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Name: _____ Class: _____ Date: _____

Chapter 1 - The Foundation of Physiology

1. Which of these statements does NOT apply to the study of physiology?
   a. identifying the location of the stomach and how it is related to the location of the pancreas
   b. describing the factors that affect cardiac output
   c. describing the process by which nerve impulses are transmitted
   d. explaining how the hormone thyroxin is synthesized in the thyroid glands

ANSWER: a

2. Which one of these pairs is correctly matched?
   a. anatomy/body function
   b. bacteria/multicellular
   c. organs/one primary tissue
   d. physiology/body function

ANSWER: d

3. Which of the following is a mechanistic rather than a teleological explanation of a physiological phenomenon?
   a. A person breathes to obtain oxygen.
   b. A person sweats to cool off.
   c. A person's stomach secretes digestive juices because it is stimulated by the nervous system.
   d. A person's heart beats to pump blood.

ANSWER: c

4. Which one of these sequences represents the hierarchy of biological organization?
   a. cell, organ, tissue, system, organism
   b. cell, tissue, organ, system, organism
   c. tissue, cell, system, organism, organ
   d. tissue, cell, organism, system, organ

ANSWER: b

5. Which progression represents the hierarchy of organization, from simplest to more complex?
   a. atom, cell, tissue, organ, system, organism
   b. tissue, cell, system, organism, organ, body
   c. system, atom, cell, organ, tissue, organism
   d. atom, molecule, compound, cell, body, organism

ANSWER: a

6. Which of these types of tissues uses the terminology "smooth"?
   a. connective tissue
   b. epithelial tissue
   c. glandular tissue
   d. muscle tissue

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ANSWER: d

7. Which of these tissues can be found on the outer layer of the skin?
   a. connective
   b. endocrine
   c. epithelial
   d. muscle

ANSWER: c

8. What type of tissue consists of cells specialized for transmitting messages?
   a. connective
   b. muscle
   c. bone
   d. nervous

ANSWER: d

9. Epithelial tissue is organized into which of the two general types of structures?
   a. cells and cell walls
   b. epithelial sheets and secretory glands
   c. ducts and nuclei
   d. protective and absorptive

ANSWER: b

10. Which of these statements is characteristic of connective tissue?
   a. It has relatively few cells dispersed within an abundance of extracellular matrix.
   b. It has no blood vessels.
   c. It covers various parts of the body.
   d. It is usually found in the walls of hollow cavities.

ANSWER: a

11. Which of the following statements does NOT apply to connective tissue?
   a. It includes bone.
   b. It includes blood.
   c. Elastin can be found in its extracellular material.
   d. It forms coverings and linings of the body cavities.

ANSWER: d

12. Which of the following is a type of connective tissue?
   a. exocrine glands
   b. endocrine glands
   c. blood

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d. smooth muscle tissue

ANSWER: c

13. What kind of glands secrete through ducts to the outside of the body (or cavity open to the outside)?

a. endocrine
b. embryonic
c. external
d. exocrine

ANSWER: d

14. Which of the following are two examples of exocrine glands?

a. sweat glands and glands that secrete digestive juices
b. mammary glands and the pancreas
c. the bladder and the kidneys
d. thyroid gland and sweat glands

ANSWER: a

15. Which of these statements describes endocrine glands?

a. They consist of ducts.
b. They secrete hormones internally into the blood capillaries.
c. They are derived from connective tissue.
d. They include the salivary glands.

ANSWER: b

16. Which of these statements describes the internal environment?

a. It consists of intracellular fluid.
b. It is in direct contact with the body's cells and consists of the extracellular fluid.
c. It is inside the body but not in direct contact with the body's cells.
d. It is outside of the body and keeps the fluid volume in unchanging composition.

ANSWER: b

17. What type of fluid resides within cells?

a. intracellular
b. interstitial
c. extracellular
d. plasma

ANSWER: a

18. Which of these statements describes stem cells?

a. They are well-differentiated embryonic cells that may reproduce just one time.
b. They may reproduce just one time and cannot be readily grown.

