Name: _____ Class: _____ Date: _____

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1. The parietal lobes are found rostral to the occipital lobes and posterior to the frontal lobes.

a. True
b. False

ANSWER: True

2. The arachnoid layer of the meninges is found in both the central and peripheral nervous systems.

a. True
b. False

ANSWER: False

3. Nerves originating in the lumbar division of the spinal cord serve the lower back and legs.

a. True
b. False

ANSWER: True

4. The amygdala participates in emotional behavior and is particularly important in the fear response.

a. True
b. False

ANSWER: True

5. The reticular formation extends from the medulla through the pons and into the midbrain.

a. True
b. False

ANSWER: True

6. The primary auditory cortex is found in the parietal lobe of the cerebral cortex.

a. True
b. False

ANSWER: False

7. The primary somatosensory cortex is located in the precentral gyrus of the frontal lobe.

a. True
b. False

ANSWER: False

8. All cranial nerves carry both sensory and motor information to and from the brain.

a. True
b. False

ANSWER: False

9. Neurons comprising the parasympathetic division of the autonomic nervous system are located in the brain and sacral

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divisions of the spinal cord.

a. True
b. False

ANSWER: True

10. From early versions of the hominin up until current *Homo sapiens*, the brain has undergone virtually no change in size.

a. True
b. False

ANSWER: False

11. The cerebellum is part of the diencephalon.

a. True
b. False

ANSWER: False

12. The thalamus and hypothalamus are the central structures in the limbic system.

a. True
b. False

ANSWER: False

13. Structures located relatively toward the tail of a four-legged animal are referred to as

a. rostral.
b. caudal.
c. dorsal.
d. ventral.

ANSWER: b

14. Structures located relatively toward the belly of a four-legged animal are referred to as

a. rostral.
b. caudal.
c. dorsal.
d. ventral.

ANSWER: d

15. A dog's ears are _____ relative to its tail.

a. rostral
b. caudal
c. dorsal
d. ventral

ANSWER: a

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16. Which of the following pairs of terms mean the same thing in a four-legged animal?
    a. ventral—superior
    b. dorsal—inferior
    c. rostral—anterior
    d. caudal—ipsilateral

ANSWER: c

17. An imaginary line that runs the length of the spinal cord to the front of the brain is known as the
    a. sagittal slice.
    b. proximal.
    c. neuraxis.
    d. plane of section.

ANSWER: c

18. The neuraxis runs in a straight line
    a. parallel to the ground in four-legged animals and humans.
    b. perpendicular to the ground in four-legged animals and humans.
    c. parallel to the ground in four-legged animals but makes a 80-degree turn in the brains of humans.
    d. parallel to the ground in humans but makes a 80-degree turn in the brains of four-legged animals.

ANSWER: c

19. A person's hand is _____ relative to his or her elbow.
    a. proximal
    b. distal
    c. contralateral
    d. ipsilateral

ANSWER: b

20. Your right arm is ____ to your left arm.
    a. proximal
    b. distal
    c. ipsilateral
    d. contralateral

ANSWER: d

21. Your right arm is _____ to your right leg.
    a. proximal
    b. distal
    c. contralateral

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d. ipsilateral

ANSWER: d

22. The nerve fibers originate in the cerebral cortex and control movement cross the midline just above the junction of the medulla and spinal cord. As a result, these fibers provide input to _____ structures of the body or structures that are on the _____ side of the midline as the cortical cells providing their motor input.

a. ipsilateral; same
b. contralateral; opposite
c. ipsilateral; opposite
d. contralateral; same

ANSWER: b

23. A person who experiences damage to the motor cortex from a stroke in the right hemisphere is likely to

a. not be able to walk at all because he will be paralyzed from the waist down.
b. have some paralysis in the left side of his body.
c. not be able to understand anything you say to him.
d. have some paralysis on the right side of his body.

ANSWER: b

24. Researchers investigating appetite distinguish between the roles played by the ventromedial hypothalamus and the lateral hypothalamus. Where are these two structures located relative to one another?

a. The lateral hypothalamus is contralateral to the ventromedial hypothalamus.
b. The lateral hypothalamus is rostral to the ventromedial hypothalamus.
c. The lateral hypothalamus is closer to the midline than the ventromedial hypothalamus.
d. The ventromedial hypothalamus is located closer to the midline than the lateral hypothalamus.

