Chapter 02
The Brain and Behavior

Multiple Choice Questions

1. *(p. 43)* The _____ system is the body's electrochemical communication circuitry.
A. pulmonary
B. nervous
C. endocrine
D. respiratory

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

2. *(p. 43)* A single cubic centimeter of the human brain consists of well over _____ nerve cells.
A. 50 million
B. 10 million
C. 30 billion
D. 20 billion

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

3. *(p. 43)* Which of the following characteristics of the nervous system best reflects the brain's ability to coordinate information from all five senses?
A. Complexity
B. Adaptability
C. Integration
D. Electrochemical transmission

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Nervous System

4. *(p. 44)* The term plasticity refers to the _____.
A. flexibility of the endocrine system
B. ability of people to adapt to new surroundings
C. ability to connect electrical impulses and chemical messengers
D. brain's special capacity for modification and change

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

5. *(p. 44)* Plasticity best reflects which of the following characteristics of the nervous system?
A. Complexity
B. Integration
C. Adaptability
D. Electrochemical transmission

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Nervous System

6. *(p. 44)* You are listening to a lecture. Then the bell rings in the hallway. In order to hear this stimulus, _____ neurons must carry electrochemical messages from your ears to your brain.
A. afferent
B. olfactory
C. efferent
D. pyramidal

Blooms: Apply
Difficulty: Medium
Learning Objectives: The Nervous System

7. *(p. 44)* The lecture you were listening to is over. The bell that rang in the hall signaled the end of class. You get up out of your seat, pick up your things, and walk out the classroom door. Which kind of nerves sent the signals from your brain to your muscles to initiate your physical movements?
A. Afferent
B. Pyramidal
C. Efferent
D. Olfactory

Blooms: Apply
Difficulty: Medium
Learning Objectives: The Nervous System

8. *(p. 44)* Information from the brain and spinal cord to the muscles is sent through _____, thus enabling the body to move.
A. afferent nerves
B. efferent nerves
C. pyramidal nerves
D. olfactory nerves

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

9. *(p. 44)* Your brain has instructed your body muscles to move so that you avoid burning your hand on a hot stove. Which type of nerves carried the information from your brain to your muscles so that you could avoid getting burned?
A. Efferent nerves
B. Afferent nerves
C. Sensory nerves
D. Parasympathetic nerves

Blooms: Apply
Difficulty: Hard
Learning Objectives: The Nervous System

10. *(p. 44)* Joshua is reading a novel. The input from his eyes is transmitted to his brain and then passed through many _____ that translate the character on the page to integrate sensory input and motor output.
A. vesicles
B. myelin sheaths
C. synapses
D. neural networks

Blooms: Apply
Difficulty: Medium
Learning Objectives: The Nervous System

11. *(p. 45)* The brain and spinal cord make up the _____.
A. peripheral nervous system
B. central nervous system
C. autonomic nervous system
D. somatic nervous system

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

12. *(p. 45)* The _____ nervous system connects the brain and spinal cord to the rest of the body.
A. central
B. peripheral
C. somatic
D. autonomic

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

13. *(p. 45)* The somatic nervous system and autonomic nervous system are components of the _____.
A. sensory system
B. central nervous system
C. limbic system
D. peripheral nervous system

Blooms: Remember
Difficulty: Medium
Learning Objectives: The Nervous System

14. *(p. 45)* The function of the somatic nervous system is to _____.
A. take messages to and from the body's internal organs, monitoring such processes as breathing, heart rate, and digestion
B. tell muscles what to do
C. be involved in the experience of stress and calms the body
D. convey information from the skin and muscles to the CNS about conditions such as pain and temperature

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Nervous System

15. *(p. 45)* The function of the _____ is to take messages to and from the body's internal organs, monitoring such processes as breathing, heart rate, and digestion.
A. central nervous system
B. autonomic nervous system
C. somatic nervous system
D. parasympathetic nervous system

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

16. *(p. 45)* Which of the following essential body functions are under the control of the autonomic nervous system?
A. Functions of reproductive system
B. Excretory functions
C. Sensory functions such as vision and hearing
D. Heart rate, breathing, and digestion

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Nervous System

17. *(p. 45)* The sympathetic nervous system and parasympathetic nervous system are components of the _____.
A. central nervous system
B. endocrine system
C. somatic nervous system
D. autonomic nervous system

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

18. *(p. 46)* Which of the following is one of the functions of the sympathetic nervous system?
A. Convey information from skin and muscles to CNS
B. Calm the body
C. Fight-or-flight reaction
D. Influence somatic nervous system