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c. Their daughter cells may differentiate into a number of different specialized cell types.
d. They cannot be readily grown unless they are already specialized cell types.

ANSWER: c

19. Which of these systems mainly distributes nutrients and oxygen through the body?
a. circulatory system
b. digestive system
c. endocrine system
d. integumentary system

ANSWER: a

20. Which of these statements describes extracellular fluid?
a. It is the external environment of the body.
b. It is the fluid inside each cell.
c. It consists of plasma only.
d. It consists of plasma and interstitial fluid.

ANSWER: d

21. Which of these statements applies to the respiratory system?
a. It eliminates unwanted substances from the body to the external environment.
b. It consists of the heart, blood vessels, and lungs in the pulmonary cavity.
c. It is important for maintaining the proper pH of the internal environment.
d. It is responsible for taking up required essential nutrients for the body.

ANSWER: c

22. In which of the body systems is calcium mainly stored?
a. endocrine system
b. integumentary system
c. muscular system
d. skeletal system

ANSWER: d

23. Which of these statements describes negative feedback?
a. A change in a regulated variable triggers a response by the effector that opposes the change.
b. The input to a system increases the output, and the output limits its own production by inhibiting the input.
c. A control system's input and output continue to enhance each other in order to maintain homeostasis.
d. It is the main operating principle of most of the body's homeostatic control mechanisms.

ANSWER: b

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24. What are the two systems concerned with the control of body functioning by extrinsic controls?
    a. nervous and respiratory
    b. nervous and endocrine
    c. endocrine and respiratory
    d. endocrine and lymphatic

ANSWER: b

25. In a negative-feedback loop, which component produces a response that changes a controlled condition?
    a. receptor
    b. control centre
    c. effector
    d. set point

ANSWER: c

26. What are the three actions that the body's control system must perform in order to maintain homeostasis?
    a. control the external environment, record information, make appropriate adjustments
    b. control the internal environment, record information, detect deviation
    c. detect information, integrate internal environment, control changes
    d. detect deviations, integrate information, make appropriate adjustments

ANSWER: d

27. Which of these sequences illustrates a negative-feedback system?
    a. input ?4? negative effect ?4? output ?4? change
    b. external stimulus ?4? effector ?4? internal change ?4? integration
    c. sensor ?4? integrator ?4? effector ?4? compensatory response
    d. integrator ?4? effector ?4? compensatory response ?4? sensor

ANSWER: c

28. The hormone insulin enhances the transport of glucose (sugar) from the blood into most of the body's cells. Its secretion is controlled by a negative-feedback system between the concentration of glucose in the blood and insulin-secreting cells. How does this negative-feedback system work?
    a. A decrease in blood glucose concentration stimulates insulin secretion, which in turn further lowers the blood glucose concentration.
    b. An increase in blood glucose concentration stimulates insulin secretion, which in turn lowers the blood glucose concentration.
    c. A decrease in blood glucose concentration stimulates insulin secretion, which in turn increases the blood glucose concentration.
    d. An increase in blood glucose concentration stimulates insulin secretion, which further increases the blood glucose concentration.

ANSWER: b

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29. When a blood capillary is cut, a clot forms under which feedback control system?

a. negative feedback
b. positive feedback
c. extrinsic control
d. feedforward

ANSWER: b

30. Which of the following is an example of a positive-feedback system?

a. regulation if body temperature
b. birth of a baby
c. regulation of room temperature
d. regulation of blood pH

ANSWER: b

31. Sweating is initiated in response to a rise in body temperature that occurs on exposure to a hot environment. Evaporation of the sweat cools the body. What is this an example of?

a. negative feedback
b. positive feedback
c. feedforward mechanism
d. intrinsic (local) control mechanism

ANSWER: a

32. Platelets, which have negatively charged cell membranes, adhere to the positively charged surface of a torn blood vessel. As they do so, they release substances that attract more platelets to the damaged area and change the charge on their cell membranes to positive. More platelets adhere to the damaged area. The cycle repeats until the damaged area is sealed. What sort of feedback loop is formed, and why?

