

**MULTIPLE CHOICE**

1. Moving substances into or out of a cell using energy is
- active transport.
  - passive transport.
  - osmosis.
  - diffusion.

ANS: A                    DIF: 1                    REF: p. 12

2. Which of the following is the compound that stores energy?
- Deoxyribonucleic acid
  - Adenosine triphosphate
  - Ribonucleic acid
  - Water

ANS: B                    DIF: 1                    REF: p. 8

3. What is the chemical process in the body that joins simple compounds to form more complex compounds, such as carbohydrates, lipids, proteins, and nucleic acids?
- Catabolism
  - Metabolism
  - Anabolism
  - Meiosis

ANS: C                    DIF: 1                    REF: p. 8

4. What is the study of the structures of the body and the relationship of its parts?
- Physiology
  - Pathology
  - Kinesiology
  - Anatomy

ANS: D                    DIF: 1                    REF: p. 4

5. The part of epithelial cells exposed to the atmosphere or a passageway in the body is what surface?
- Apical
  - Outer
  - Superficial
  - Basal

ANS: A                    DIF: 1                    REF: p. 14

6. What is the smallest particle of an element that retains and exhibits the properties of that element?
- Proton
  - Atom
  - Neutron
  - Electron

ANS: B                    DIF: 1                    REF: p. 7

7. A decrease in the size of a body part or organ caused by a decrease in the size of the cells is
- hypertrophy.
  - trophy.
  - atrophy.
  - hypotrophy.

ANS: C                    DIF: 1                    REF: p. 14

8. The part of the tissue that faces the inside of the body is what type of surface?
- Apical
  - Outer
  - Inner
  - Basal

ANS: D                    DIF: 1                    REF: p. 14

9. Which of the following is the structure that attaches epithelial tissues to the underlying connective tissues?
- Basement membrane
  - Tissue matrix
  - Connective sheath
  - Cell membrane

ANS: A                    DIF: 1                    REF: p. 14

10. Sugars, starches, and cellulose composed of carbon, hydrogen, and oxygen are categorized as
- proteins.
  - carbohydrates.
  - lipids.
  - amino acids.
- ANS: B            DIF: 1            REF: p. 9
11. What type of fibers are found in the heart?
- Collagenous
  - Reticular
  - Cardiac muscle
  - Smooth muscle
- ANS: C            DIF: 1            REF: p. 18
12. What chemical process in the body releases energy as complex compounds are broken down into simpler ones?
- Anabolism
  - Metabolism
  - Digestion
  - Catabolism
- ANS: D            DIF: 1            REF: p. 8
13. The basic structural unit of a living organism is the
- cell.
  - atom.
  - molecule.
  - organelle.
- ANS: A            DIF: 1            REF: p. 13
14. A protein substance composed of small fibrils that combine to create the connective tissue of fasciae, tendons, and ligaments is
- smooth muscle.
  - collagen.
  - elastin.
  - phospholipid bilayer.
- ANS: B            DIF: 1            REF: p. 1
15. Which of the following can withstand the most tension force because it has a high degree of tensile strength?
- Collagen
  - Elastin
  - Reticular fibers
  - Cardiac muscle fibers
- ANS: A            DIF: 1            REF: p. 15
16. What constitutes approximately one fourth of the protein in the body?
- Blood
  - Nerves
  - Collagen
  - Amino acids
- ANS: C            DIF: 1            REF: p. 15
17. Strength with little capacity for stretch describes what type of fibers?
- Reticular
  - Elastin
  - Smooth muscle
  - Collagenous
- ANS: D            DIF: 1            REF: p. 15
18. Supporting and holding together the body and its parts body describes what type of tissue?
- Connective
  - Epithelial
  - Muscle
  - Nervous
- ANS: A            DIF: 1            REF: p. 15
19. The fluid inside the cell membrane is known as
- cytoskeleton.
  - cytosol.
  - endoplasmic reticulum.
  - microvilli.
- ANS: B            DIF: 1            REF: p. 13