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Nervous System

19. *(p. 46)* You are walking to school when you encounter a strange barking dog. You start sweating and contemplate whether you should run away. Which nervous system is responsible for this "fight-or-flight" reaction?
A. Somatic
B. Sympathetic
C. Parasympathetic
D. Central

Blooms: Apply
Difficulty: Medium
Learning Objectives: The Nervous System

20. *(p. 46)* Just before you went on a job interview your heart was pounding like crazy. You experienced a shortness of breath and felt sick to your stomach. These symptoms were most likely produced by your _____ nervous system.
A. central
B. somatic
C. parasympathetic
D. sympathetic

Blooms: Apply
Difficulty: Hard
Learning Objectives: The Nervous System

21. *(p. 46)* Which division of the peripheral nervous system is responsible for producing physiological symptoms (such as increased heart rate and butterflies in the stomach) under conditions of stress?
A. Somatic
B. Parasympathetic
C. Sympathetic
D. Central

Blooms: Apply
Difficulty: Medium
Learning Objectives: The Nervous System

22. *(p. 46)* After finishing a psychology test, you try to relax by engaging in some meditation techniques. Doing these exercises should increase the response of the _____ nervous system, which results in a slower heart and respiration rate and less muscular tension.
A. somatic
B. central
C. parasympathetic
D. sympathetic

Blooms: Apply
Difficulty: Hard
Learning Objectives: The Nervous System

23. *(p. 46)* Corticosteroids are _____.
A. stress hormones
B. sex hormones
C. neurotransmitters that regulate mood
D. neurotransmitters that regulate memory

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

24. *(p. 46)* _____ stress is the momentary stress that occurs in response to life experiences.
A. Intrinsic
B. Differential
C. Chronic
D. Acute

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Nervous System

25. *(p. 47)* Which of the following types of cells in the nervous system handle the information-processing function?
A. Neurons
B. Glial cells
C. Sclerenchyma cells
D. Myelin

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

26. *(p. 47)* _____ provide support, nutritional benefits, and other functions in the nervous system.
A. Neurons
B. Glial cells
C. Sclerenchyma cells
D. Dendrites

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

27. *(p. 49)* The cell body contains the _____, which directs the manufacture of substances that a neuron needs for growth and maintenance.
A. myelin
B. nucleus
C. axon
D. dendrite

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

28. *(p. 49)* The part of the neuron that contains the nucleus, which directs the manufacture of substances that the neuron needs for growth and maintenance, is called the _____.
A. axon hillock
B. terminal stub
C. cell body
D. stem cell

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

29. *(p. 49)* Where is the nucleus of a neuron located?
A. axon hillock
B. terminal stub
C. dendrite
D. cell body

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

30. *(p. 49)* Dendrites are _____.
A. the part of the neuron that is responsible for sending information away from the cell body toward other cells
B. the branch-like part of the neuron that is responsible for receiving information from other neurons
C. located inside the cell body
D. the layer of fat cells that encase and insulate the neuron

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

31. *(p. 49)* The axon is _____.
A. the part of the neuron that is responsible for sending or carrying information away from the cell body toward other cells
B. the branch-like part of the neuron that is responsible for receiving information from other neurons
C. located inside the cell body
D. the layer of fat cells that encase and insulate the neuron

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

32. *(p. 49)* _____ is a layer of fat cells that insulates most axons and speeds up the transmission of nerve impulses.
A. A dendrite
B. The myelin sheath
C. The axon
D. A nucleus

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

33. *(p. 49)* Which of the following is a function of the myelin sheath?
A. Carry information away from the cell body toward other cells
B. Increase the surface area of nerve cells
C. Speed up the transmission of nerve impulses
D. Play a role in imitation

Blooms: Understand
Difficulty: Medium
Learning Objectives: Neurons

34. *(p. 50)* Resting potential is the _____.
A. amount of time a signal travels through the central nervous system
B. amount of time a neuron must "rest" in between firing episodes
C. stable, positive charge of an inactive neuron
D. stable, negative charge of an inactive neuron

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

35. *(p. 50)* The membrane of the resting neuron is said to be _____.
A. deconcentrated
B. depolarized
C. concentrated
D. polarized

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

36. *(p. 50)* When a neuron is at its resting state, what is the status of the charges on each side of the cell membrane?
A. There is a negative charge on the outside of the cell membrane, and a positive charge on the inside.
B. There is a negative charge on the inside of the cell membrane and a positive charge on the outside.
C. There is a negative charge on both the outside and the inside of the cell membrane.
D. There is a positive charge on both the outside and the inside of the cell membrane.

