Outcome: 2-10

Bloom's Taxonomy: Analysis

- 73) Enzymes

- A) are lipids.
- B) function as biological catalysts.
- C) raise the activation energy for a reaction.
- D) are carbohydrates.
- E) are derived from cholesterol.

Answer: B

Learning Outcome: 2-11

Bloom's Taxonomy: Knowledge

- 74) Substrate molecules bind to enzymes at the
- A) allosteric sites.
  - B) modification sites.
  - C) reaction sites.
  - D) active sites.
  - E) ionic sites.

Answer: D

*Learning Outcome: 2-11*

*Bloom's Taxonomy: Knowledge*

- 75) Proteins are composed of units called
- A) amino acids.
  - B) simple sugars.
  - C) fatty acids.
  - D) adenosines.
  - E) nucleotides.

Answer: A

*Learning Outcome: 2-11*

*Bloom's Taxonomy: Knowledge*

- 76) Each amino acid forms bonds by connecting its carboxyl group to the next amino acid's
- A) central carbon atom.
  - B) amino group.
  - C) carboxyl group.
  - D) hydroxyl group.
  - E) hydroxide group.

Answer: B

*Learning Outcome: 2-11*

*Bloom's Taxonomy: Knowledge*

- 77) Molecules that perform **almost all** cell functions are called
- A) proteins.
  - B) nucleic acids.
  - C) carbohydrates.
  - D) steroids.
  - E) lipids.

Answer: A

*Learning Outcome: 2-11*

*Bloom's Taxonomy: Knowledge*

- 78) Special clotting proteins that restrict bleeding following an injury to the cardiovascular system are an example of which protein function?
- A) support
  - B) transport
  - C) metabolic regulation
  - D) movement
  - E) defense

Answer: E

*Learning Outcome: 2-11*

*Bloom's Taxonomy: Comprehension*

79) Which of the following can be denatured?

- A) enzymes
- B) ions
- C) atoms
- D) molecules
- E) isotopes

Answer: A

*Learning Outcome: 2-11*

*Bloom's Taxonomy: Comprehension*

80) Amino acids contain a central carbon atom adjacent to a(n) \_\_\_\_\_ group and a(n) \_\_\_\_\_ group.

- A) carboxyl; phosphate
- B) nitrogenous; carboxyl
- C) nitrogenous; amino
- D) amino; carboxyl
- E) amino; phosphate

Answer: D

*Learning Outcome: 2-11*

*Bloom's Taxonomy: Comprehension*

81) If a polypeptide contains 9 peptide bonds, how many amino acids does it contain?

- A) 0
- B) 5
- C) 12
- D) 11
- E) 10

Answer: E

*Learning Outcome: 2-11*

*Bloom's Taxonomy: Application*

82) Which of the following is unique to RNA?

- A) glucose
- B) phosphate group
- C) ribose
- D) adenosine triphosphate
- E) deoxyribose

Answer: C

*Learning Outcome: 2-12*

*Bloom's Taxonomy: Knowledge*

83) The nucleic acid DNA

- A) is double stranded.
- B) contains uracil in place of thymine.
- C) contains the pentose ribose.
- D) contains protein bases.
- E) synthesizes lipids.

Answer: A

*Learning Outcome: 2-12*

*Bloom's Taxonomy: Knowledge*

- 84) The molecule DNA contains the unique five-carbon sugar \_\_\_\_\_.  
A) ribose  
B) pentose  
C) deoxyribose  
D) sucrose  
E) fructose

Answer: C

*Learning Outcome: 2-12*

*Bloom's Taxonomy: Knowledge*

- 85) Which nitrogenous base is unique to RNA molecules?  
A) uracil  
B) cytosine  
C) adenine  
D) guanine  
E) thymine

Answer: A

*Learning Outcome: 2-12*

*Bloom's Taxonomy: Knowledge*

- 86) A bond between a phosphate group and a sugar can be found linking together  
A) two simple sugars.  
B) one amino acid to an amino group of another.  
C) two nucleotides.  
D) a fatty acid and a glycerol molecule.  
E) a cholesterol molecule and a fatty-acid molecule.