a. positive-feedback loop: the response reinforces the initial change
b. negative-feedback loop: the response opposes the initial stimulus
c. negative-feedback loop: having too many platelets in one area blocks blood flow
d. positive-feedback loop: the response prevents a person from haemorrhaging to death

ANSWER: a

33. Cells eliminate carbon dioxide as a waste product.

a. True
b. False

ANSWER: True

34. All cells are capable of reproducing.

a. True
b. False

ANSWER: False

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35. Highly differentiated tissues such as nervous and cardiac muscle are incapable of new cell production.

a. True
b. False

ANSWER: False

36. Enzymes are carbohydrates.

a. True
b. False

ANSWER: False

37. A mechanistic explanation of why a person breathes is to obtain oxygen.

a. True
b. False

ANSWER: False

38. A mechanistic explanation of why a person sweats is to cool off.

a. True
b. False

ANSWER: False

39. Tissues are composed of two or more types of cells organized to perform a particular function or functions.

a. True
b. False

ANSWER: False

40. Muscle cells produce movement by expanding.

a. True
b. False

ANSWER: False

41. Blood is a type of connective tissue.

a. True
b. False

ANSWER: True

42. Glands are formed during embryonic development by pockets of epithelial tissue that dip inward from the surface.

a. True
b. False

ANSWER: True

43. Endocrine glands secrete hormones through ducts into the blood.

a. True

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b. False

ANSWER: False

44. A lumen is a cavity within a hollow organ or tube.

a. True
b. False

ANSWER: True

45. Organs are composed of two or more kinds of primary tissues.

a. True
b. False

ANSWER: True

46. The external environment is found outside cells but inside the body.

a. True
b. False

ANSWER: False

47. Factors that are homeostatically regulated are maintained at a constant, fixed level unless disease is present.

a. True
b. False

ANSWER: False

48. The lungs remove carbon dioxide from the blood plasma.

a. True
b. False

ANSWER: True

49. To sustain life, the internal environment must be maintained in an absolutely unchanging state.

a. True
b. False

ANSWER: False

50. Not all activities performed by the muscular and nervous systems are directed toward maintaining homeostasis.

a. True
b. False

ANSWER: True

51. The plasma surrounds and bathes all the body's cells.

a. True
b. False

ANSWER: False

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52. The concentration of salt in the extracellular fluid influences how water enters and leaves cells.

a. True
b. False

ANSWER: True

53. Exocrine glands are the only structures in the body capable of secretion.

a. True
b. False

ANSWER: False

54. Secretion refers to the release from a cell, in response to appropriate stimulation, of specific products that have, in large part, been synthesized by the cell.

a. True
b. False

ANSWER: True

55. The endocrine system functions with the circulatory system for the transport of hormones.

a. True
b. False

ANSWER: True

56. Some organs, such as the heart, skin, and intestine, belong to more than one body system.

a. True
b. False

ANSWER: True

57. The skin is part of the integumentary system.

a. True
b. False

ANSWER: True

58. Negative feedback operates to maintain a controlled factor in a relatively steady state, whereas positive feedback moves a controlled variable even further from a steady state.

a. True
b. False

ANSWER: True

59. With positive feedback, a control system's input and output continue to enhance each other.

a. True
b. False

ANSWER: True

60. Feedforward mechanisms bring about a response in reaction to a change in a regulated variable.

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a. True
b. False

ANSWER: False

61. Most homeostatic mechanisms operate on the principle of positive feedback.

a. True
b. False

ANSWER: False

62. All proteins are enzymes.

a. True
b. False

ANSWER: False

63. All stem cells are found in the umbilical cord.

a. True
b. False

ANSWER: False

64. Intestine, heart, and skin do not consist of hormone-secreting cells.

a. True
b. False

ANSWER: False

65. Stem cells are not common to all multicellular organisms.

a. True
b. False

ANSWER: False

66. Homeostatic control systems are grouped into two classes: intrinsic and extrinsic controls.

a. True
b. False

ANSWER: True

67. The smallest unit capable of carrying out the processes associated with life is the _____.
ANSWER: cell

68. _____ cells are specialized to send electrical signals.
ANSWER: Nerve

69. _____ muscle tissue composes the heart.
ANSWER: Cardiac

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70. _____ are composed of two or more types of primary tissue organized to perform a particular function or functions.
ANSWER: Organs