Blooms: Understand
Difficulty: Medium
Learning Objectives: Neurons

37. *(p. 51)* The brief wave of positive electrical charge that sweeps down the axon is _____.
A. resting potential
B. action potential
C. graded potential
D. polarized potential

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

38. *(p. 51)* When a neuron sends an action potential, it is commonly said to be "_____."
A. firing
B. grading
C. depolarizing
D. classifying

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

39. *(p. 51)* According to the all-or-nothing principle, _____.
A. if all the neurons in a network are not integrated, the "message" carried by the neurons will be lost
B. the amount of time a neuron must "rest" in between firing episodes is stable
C. once the electrical impulse reaches a certain level of intensity (its threshold), it fires and moves all the way down the axon without losing any intensity
D. as a person ages, his or her neurological system slows down and the intensity of neural impulses decreases significantly

Blooms: Understand
Difficulty: Medium
Learning Objectives: Neurons

40. *(p. 51)* Which of the following refer to tiny spaces between the neurons?
A. Dendrites
B. Axons
C. Synapses
D. Basal ganglia

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

41. *(p. 52)* _____ are chemical substances that are stored in very tiny sacs within the terminal buttons and involved in transmitting information across a synaptic gap to the next neuron.
A. Neurotransmitters
B. Axons
C. Synapses
D. Dendrites

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

42. *(p. 53)* Acetylcholine is a neurotransmitter that plays an important role in _____.
A. action of muscles, learning, and memory
B. vision and hearing
C. mood regulation
D. reproductive function

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

43. *(p. 53)* Your relative is experiencing memory loss related to Alzheimer disease. Research suggests that the decline in memory is due to a(n) _____ deficiency in this individual's brain.
A. serotonin
B. gamma-amino butyric acid (GABA)
C. acetylcholine
D. dopamine

Blooms: Apply
Difficulty: Medium
Learning Objectives: Neurons

44. *(p. 54)* _____ inhibits the firing of neurons in the central nervous system, but it excites the heart muscle, intestines, and urogenital tract.
A. Serotonin
B. Dopamine
C. Norepinephrine
D. GABA

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

45. *(p. 454)* Which of the following pairs are correctly matched?
A. High levels of oxytocin—Alzheimer disease
B. Low levels of dopamine—Parkinson disease
C. Low levels of acetylcholine—Schizophrenia
D. High levels of serotonin—Depression

Blooms: Understand
Difficulty: Medium
Learning Objectives: Neurons

46. *(p. 54)* Depression is associated with low levels of which neurotransmitter?
A. Acetylcholine
B. Serotonin
C. Dopamine
D. Oxytocin

Blooms: Remember
Difficulty: Easy
Learning Objectives: Neurons

47. *(p. 54)* Which of the following indicates elevated levels of endorphins?
A. Amy, a 30 year old teacher, who in shock after a car wreck.
B. Jamie, a 40 year old diplomat, who is on a cruise.
C. Martha, a 32 year old home maker, who is showing symptoms of schizophrenia.
D. Joshua, a 17 year old student, who is depressed after seeing his low scores on SAT.

Blooms: Apply
Difficulty: Hard
Learning Objectives: Neurons

48. *(p. 54)* A powerful surge of oxytocin is released in a _____.
A. person who is in shock after a car wreck
B. long distance runner
C. young boy on a roller coaster ride
D. mother who has just given birth

Blooms: Apply
Difficulty: Medium
Learning Objectives: Neurons

49. *(p. 55)* An _____ is a drug that mimics or increases a neurotransmitter's effects whereas an _____ is a drug that blocks a neurotransmitter's effect.
A. agonist/antagonist
B. antagonist/agonist
C. oxytocin/endorphin
D. endorphin/oxytocin

Blooms: Remember
Difficulty: Medium
Learning Objectives: Neurons

50. *(p. 55)* Mark Johnson, a doctor in Dallas, prescribed an antidepressant drug Prozac to his patient, Ted. Prozac works by increasing brain levels of serotonin. This means that Prozac is considered _____.
A. an agonist
B. an antagonist
C. a hormone stimulant
D. an oxytocin

Blooms: Apply
Difficulty: Hard
Learning Objectives: Neurons

51. *(p. 55)* Michael has schizophrenia. His doctor prescribed a new drug that blocks or interferes with the activity of dopamine. Michael's doctor is using _____ to treat his disorder.
A. an agonist
B. an antagonist
C. brain lesion
D. a lobotomy

Blooms: Apply
Difficulty: Hard
Learning Objectives: Neurons

52. *(p. 56)* Neuroscientists who surgically remove, destroy, or eliminate the brain tissue of laboratory animals are using which of the following techniques for studying the brain?
A. Electroencephalogram
B. Positron emission tomography (PET)
C. Magnetic resonance imaging (MRI)
D. Brain lesioning