20. What is the material enclosed by the cell membrane?  
a. Cytoplasm  
b. Collagen  
c. Inorganic compounds  
d. Matrix  
ANS: A            DIF: 1            REF: p. 13
21. What is the framework of proteins inside the cell that provides flexibility and strength?  
a. Cytosol  
b. Cytoskeleton  
c. Cytoplasm  
d. Cell membrane  
ANS: B            DIF: 1            REF: p. 13
22. The movement of ions and molecules from an area of higher concentration to that of lower concentration is  
a. passive transport.  
b. active transport.  
c. conductivity.  
d. permeability.  
ANS: A            DIF: 1            REF: p. 12
23. What is the genetic material of the cell that carries the chemical “blueprint” of the body?  
a. RNA  
b. Nucleolus  
c. Lysosome  
d. DNA  
ANS: D            DIF: 1            REF: p. 1
24. What type of fiber returns to its original length after being stretched?  
a. Elastic  
b. Reticular  
c. Nerve  
d. Collagenous  
ANS: A            DIF: 1            REF: p. 15
25. What substance contains only a single kind of atom?  
a. Compound  
b. Element  
c. Protein  
d. Carbohydrate  
ANS: B            DIF: 1            REF: p. 7
26. The process of bringing particles inside the cell by engulfing them and forming vesicles is  
a. exocytosis.  
b. carrier-mediated transport.  
c. endocytosis.  
d. cellular respiration.  
ANS: C            DIF: 1            REF: p. 12
27. A network of tubular intracellular membranes that is connected to the nuclear membrane is  
a. mitochondria.  
b. ribosome.  
c. lysosome.  
d. endoplasmic reticulum.  
ANS: D            DIF: 1            REF: p. 13
28. What is the term for the capacity to work?  
a. Energy  
b. ATP  
c. Transport  
d. Elasticity  
ANS: A            DIF: 1            REF: p. 8
29. Covering and lining the surface of the body and body cavities, and forming glands, describes what type of tissue?  
a. Connective  
b. Epithelial  
c. Muscle  
d. Nervous  
ANS: B            DIF: 1            REF: p. 14

30. The type of tissue that is usually found in areas that move substances into and out of the body during secretion, absorption, and excretion is \_\_\_\_\_ tissue.
- nervous
  - muscular
  - epithelial
  - connective
- ANS: C                    DIF: 1                    REF: p. 14
31. What is the term for the movement of substances out of a cell?
- Endocytosis
  - Phagocytosis
  - Endometriosis
  - Exocytosis
- ANS: D                    DIF: 1                    REF: p. 12
32. The study of body structures visible to the naked eye is what type of anatomy?
- Gross
  - Systemic
  - Surface
  - Regional
- ANS: A                    DIF: 1                    REF: p. 4
33. What is the term for the relatively constant state of the internal environment of the body that is maintained by adaptive responses?
- Negative feedback
  - Homeostasis
  - Positive feedback
  - Control
- ANS: B                    DIF: 1                    REF: p. 5
34. Which of the following bonds occurs between positively and negatively charged atoms?
- Covalent
  - Polar covalent
  - Ionic
  - Hydrogen
- ANS: C                    DIF: 1                    REF: p. 8
35. An increase in the size of a cell that results in an increase in the size of a body part or organ is
- atrophy.
  - swelling.
  - hypertonicity.
  - hypertrophy.
- ANS: D                    DIF: 1                    REF: p. 14
36. What is the quality of not permitting entry of certain substances?
- Impermeable
  - Semipermeable
  - Resistant
  - Solid
- ANS: B                    DIF: 1                    REF: p. 12
37. Which of the following are chemical structures that do not have carbon and hydrogen atoms as the primary structure?
- Organic compounds
  - Inorganic compounds
  - Ions
  - Molecules
- ANS: B                    DIF: 1                    REF: p. 9
38. What is the period during which a cell grows and carries on its internal activities?
- Anaphase
  - Metaphase
  - Interphase
  - Prophase
- ANS: C                    DIF: 1                    REF: p. 14
39. Carriers that transport substances into or out of a cell using energy are known as
- compounds.
  - carrier cells.
  - high-energy bonds.
  - pumps.
- ANS: D                    DIF: 1                    REF: p. 12