Answer: C

*Learning Outcome: 2-12*

*Bloom's Taxonomy: Comprehension*

- 87) A DNA nucleotide specifically consists of  
A) a five-carbon sugar and a phosphate group.  
B) a five-carbon sugar and a nitrogen base.  
C) a ribose sugar, a nitrogenous base, and a phosphate group.  
D) a deoxyribose sugar, a nitrogenous base, and a phosphate group.  
E) a five-carbon sugar and an amino acid.

Answer: D

*Learning Outcome: 2-12*

*Bloom's Taxonomy: Comprehension*

- 88) According to the rules of complementary base pairing, a nucleotide containing the base cytosine would only pair with a nucleotide containing the base  
A) thymine.  
B) adenine.  
C) uracil.  
D) cytosine.  
E) guanine.

Answer: E

*Learning Outcome: 2-12*

*Bloom's Taxonomy: Application*



89) A(n) \_\_\_\_\_ bond is a covalent bond that stores an unusually large capacity to perform work.

- A) high-energy
- B) polar covalent
- C) ionic
- D) electrically neutral
- E) peptide

Answer: A

*Learning Outcome: 2-13*

*Bloom's Taxonomy: Knowledge*

90) The hydrolysis of ATP yields the molecule \_\_\_\_\_.

- A) adenine
- B) phospholipid
- C) ribose
- D) thymine
- E) adenosine diphosphate

Answer: E

*Learning Outcome: 2-13*

*Bloom's Taxonomy: Comprehension*

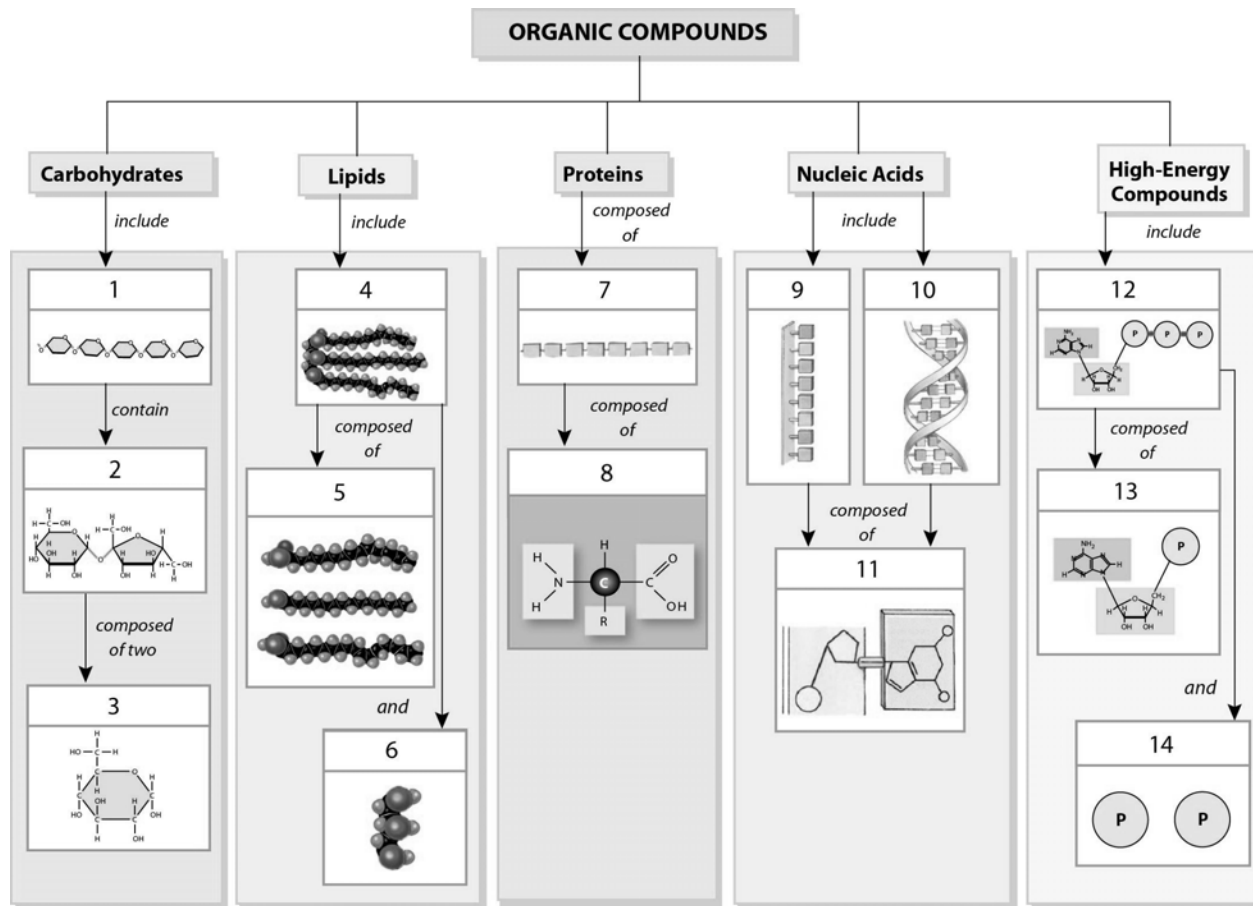
91) Choose the correct pairing of macromolecule type to its function.