Blooms: Understand
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

53. *(p. 56)* Electrical activity in the brain can be captured by placing multiple electrodes on the scalp and then measuring the underlying electrical activity. This method of studying the brain's activity is called a(n) _____.
A. electroencephalogram (EEG)
B. positron emission tomography (PET)
C. magnetic resonance imaging (MRI)
D. functional MRI (fMRI)

Blooms: Understand
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

54. *(p. 57)* Arnold Becker, a doctor in Seattle, needs information about the location and extent of damage involving stroke and loss of memory of his patient, Judith. Which of the following techniques will he most likely use to diagnose Judith's condition?
A. Brain lesioning
B. Computerized axial tomography (CAT scan)
C. Positron emission tomography (PET)
D. Electroencephalogram (EEG)

Blooms: Apply
Difficulty: Hard
Learning Objectives: Structures of the Brain and Their Functions

55. *(p. 57)* Stern Tyler, a neuroscientist who is collecting data for a new research study, uses techniques for monitoring the amount of glucose in various areas of the brain. Which of the following methods is Stern Tyler using in this study?
A. Brain lesioning
B. Staining
C. Positron emission tomography (PET scan)
D. Electroencephalogram (EEG)

Blooms: Apply
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

56. *(p. 57)* Magnetic resonance imaging (MRI) is a technique that _____.
A. measures the amount of glucose in various areas of the brain and then sends this information to a computer for analysis
B. constructs a three-dimensional image from X rays
C. examines the effects of lesions in brain tissue
D. involves creating a magnetic field around a person's body and using radio waves to construct images of a person's tissues and biochemical activities

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

57. *(p. 58)* Functional magnetic resonance imaging (fMRI) is a technique that _____.
A. allows scientists to see what is happening in the brain while it is working
B. requires injecting the brain with a substance but still cannot portray brain function.
C. measures the amount of glucose in various areas of the brain and then sends this information to a computer for analysis
D. examines the effects of lesions in brain tissue

Blooms: Remember
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

58. *(p. 60)* The medulla, cerebellum, and pons are parts of the _____.
A. hindbrain
B. midbrain
C. forebrain
D. corpus callosum

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

59. *(p. 60)* Which part of the nervous system regulates breathing and heart rate?
A. Hypothalamus
B. Pons
C. Medulla
D. Cerebellum

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

60. *(p. 61)* Marshall damaged his cerebellum in a car accident. Marshal is likely to have problems with _____.
A. breathing and heart rate
B. seeing and hearing
C. talking and understanding
D. balance and muscle coordination

Blooms: Apply
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

61. *(p. 61)* Clumps of cells in the _____ determine alertness and regulate basic survival functions such as breathing, heartbeat, and blood pressure.
A. hypothalamus
B. forebrain
C. brain stem
D. cerebellum

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

62. *(p. 61)* The _____ relays information between the brain and the eyes and ears.
A. forebrain
B. midbrain
C. hindbrain
D. cerebellum

Blooms: Understand
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

63. *(p. 61)* The reticular formation is primarily responsible for _____.
A. controlling breathing and regulating reflexes to maintain an upright posture
B. involved in arousal and stereotyped patterns such as walking, sleeping, or turning to attend to a sudden noise
C. control and coordination of balance, hearing, and parasympathetic function
D. governs higher brain functions, such as thinking, learning, and consciousness

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

64. *(p. 61)* Which of the following is the brain's largest division?
A. Forebrain
B. Midbrain
C. Hindbrain
D. Medulla

Blooms: Understand
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

65. *(p. 61)* Which of the following parts of the brain are correctly matched?
A. Thalamus—hindbrain
B. Amygdala—midbrain
C. Basal ganglia—hindbrain
D. Limbic system—forebrain

Blooms: Understand
Difficulty: Hard
Learning Objectives: Structures of the Brain and Their Functions

66. *(p. 61-62)* Discrimination of objects that are necessary for survival (such as appropriate food) as well as emotional awareness and expression involves the _____.
A. hippocampus
B. occipital lobe
C. medulla
D. amygdala

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

67. *(p. 62)* Steven was in a serious automobile accident that caused a severe injury to his hippocampus. What type of problem is Steven likely to experience as a result of this brain injury?
A. He will probably be unable to speak.
B. He will probably be unable to comprehend language.
C. He will probably be unable retain any new conscious memories.
D. He will probably be unable to move on his own.