40. Fats and oils are also known as
- lipids.
  - proteins.
  - starches.
  - fibers.
- ANS: A            DIF: 1            REF: p. 11
41. What is the cell organelle that is part of the intracellular digestive system?
- Endoplasmic reticulum
  - Lysosome
  - Golgi apparatus
  - Nucleus
- ANS: B            DIF: 1            REF: p. 13
42. Which of the following is the basic substance between the cells of a tissue?
- Matrix
  - Ground substance
  - Insulation
  - Plasma
- ANS: A            DIF: 1            REF: p. 14
43. Which of the following is composed of an amorphous ground substance consisting of molecules that expand when water molecules and electrolytes bind to them?
- Gelatin
  - Matrix
  - Inorganic compound
  - Elements
- ANS: B            DIF: 1            REF: p. 2
44. What is the type of cell division in which each daughter cell receives half the normal number of chromosomes, forming two reproductive cells?
- Anaphase
  - Interphase
  - Meiosis
  - Mitosis
- ANS: C            DIF: 1            REF: p. 14
45. What is the thin sheetlike layer of tissue that covers a cell (or an organ, or some other structure), lines a tube or cavity, or divides or separates one part from another?
- Adipose
  - Muscle tissue
  - Nerve tissue
  - Membrane
- ANS: D            DIF: 1            REF: p. 14
46. The chemical process in the body that converts food and oxygen into energy to support growth, distribution of nutrients, and elimination of waste is known as
- metabolism.
  - reproduction.
  - absorption.
  - hydration.
- ANS: A            DIF: 1            REF: p. 8
47. Molecules synthesized or broken down inside the body by chemical reactions are known as
- transport ions.
  - ground substance.
  - metabolites.
  - matrix.
- ANS: C            DIF: 1            REF: p. 8
48. What are the small projections of the cell membrane that increase the surface area of the cell?
- Golgi apparatus
  - Endoplasmic reticulum
  - Flagellum
  - Microvilli
- ANS: D            DIF: 1            REF: p. 13
49. "Rod- or oval-shaped cell organelles" describes which of the following?
- Mitochondria
  - Endoplasmic reticulum
  - Nucleolus
  - Golgi apparatus
- ANS: A            DIF: 1            REF: p. 2

50. The type of cell division in which the cell duplicates its DNA and divides into two identical daughter cells is
- meiosis.
  - mitosis.
  - catabolism.
  - anabolism.
- ANS: B            DIF: 1            REF: p. 2
51. The genetic material in the cell is which molecule?
- Collagen
  - Elastin
  - DNA
  - Matrix
- ANS: C            DIF: 1            REF: p. 9
52. The essential elements and molecules obtained from the diet that are required by the body for normal body function are
- enzymes.
  - metabolites.
  - ATP.
  - nutrients.
- ANS: D            DIF: 1            REF: p. 9
53. What are the basic cellular components that perform specific functions within the cell?
- Organelles
  - Golgi apparatus
  - Endoplasmic reticulum
  - Phagocytes
- ANS: A            DIF: 1            REF: p. 11
54. Substances that have carbon and hydrogen as part of their basic structure are
- inorganic compounds.
  - organic compounds.
  - ground substance.
  - connective tissue.
- ANS: B            DIF: 1            REF: p. 9
55. The term for diffusion of water in a solution from a region of lower concentration to a region of higher concentration across the semipermeable membrane of a cell is
- edema.
  - hypertrophy.
  - osmosis.
  - metabolism.
- ANS: C            DIF: 1            REF: p. 12
56. What is the transportation of a substance across the cell membrane without the use of energy?
- Osmosis
  - Active transport
  - Diffusion
  - Passive transport
- ANS: D            DIF: 1            REF: p. 12
57. Endocytosis followed by digestion of the vesicle contents by enzymes present in the cytoplasm is
- phagocytosis.
  - metabolism.
  - homeostasis.
  - exocytosis.
- ANS: A            DIF: 1            REF: p. 16
58. What is the cell membrane that is made up of lipids, carbohydrates, and proteins?
- Basal membrane
  - Phospholipid bilayer
  - Epithelial membrane
  - Ground substance
- ANS: B            DIF: 1            REF: p. 11
59. The study of the processes and functions of the body involved in supporting life is known as
- anatomy.
  - pathology.
  - physiology.
  - kinesiology.
- ANS: C            DIF: 1            REF: p. 4