71. _____ glands secrete through ducts in the skin.
ANSWER: Exocrine

72. A _____ is a collection of organs that perform related functions and interact to accomplish a common activity that is essential for survival of the whole body.
ANSWER: body system

73. The internal environment consists of the _____, which is made up of _____, the fluid portion of the blood, and _____, which surrounds and bathes all cells.
ANSWER: extracellular fluid; plasma; interstitial fluid

74. The _____ is the liquid part of the blood.
ANSWER: plasma

75. The body cells are in direct contact with and make life-sustaining exchanges with the _____.
ANSWER: internal environment
extracellular fluid

76. _____ refers to maintenance of a relatively stable internal environment.
ANSWER: Homeostasis

77. _____ tissue is composed of cells specialized for contraction and force generation.
ANSWER: Muscle

78. The _____ system consists of all hormone-secreting tissues.
ANSWER: endocrine

79. The two major control systems of the body are the _____ and the _____.
ANSWER: nervous system; endocrine system
endocrine system; nervous system

80. _____ are the blood vessels in which materials are mixed between the blood plasma and the interstitial fluid.
ANSWER: Capillaries

81. The _____ system is the transport system of the body.
ANSWER: circulatory

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82. The _____ system eliminates waste products other than carbon dioxide, and plays a key role in regulating the volume, electrolyte composition, and acidity of the extracellular fluid.
ANSWER: urinary

83. The _____ system controls and coordinates bodily activities that require swift responses, especially to changes in the external environment.
ANSWER: nervous

84. _____ refers to the abnormal functioning of the body associated with disease.
ANSWER: Pathophysiology

85. Homeostasis is primarily operated by _____ mechanisms.
ANSWER: negative-feedback

86. The term _____ refers to the abnormal functioning of the body associated with disease.
ANSWER: pathophysiology

Match the terms labelled a. through d. with their correct descriptions. (Options may be used more than once or not at all.)

a. nervous tissue
b. epithelial tissue
c. muscle tissue
d. connective tissue

87. This tissue type is composed of cells specialized for contraction.
ANSWER: c

88. This tissue type is made up of cells specialized in the exchange of materials between the cell and its environment.
ANSWER: b

89. This tissue type connects, supports, and anchors various body parts.
ANSWER: d

90. The heart is made of this type of tissue.
ANSWER: c

91. Bone is this tissue type.
ANSWER: d

92. Glands are a derivative of this tissue type.
ANSWER: b

93. The digestive tract is lined with this tissue.

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ANSWER: b

94. The brain is made primarily of this tissue.
ANSWER: a

95. The blood is this tissue type.
ANSWER: d

96. This tissue is distinguished by relatively few cells within an extracellular material.
ANSWER: d

Match the components labelled a. through d. with their correct role.
Temperature-sensitive nerve cells monitor the body temperature and provide information about its status to a temperature-control centre in the hypothalamus, a part of the brain. The hypothalamus can bring about adjustments in body temperature by inducing shivering or sweating, among other things.

a. controlled variable
b. integrator
c. sensor
d. effector

97. body temperature
ANSWER: a

98. temperature-sensitive nerve cells
ANSWER: c

99. skeletal muscles and sweat glands
ANSWER: d

100. hypothalamus
ANSWER: b

Match the terms labelled a. through d. with their correct physiological events. (Options may be used more than once or not at all.)

a. intrinsic control
b. negative-feedback control
c. positive-feedback control
d. feedforward control

101. increased blood flow into muscle tissue in response to a localized increase in carbon dioxide
ANSWER: a

102. the release of a hormone to lower blood calcium level when it gets too high
ANSWER: b

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103. increased cardiac activity to elevate blood pressure when systemic pressure is low
ANSWER: b

104. rapid clotting of blood due to increasing levels of platelet activity at a site of vessel damage
ANSWER: c

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