Blooms: Apply
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

68. *(p. 62)* Large neuron clusters located above the thalamus and under the cerebral cortex, that work with the cerebellum and the cerebral cortex to control and coordinate voluntary movements are called _____.
A. occipital lobes
B. basal ganglia
C. medulla
D. amygdala

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

69. *(p. 63)* The _____ is a small forebrain structure that monitors pleasurable activities (e.g. eating, drinking, and sex), emotion, stress, and reward.
A. hypothalamus
B. basal ganglia
C. corpus callosum
D. medulla

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

70. *(p. 64)* The most complex mental functions, such as thinking and planning, take place in the _____.
A. corpus callosum
B. cerebral cortex
C. cerebellum
D. amygdala

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

71. *(p. 64)* Samantha had a stroke. Doctors told her she sustained substantial damage to the occipital lobes. What type of deficiencies is Samantha likely to experience as a result of this brain damage?
A. She may be blind or unable to see clearly.
B. She will probably be unable to comprehend language.
C. She will probably have difficulties with memory function.
D. She will probably suffer from impaired cognitive functioning (planning, reasoning, and self-control will be negatively impacted).

Blooms: Apply
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

72. *(p. 65)* Structures in the cerebral cortex that are involved in hearing, language processing, and memory are called _____.
A. temporal lobes
B. frontal lobes
C. occipital lobes
D. parietal lobes

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

73. *(p. 65)* The ____ are involved in personality, intelligence, and the control of voluntary muscles.
A. temporal lobes
B. frontal lobes
C. occipital lobes
D. parietal lobes

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

74. *(p. 65)* Which of the following are correctly matched?
A. Frontal lobes—hearing, language processing, and memory
B. Occipital lobes—personality, intelligence, and the control of voluntary muscles
C. Temporal lobes—visual stimuli
D. Parietal lobes—spatial location, attention, and motor control

Blooms: Understand
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

75. *(p. 65)* The somatosensory cortex processes information about _____.
A. planning and decision making
B. bodily sensations
C. facial expressions
D. voluntary body movement

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

76. *(p. 65)* The _____ is the part of the cerebral cortex that processes information about voluntary muscle movement.
A. motor cortex
B. sensory cortex
C. limbic system
D. temporal lobe

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

77. *(p. 67)* Which of the following is true with regard to the association cortex?
A. It processes information about body sensations.
B. It makes up 25 percent of the cerebral cortex.
C. It is at the rear of the frontal lobes, processes information about voluntary movement.
D. It is the region of the cerebral cortex that is the site of the highest intellectual functions, such as thinking and problem solving.

Blooms: Understand
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

78. *(p. 67)* Katy was in a car accident and sustained serious brain damage. Since the accident Katy can speak only one word. This is an example of _____.
A. amnesia
B. aphasia
C. multiple sclerosis
D. epilepsy

Blooms: Apply
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

79. *(p. 67)* _____ plays an important role in the production of speech, whereas _____ plays an important role in the comprehension of language.
A. Wernicke's area/Broca's area
B. Broca's area/Wernicke's area
C. The occipital lobe/the hippocampus
D. The hippocampus/the occipital lobe

Blooms: Understand
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

80. *(p. 68)* The corpus callosum _____.
A. is the large bundle of axons that connects the brain's two hemispheres and relays information between the two sides
B. is the region of the brain that is primarily responsible for managing our emotions
C. is an almond-shaped structure within the base of the temporal lobe that is involved in the discrimination of objects that are necessary for the organism's survival, such as appropriate food, mates, and social rivals.
D. plays an important role in the production of speech

Blooms: Remember
Difficulty: Easy
Learning Objectives: Structures of the Brain and Their Functions

81. *(p. 68)* Neurosurgeons can reduce the unbearable seizures some epileptics experience by severing the _____.
A. hypothalamus
B. cerebellum
C. amygdala
D. corpus callosum

Blooms: Remember
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

82. *(p. 69)* The left hemisphere of the brain plays an important role in managing or regulating _____.
A. speech and grammar
B. spatial perception
C. visual recognition
D. movement in the left side of the body

Blooms: Understand
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

83. *(p. 71)* The endocrine system _____.
A. directs the most complex mental functions, such as thinking and planning
B. connects the brain and the spinal cord to the rest of the body
C. consists of glands that regulate the activities of certain organs by releasing hormones into the bloodstream
D. communicates through the release of neurotransmitters

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Endocrine System

84. *(p. 71)* The chemical messengers produced by the endocrine glands are known as _____.
A. neurotransmitters
B. hormones
C. myelin sheath
D. stem cells

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Endocrine System

85. *(p. 72)* The _____ is sometimes referred to as the "master gland" because it controls growth and it releases the hormones that regulate other glands in the endocrine system.
A. thyroid gland
B. adrenal gland
C. pituitary gland
D. parathyroid gland

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Endocrine System

86. *(p. 72)* Ellie has recently experienced irregular mood swings. Her energy level has decreased and she seems to have greater difficulty coping with stress. Based on her symptoms, it seems as though Ellie may have problems with her _____ glands.
A. pituitary
B. pineal
C. adrenal
D. thymus