60. What are substances formed from amino acids?  
a. Lipids  
b. Fats  
c. Carbohydrates  
d. Proteins  
ANS: D            DIF: 1            REF: p. 11
61. The study of the structures of a particular area of the body is what type of anatomy?  
a. Regional  
b. Gross  
c. Superficial  
d. Surface  
ANS: A            DIF: 1            REF: p. 4
62. Occurring in networks and supporting small structures such as capillaries, nerve fibers, and the basement membrane are which type of fibers?  
a. Collagenous  
b. Reticular  
c. Elastin  
d. Tensile  
ANS: B            DIF: 1            REF: p. 15
63. The transfer of genetic information is performed by  
a. collagen.  
b. DNA.  
c. RNA.  
d. matrix.  
ANS: C            DIF: 1            REF: p. 9
64. The large cross-striated cells that are connected to the skeleton are which type of muscle fiber?  
a. Smooth  
b. Cardiac  
c. Visceral  
d. Skeletal  
ANS: D            DIF: 1            REF: p. 18
65. Regulating blood flow through the cardiovascular system, propelling food through the gut, and squeezing secretions from glands describes which type of muscle fibers?  
a. Smooth  
b. Cardiac  
c. Skeletal  
d. Visceral  
ANS: A            DIF: 1            REF: p. 18
66. The study of internal organs and structures as they can be recognized and related to external features is what type of anatomy?  
a. Superficial  
b. Surface  
c. Regional  
d. Gross  
ANS: B            DIF: 1            REF: p. 4
67. The study of the structure of a particular body system is what type of anatomy?  
a. Superficial  
b. Regional  
c. Systemic  
d. Surface  
ANS: C            DIF: 1            REF: p. 4
68. A group of similar cells combined to perform a common function is known as which of the following?  
a. Organ  
b. System  
c. Organism  
d. Tissue  
ANS: D            DIF: 1            REF: p. 14
69. The field of anatomy includes which of the following types of subdivisions?  
a. Developmental, organizational, gross, and physiologic  
b. Organizational, gross, regional, systemic, and pathologic  
c. Developmental, gross, surface, and pathologic  
d. Developmental, gross, regional, systemic, and surface  
ANS: D            DIF: 2            REF: p. 4

70. The study of physiology can be divided into what three approaches?
- Gross, surface, and pathologic
  - Developmental, regional, and pathophysiologic
  - Developmental, organizational, and pathophysiologic
  - Organizational, pathophysiologic, and systemic
- ANS: D            DIF: 2            REF: p. 4
71. Mitochondria and lysosomes are examples of
- molecules.
  - organelles.
  - proteins.
  - elements.
- ANS: B            DIF: 1            REF: pp. 11-13
72. Covering and protecting the surface of the body and its parts is a function of which type of tissue?
- Connective
  - Collagenous
  - Epithelial
  - Cartilaginous
- ANS: C            DIF: 1            REF: p. 14
73. The chemical process that joins simple compounds to form complex compounds of carbohydrates, lipids, proteins, and nucleic acids is
- anabolism.
  - physiology.
  - catabolism.
  - active transport.
- ANS: A            DIF: 3            REF: p. 8
74. Active transport is the movement of substances into or out of a cell using
- gravity.
  - osmosis.
  - energy.
  - meiosis.
- ANS: C            DIF: 2            REF: p. 12
75. Skin cancer that originates in the tissue surface that faces the inside of the body means it originates in the
- basement membrane.
  - apical surface.
  - basal surface.
  - matrix material.
- ANS: C            DIF: 3            REF: p. 14
76. The chemical process in the body that releases energy as complex compounds are broken down is
- active transport.
  - anabolism.
  - phagocytosis.
  - catabolism.
- ANS: D            DIF: 2            REF: p. 8
77. If yin corresponds to the structure of the lungs, what does yang correspond to?
- Air passageways within the lung itself
  - Coverings of the lungs
  - Swallowing food
  - The breathing process
- ANS: D            DIF: 3            REF: p. 18
78. How internal organs and structures can be recognized and related to external features on the outside of the body is what type of anatomy?
- Systemic
  - Surface
  - Regional
  - Gross
- ANS: B            DIF: 3            REF: p. 4
79. What is the movement of ions and molecules from an area of higher concentration to that of a lower concentration?
- Diffusion
  - Mitosis
  - Meiosis
  - Osmosis
- ANS: A            DIF: 2            REF: p. 12