- A) lipid – manufactures proteins
- B) DNA – controls reaction rates
- C) carbohydrate – major source of energy
- D) protein – comprises majority of membrane structure
- E) RNA – determines our inherited characteristics

Answer: C

*Learning Outcome: 2-13*

*Bloom's Taxonomy: Comprehension*



**Figure 2-4 An Overview of the Structures of Organic Compounds in the Body**

Use Figure 2-4 to answer the following question(s):

92) Glucose-based starches are an example of the structure labeled #1. Identify the structure.

- A) triglyceride
- B) polysaccharide
- C) glycerol
- D) steroid
- E) phospholipid

Answer: B

Learning Outcome: 2-13

Bloom's Taxonomy: Comprehension

93) Identify the structure labeled #5, a component of triglycerides, which is comprised of long chains of carbon atoms with attached hydrogen atoms that end in a carboxyl group.

- A) glycerol
- B) monosaccharide
- C) amino acid
- D) nucleotide
- E) fatty acid

Answer: E

*Learning Outcome: 2-13*

*Bloom's Taxonomy: Comprehension*

94) Identify the structure labeled #8, which is a building block of proteins.

- A) nucleic acid
- B) peptide
- C) amino acid
- D) monosaccharide
- E) lauric acid

Answer: C

*Learning Outcome: 2-13*

*Bloom's Taxonomy: Comprehension*

95) What is/are the primary function(s) of the structure labeled #9?

- A) determines an individual's inherited characteristics
- B) structural role when attached to lipids
- C) energy source; insulation
- D) manufactures specific proteins
- E) storage or transfer of energy

Answer: D

*Learning Outcome: 2-13*

*Bloom's Taxonomy: Comprehension*

96) Phospholipids consist of \_\_\_\_\_ linked to a non-lipid group by a phosphate group.

- A) four connected rings of carbon atoms
- B) a glycerol and three fatty acids
- C) a glycerol and two fatty acids
- D) long chains of carbon atoms with attached hydrogen atoms that end in a carboxyl group
- E) interconnected glucose molecules

Answer: C

*Learning Outcome: 2-14*

*Bloom's Taxonomy: Comprehension*

## Essay Questions

- 97) A certain reaction pathway consists of four steps. How would increasing the amount of enzyme that catalyzes in the third step affect the amount of product produced at the end of the pathway?

Answer: Increasing the amount of enzyme at the third step might not affect the whole series of reactions because the rate of the first, second, and fourth enzymes would remain the same. While more substrate would be available for the next step, that doesn't necessarily mean that the fourth enzyme will increase its speed. The net result would be no change if the first, second, and fourth enzymes were working optimally before the change is made. On the other hand, there could be an increase in the amount of product if the first, second, and fourth enzymes were working at below optimum before the change.

*Learning Outcome: 2-4*

*Bloom's Taxonomy: Analysis*

- 98) Why is it life-threatening to have a low pH?

Answer: A low pH can be life-threatening because the change in hydrogen ion concentration can cause certain proteins, such as vital enzymes, to become inactive. When this occurs, the proteins become nonfunctional, and if they catalyze reactions that are necessary for life, life will cease.

*Learning Outcome: 2-7*

*Bloom's Taxonomy: Comprehension*

- 99) How does the RNA molecule differ from a DNA molecule?

Answer: RNA is usually single stranded and DNA is double stranded. RNA contains ribose sugars and DNA contains deoxyribose sugars. DNA contains the nitrogenous bases A, G, C, and T, while RNA contains A, G, C, and U.

*Learning Outcome: 2-12*

*Bloom's Taxonomy: Comprehension*