Blooms: Apply
Difficulty: Medium
Learning Objectives: The Endocrine System

87. *(p. 72)* _____ are secreted by the adrenal glands.
A. Epinephrine and norepinephrine
B. Estrogen and testosterone
C. Estrogen and epinephrine
D. Acetylcholine and testosterone

Blooms: Remember
Difficulty: Easy
Learning Objectives: The Endocrine System

88. *(p. 72)* Which of the following play(s) an important role in insulin production, metabolism, and body weight?
A. Testes and ovaries
B. Adrenal gland
C. Pituitary gland
D. Pancreas

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Endocrine System

89. *(p. 72)* Which of the following organs are involved in men's and women's sexual development and reproduction?
A. Testes and ovaries
B. Adrenal glands
C. Pituitary glands
D. Pancreas

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Endocrine System

90. *(p. 73)* When the axons of healthy neurons adjacent to damaged cells grow new branches, _____ has occurred.
A. collateral sprouting
B. substitution of function
C. neurogenesis
D. synaptic pruning

Blooms: Remember
Difficulty: Medium
Learning Objectives: Brain Damage; Plasticity; and Repair

91. *(p. 73)* When Charlie was three years old, he fell off the slide at the playground and damaged the left hemisphere of his brain. Despite this injury, as Charlie grew older he still retained some of his language abilities because the right hemisphere of his brain took control over the language function. Which of the following mechanisms of brain damage repair is apparent in this example?
A. Collateral sprouting
B. Substitution of function
C. Neurogenesis
D. Lobotomy

Blooms: Apply
Difficulty: Hard
Learning Objectives: Brain Damage; Plasticity; and Repair

92. *(p. 75)* Which of the following is true about neurogenesis?
A. Neurogenesis cannot occur in human adults.
B. No neurons, only increased connections between neurons, could be formed following infancy.
C. Researchers have documented neurogenesis in only two brain regions; the hippocampus and the olfactory bulb.
D. The different functions that these new brain cells perform are now known and they have been found to last for several years.

Blooms: Understand
Difficulty: Medium
Learning Objectives: Brain Damage; Plasticity; and Repair

93. *(p. 75)* _____ are unique primitive cells that have the capacity to develop into most types of human cells.
A. Schwann cells
B. Neurons
C. Glial cells
D. Stem cells

Blooms: Understand
Difficulty: Medium
Learning Objectives: Brain Damage; Plasticity; and Repair

94. *(p. 76)* In the human cell, threadlike structures that come in 23 pairs, one member of each pair originating from each parent, and that contain DNA are called _____.
A. chromosomes
B. ergosomes
C. ribosome
D. polysomes

Blooms: Remember
Difficulty: Easy
Learning Objectives: Genetics and Behavior

95. *(p. 76)* _____ is a complex molecule in the cell's chromosomes that carries genetic information.
A. RNA
B. DNA
C. Ribosome
D. Polysome

Blooms: Remember
Difficulty: Easy
Learning Objectives: Genetics and Behavior

96. *(p. 77)* Genes _____.
A. consist of short segments of ribosomes composed of RNA
B. match and link small pieces of RNA
C. enable cells to reproduce and manufacture the proteins that are necessary for maintaining life
D. act independently and do not collaborate with another gene

Blooms: Remember
Difficulty: Medium
Learning Objectives: Genetics and Behavior

97. *(p. 78)* According to the dominant-recessive genes principle, _____.
A. the recessive gene overrides the dominant gene
B. a recessive gene exerts its influence only if one gene of a pair is recessive
C. a recessive gene exerts its influence only if both genes are dominant
D. the dominant gene overrides the recessive gene

Blooms: Remember
Difficulty: Easy
Learning Objectives: Genetics and Behavior

98. *(p. 78)* _____ is a term used to describe the influences of multiple genes on behavior.
A. The all or none principle
B. Polygenic inheritance
C. Phenotype
D. Genotype

Blooms: Remember
Difficulty: Easy
Learning Objectives: Genetics and Behavior

99. *(p. 78)* _____ is a genetic method in which organisms are chosen for reproduction based on how much of a particular trait they display.
A. Selective breeding
B. Experimental evolution
C. Polymorphism
D. Natural selection

Blooms: Remember
Difficulty: Easy
Learning Objectives: Genetics and Behavior

100. *(p. 78)* Dr. Cardinale is interested in the effects of heredity and environment on intelligence. She compares the similarity of IQ scores of identical twins to the similarity of IQ scores of fraternal twins. Dr. Cardinale is conducting a _____ study.
A. human genome
B. molecular genetics
C. behavior genetics
D. selective breeding