80. Skeletal muscle fibers can be described by which of the following?  
a. Small connective cells  
b. Cross-striated  
c. Involuntary  
d. Having limited blood flow  
ANS: B            DIF: 3            REF: p. 18
81. The chemical composition of lipids, carbohydrates, and proteins are described chemically as  
a. having the same amount of carbon, hydrogen, and oxygen.  
b. some having nucleic acids and others not.  
c. some incorporating ATP into their structures and others not.  
d. having different amounts of carbon, hydrogen, and oxygen.  
ANS: D            DIF: 3            REF: p. 11
82. Which one of the following fibers is found in connective tissue?  
a. Reticular  
b. Cardiac  
c. Skeletal  
d. Smooth  
ANS: A            DIF: 1            REF: p. 15
83. What is the most abundant type of tissue in the body?  
a. Muscle  
b. Nervous  
c. Connective  
d. Epithelial  
ANS: C            DIF: 1            REF: p. 15
84. Engulfing particles located outside the cell membrane by forming vesicles and bringing it into the cell but not digesting the vesicle is  
a. phagocytosis.  
b. endocytosis.  
c. osmosis.  
d. diffusion.  
ANS: B            DIF: 2            REF: p. 12
85. The movement of substances out of a cell is  
a. exocytosis.  
b. endocytosis.  
c. osmosis.  
d. phagocytosis.  
ANS: A            DIF: 2            REF: p. 12
86. The movement of substances from an area of higher concentration to an area of lower concentration is  
a. diffusion.  
b. endocytosis.  
c. exocytosis.  
d. active transport.  
ANS: A            DIF: 2            REF: p. 12
87. The human body's adaptability in maintaining a relatively constant internal environment even though the outside temperature is freezing is an example of  
a. meiosis.  
b. metabolism.  
c. anabolism.  
d. homeostasis.  
ANS: D            DIF: 3            REF: p. 5
88. A massage practitioner is effective with palpation and observation skills. During assessment, he identified asymmetry in the shoulders and hips. In which of the following has he invested the effort to become proficient?  
a. Pathophysiology  
b. Developmental anatomy  
c. Characteristics of life  
d. Gross and surface anatomy  
ANS: D            DIF: 3            REF: p. 4
89. The influence of massage on neurochemicals and their effects describes how massage interacts with  
a. systemic anatomy.  
b. yin and yang.  
c. physiology.  
d. organizational structure.  
ANS: C            DIF: 3            REF: p. 4

90. Which of the following is an accurate statement of how the study of chemistry relates to massage?
- Current research is attempting to identify the mechanism of massage effect, and body chemistry is being investigated as a possibility.
  - The building blocks at the cellular level influence the visceral anatomy, which in turn influences palpation assessment during massage application.
  - Gross anatomy and pathophysiology are both representatives of the nucleic acids and the phospholipid membrane.
  - Elements, including atoms and molecules, are the basis of the law of five-element theory in Chinese medicine.

ANS: A            DIF: 3            REF: p. 5

91. During massage application, kneading the tissue increases its pliability. The best description of this benefit is the
- piezoelectric property of nervous tissue.
  - interrelationship of prana with qi.
  - thixotropic nature of ground substance.
  - the activation of mast cells.

ANS: C            DIF: 3            REF: p. 15

92. The study of bones is best described as
- body divided into its systems.
  - body structures visible to the naked eye.
  - cellular physiology.
  - processes and functions of the body.

ANS: A            DIF: 1            REF: p. 18|p. 19

93. What does physiology explain?
- Functions of the body that support life
  - Wholeness of the structure of the body
  - How the body is laid out like a map
  - How the different parts of the body connect to each other

ANS: A            DIF: 1            REF: p. 4

94. Yin and yang combine to form a whole unit and describe
- the physiology of thinking.
  - how solid organs form.
  - the relationship of opposites.
  - physiology in terms of Western science.

ANS: C            DIF: 1            REF: p. 5

95. Which of the following is a characteristic of life?
- Movement
  - Growth
  - Excretion
  - All of the above

ANS: D            DIF: 1            REF: p. 6

96. Metabolism occurs in which body organization level?
- System
  - Organelle
  - Chemical
  - Tissue

ANS: C            DIF: 1            REF: p. 8

97. The organ level of organization would explain the structure and function of the
- body.
  - cardiac cell.
  - lungs.
  - epithelial tissues.

ANS: C            DIF: 1            REF: p. 18

98. The matrix of connective tissue includes
- alignment of the cells.
  - the basement membrane.
  - shapeless ground substance.
  - smooth muscle fibers.

ANS: C            DIF: 1            REF: p. 15

99. Blood and bone are both types of which of the following structures?
- Adipose tissue
  - Connective tissue
  - Cartilage
  - Membranes

ANS: B            DIF: 1            REF: p. 15

100. The main characteristic of muscle tissue is what ability?

- a. Coordinates and regulates body activity
- b. Performs more complex body functions
- c. Functions in the body without any attachment to connective tissue
- d. Provides movement by shortening

ANS: D                    DIF: 1                    REF: p. 18

101. Considering the body as a whole integrated unit with each and every part influencing the rest, which of the following statements is the most accurate?

- a. Medications functioning at a chemical level would be isolated to organelle production of magnesium and therefore would have fewer side effects than catabolism.
- b. Energy is the capacity to do work, and work is a movement or change in the physical structure of matter. An example of kinetic energy is when a massage using a method that glides along the skin is given.
- c. If connective tissue is the support structure of the body, then it would be best studied at a cellular level with a microscope and isolated to individual cellular function.
- d. Based on the overview of the body as a whole, only those massage applications that affect the muscle tissue provide benefits.

ANS: B                    DIF: 3                    REF: p. 8

102. A practicing massage therapist is asked to justify how massage to the surface of the body can influence cellular function. Which of the following would be the most accurate response?

- a. Massage directly affects the function of the cell when pressure is applied to the tissues. The response is isolated to mechanical force deformation of the cell wall.
- b. Massage can move fluid in the body, which then stimulates cellular division and DNA mutation, with the resulting changes in organ function.
- c. Massage indirectly influences homeostatic function of the body at an organism level, supporting efficient physiologic function.
- d. Massage indirectly influences metabolism, which produces phagocytes, in turn building strength in the cellular wall.

ANS: C                    DIF: 3                    REF: p. 6

103. The scientific method is very similar to

- a. critical thinking.
- b. physical assessment.
- c. biomechanics.
- d. kinesiology.

ANS: A                    DIF: 1                    REF: p. 3

104. What is the proper sequence used during the Clinical Reasoning process?

- a. Investigate the problem. Gather assessment information and factual data. Create a list of possible causes and solutions. Ask questions about (analyze) each of the possible causes and potential solutions. Inquire about the values, beliefs, and feelings of the people involved. Develop a plan. Implement the plan. Evaluate and adjust the plan.
- b. Create a list of possible causes and solutions. Ask questions about (analyze) each of the possible causes and potential solutions. Investigate the problem. Gather assessment information and factual data. Inquire about the values, beliefs, and feelings of the people involved. Develop a plan. Implement the plan. Evaluate and adjust the plan.
- c. Investigate the problem. Develop a plan. Implement the plan. Gather assessment information and factual data. Create a list of possible causes and solutions. Ask questions about (analyze) each of the possible causes and potential solutions. Inquire about the values, beliefs, and feelings of the people involved. Evaluate and adjust the plan.
- d. Develop a plan. Implement the plan. Evaluate and adjust the plan. Investigate the problem. Gather assessment information and factual data. Create a list of possible causes and solutions. Ask questions about (analyze) each of the possible causes and potential solutions. Inquire about the values, beliefs, and feelings of the people involved.

ANS: A                    DIF: 2                    REF: p. 3