Blooms: Apply
Difficulty: Hard
Learning Objectives: Genetics and Behavior

101. *(p. 80)* A _____ is a person's genetic heritage, his or her actual genetic material.
A. prototype
B. phenotype
C. endophenotype
D. genotype

Blooms: Understand
Difficulty: Medium
Learning Objectives: Genetics and Behavior

102. *(p. 80)* Molly's natural hair color is brown but she has had it dyed blonde. Molly changed her _____.
A. phenotype
B. genotype
C. chromosomes
D. genetic heritage

Blooms: Apply
Difficulty: Medium
Learning Objectives: Genetics and Behavior

Essay Questions

103. *(p. 45-46)* Briefly describe the peripheral nervous system and its four divisions. What is the function of each?
Give examples of situations that would activate each division and how they would do so.

The peripheral nervous system (PNS) extends from the central nervous system (CNS) to the extremities of the body through a system of neurons. The two major divisions of the PNS are the somatic and autonomic divisions. The somatic division is responsible for voluntary movements and for the transmission of information to and from such areas as the eyes, ears, and fingers. The autonomic division regulates organs that are necessary for survival, like the heart and lungs. It operates even without our awareness, because it would be disastrous if we forgot to remind ourselves to breathe or our heart to beat. The autonomic division is further subdivided into the sympathetic and parasympathetic divisions, and these subdivisions are most noticeable during emergencies. The sympathetic division prepares the body for emergencies and helps us to either fight stressors or to flee from them. If you were inside a burning house, for example, the sympathetic division would produce the necessary arousal that would allow you to either run out of the house to safety, or to find a fire extinguisher to help battle the blaze. The parasympathetic division restores the body to its resting state once an emergency has ended. Once it is clear that your house was not on fire, your breathing and heart rate return to normal, and you eventually feel a sense of calm. The parasympathetic system is also responsible for storing nutrients and oxygen for the body to use should another emergency arise.

Blooms: Understand
Difficulty: Hard
Learning Objectives: The Nervous System

104. *(p. 49)* Describe the structure of a neuron and explain the function of each component.

Every neuron has three components, a cell body, dendrites, and an axon. Dendrites are branch-like fibers that *receive* information and orient it towards the neuron's cell body. Most nerve cells have multiple dendrites. The axon is the slender, tail-like extension of a neuron that *sends* or carries information away from the cell body toward other cells. The cell body contains the nucleus, which directs the manufacture of substances that the neuron needs for growth and maintenance.

Blooms: Understand
Difficulty: Medium
Learning Objectives: Neurons

105. *(p. 51-53)* Briefly explain how one neuron sends a message to another neuron. Be sure to include a description of the roles that the various structures of the neuron play in communicating neural messages.

When neurons are at rest, they have a negative electrical charge. When an excitatory message is received from another neuron, the neuron becomes more positive. As the charge reaches a critical level of positivity, an action potential occurs and the electrical message travels along the neuron's axon. Once the message passes any point of the axon, that section becomes negatively charged once again, and the neuron is unable to fire again immediately. When a nerve impulse reaches the end of the axon, the terminal buttons on the ends of the axon release neurotransmitters into the synapse. Dendrites of nearby neurons receive messages from the neurotransmitters that "fit" onto their particular receptor sites. If the concentration of excitatory neurotransmitters that have been received is higher, then the neuron fires. If the concentration of inhibitory neurotransmitters that have been received is higher, then the neuron will not fire.

Blooms: Understand
Difficulty: Hard
Learning Objectives: Neurons

106. *(p. 56-59)* Compare and contrast the techniques researchers use to study the brain. Explain what type of information can be gained by each approach.

One way researchers have learned more about the brain is by studying the effects of brain lesions or brain damage. By examining the person or animal that has the lesion, researchers get a sense of the function of the part of the brain that was damaged. Staining is a process that involves injecting dyes that are selectively absorbed by neurons. These dyes allow scientists to chart neural networks. Electroencephalograph (EEG) involves recording the brain's electrical activity. Researchers also might use one of several brain imaging techniques. Computerized axial tomography (CAT scan or CT scan) involves the use of x-rays to produce a composite three-dimensional image and can provide information about the location and extent of brain damage. Positron-emission tomography (PET scan) is another brain imaging technique that is based on metabolic (glucose) changes related to brain activity. Magnetic resonance imaging (MRI) involves creating a magnetic field around a person's body and using radio waves to construct images of the person's tissues and biochemical activities. MRI scans provide valuable information about the structure of the brain and can allow researchers to see if and how experiences affect brain structure. Although MRI scans can reveal considerable information about brain structure, they cannot portray brain function. A new method known as functional magnetic resonance images (fMRI) allows scientists to see what is happening in the brain while it is working. fMRI charts track changes in blood oxygen that occur in association with brain activity.

Blooms: Evaluate
Difficulty: Hard
Learning Objectives: Structures of the Brain and Their Functions

107. *(p. 61-63)* Identify the major functions of the hypothalamus, cerebellum, and the reticular formation. Give examples of their functions in terms of real behaviors.

The hypothalamus is a small structure in the brain that maintains the body's internal balance or homeostasis. For example, the hypothalamus works to keep the body at a constant temperature, triggering perspiration when the body is hot and shivering when the body is cold. The hypothalamus is also involved in behaviors such as eating, self-protection, sexual behavior, emotions, and stress. The cerebellum is primarily responsible for bodily balance. When we can stand without falling, or when we successfully try to balance on a narrow plank, we know the cerebellum is functioning properly. The cerebellum constantly monitors feedback from the muscles to coordinate their placement, movement, and tension; it also helps us to analyze and coordinate sensory information and to solve problems. The reticular formation stands guard to activate other parts of the brain to quickly produce general bodily arousal. Additionally, it filters out many kinds of background stimuli (e.g., traffic noise during sleep to allow us to sleep without interruption).

Blooms: Understand
Difficulty: Hard
Learning Objectives: Structures of the Brain and Their Functions

108. *(p. 67-70)* Explain how the right and left hemispheres of the brain are specialized for different functions.

The left hemisphere controls the right side of the body and the right hemisphere controls the left side of the body. The left and right hemispheres are connected by the corpus callosum, which allows the two hemispheres to communicate and coordinate their activities. Although the left and right hemispheres have overlapping functions, each hemisphere appears to excel or specialize in certain tasks. For example, the left hemisphere plays an important role in many language functions. The right hemisphere dominates in spatial perception, visual recognition, and emotion.

Blooms: Understand
Difficulty: Medium
Learning Objectives: Structures of the Brain and Their Functions

109. *(p. 43-44, 71-72)* Compare and contrast the nervous system and the endocrine system.

Researchers have learned that the nervous system and endocrine system are intricately interconnected. Both systems work together to control the body's activities. However, the nervous system and endocrine system do differ in a variety of ways. First, the parts of the endocrine system are not all connected in the way that the parts of the nervous system are. Second, the endocrine system communicates via hormones, whereas the nervous system communicates via electrical impulses and neurotransmitters. Hormones are released in the bloodstream and are transported throughout the body by the circulatory system. Thus, hormones move much more slowly than the neural impulses in the nervous system.

Blooms: Evaluate
Difficulty: Hard
Learning Objectives: The Endocrine System

110. *(p. 71-72)* How does the endocrine system transmit its messages? What functions do the pituitary gland, adrenal glands, pancreas, and gonads (testes or ovaries) perform?

The endocrine system consists of a set of glands that regulate the activities of certain organs by releasing hormones (chemical substances) into the bloodstream. The pituitary gland regulates growth but it is also known as the "master gland" because it regulates other glands in the body. Adrenal glands are located at the top of each kidney. They secrete epinephrine and noepinephrine and play an important role in regulating mood, energy level, and the ability to cope with stress. The pancreas, which is located under the stomach, performs both digestive and endocrine functions. The pancreas produces insulin, which is a hormone that controls glucose levels in the body and is related to metabolism, body weight, and obesity. The gonads (ovaries or testes) are the sex-related endocrine glands that produce hormones related to sexual development and reproduction.

Blooms: Understand
Difficulty: Medium
Learning Objectives: The Endocrine System

111. *(p. 73-75)* Discuss the extent to which the brain has the capacity for repair. Include concepts such as plasticity, substitution of function, and neurogenesis.

The brain does have the capacity to repair itself in some situations. Plasticity, or the ability to adapt and change function, is greatest in young children. According to the substitution of function principle, although certain parts of the brain are more associated with specific tasks (e.g., auditory cortex in the temporal lobe is associated with hearing), when one area gets damaged, another area can pick up the duties of the damaged area. Neurons can actually change their purpose. New neurons can also be created through neurogenesis.

Blooms: Understand
Difficulty: Hard
Learning Objectives: Brain Damage; Plasticity; and Repair

112. *(p. 80)* Explain the difference between genotype and phenotype. Be sure to mention how both relate to the nature-nurture debate and the role of environmental influences.

A genotype is one's genetic heritage, the actual genetic material that determines characteristics. A phenotype is one's observable characteristics, which may or may not differ from what would be predicted based on the genotypic information alone. Nature provides the genotype; the environment (i.e., nurture) can influence the phenotype but cannot influence the genotype.

Blooms: Understand
Difficulty: Hard
Learning Objectives: Genetics and Behavior