ANSWER: d

25. The superior and inferior colliculi are located in the midbrain. Where are these two structures located relative to one another?

a. The superior colliculi are located above the inferior colliculi.
b. The superior colliculi are located below the inferior colliculi.
c. The superior colliculi are closer to the midline than the inferior colliculi.
d. The superior colliculi are farther away from the midline than the inferior colliculi.

ANSWER: a

26. The anterior cingulate cortex (ACC) is located _____ the posterior cingulate cortex (PCC).

a. behind
b. in front of
c. below
d. above

ANSWER: b

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27. Most of the neural input to your left eyebrow originates in the motor cortex of the left hemisphere. In other words, your eyebrow receives input from the _____ hemisphere.

a. proximal
b. distal
c. contralateral
d. ipsilateral

ANSWER: d

28. An anatomical section that divides the brain parallel to the midline and perpendicular to the ground is a _____ section.

a. sagittal
b. coronal
c. horizontal
d. axial

ANSWER: a

29. The plane of section that divides the brain from top to bottom is a _____ section.

a. sagittal
b. coronal
c. horizontal
d. midsagittal

ANSWER: c

30. Early computerized tomography (CT) equipment could take images from only one perspective, the axial or horizontal section. This means that the resulting images were from sections that are _____, dividing the brain from _____.

a. perpendicular to the ground; front to back
b. perpendicular to the ground; side to side
c. parallel to the midline; side to side
d. parallel to the ground; top to bottom

ANSWER: d

31. In order to assess the size of the lateral ventricles in patients with schizophrenia, Dr. Weinberger has decided to use a coronal or frontal section. In other words, he is looking at a plane of section that is

a. perpendicular to the ground, dividing the brain from front to back.
b. perpendicular to the ground, dividing the brain from side to side.
c. parallel to the midline, dividing the brain from side to side.
d. parallel to the ground, dividing the brain from top to bottom.

ANSWER: a

32. The correct ordering of the layers of the meninges from the skull to the brain is

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a. pia mater, arachnoid layer, and dura mater.
b. arachnoid layer, pia mater, and dura mater.
c. dura mater, pia mater, and arachnoid layer.
d. dura mater, arachnoid layer, and pia mater.

ANSWER: d

33. You just heard about a friend who has a tumor on the meninges of her right temporal lobe. This means that the tumor is _____ to the midline of the brain.

a. contralateral
b. medial
c. ventral
d. lateral

ANSWER: d

34. Your cat always walks up to you and wants you to pet it on its back or _____ surface, but your dog lies on its back and presents its _____ surface for you to scratch.

a. ventral; dorsal
b. dorsal; ventral
c. rostral; caudal
d. caudal; rostral

ANSWER: b

35. A subdural hematoma is a "bruise" that often occurs following a head injury and affects a layer of the membranes that cover the central nervous system (CNS) and the peripheral nerves. Given your knowledge of anatomical terms, which of the following is the likely location of this type of injury?

a. the scalp
b. the meninges
c. the lateral ventricles
d. the central canal of the spinal cord

ANSWER: b

36. Which of the meninges is described as a leatherlike tissue that follows the contours of the skull bones?

a. pia mater
b. dura mater
c. arachnoid layer
d. subarachnoid space

ANSWER: b

37. What types of tissue protect the nerve fibers of the peripheral nervous system?

a. pia mater, arachnoid layer, and dura mater
b. pia mater only

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c. connective tissue
d. arachnoid layer and dura mater only

ANSWER: c

38. A lymphatic system was discovered recently in which part of the nervous system?
a. Circle of Willis
b. central canal
c. ventricles
d. meninges

ANSWER: d

39. The subarachnoid space is found between the arachnoid layer and the
a. pia mater.
b. dura mater.
c. skull bones.
d. lateral ventricles.

ANSWER: a

40. Cerebrospinal fluid (CSF) is secreted by the
a. meninges.
b. subarachnoid space.
c. choroid plexus.
d. ventricles.

ANSWER: c

41. CSF may be found in the
a. central and peripheral nervous systems.
b. peripheral nervous system only.
c. lateral and distal ventricles of the brain.
d. ventricles, subarachnoid space, and central canal of the spinal cord.

ANSWER: c

42. The primary purpose of CSF is to
a. nourish the cells of the brain and spinal cord.
b. float the brain within the skull.
c. remove toxins from the brain and excrete them from the body.
d. synthesize chemical messengers.

ANSWER: b

43. A friend calls and says his child is complaining of a severe headache. When the child bends her head forward she

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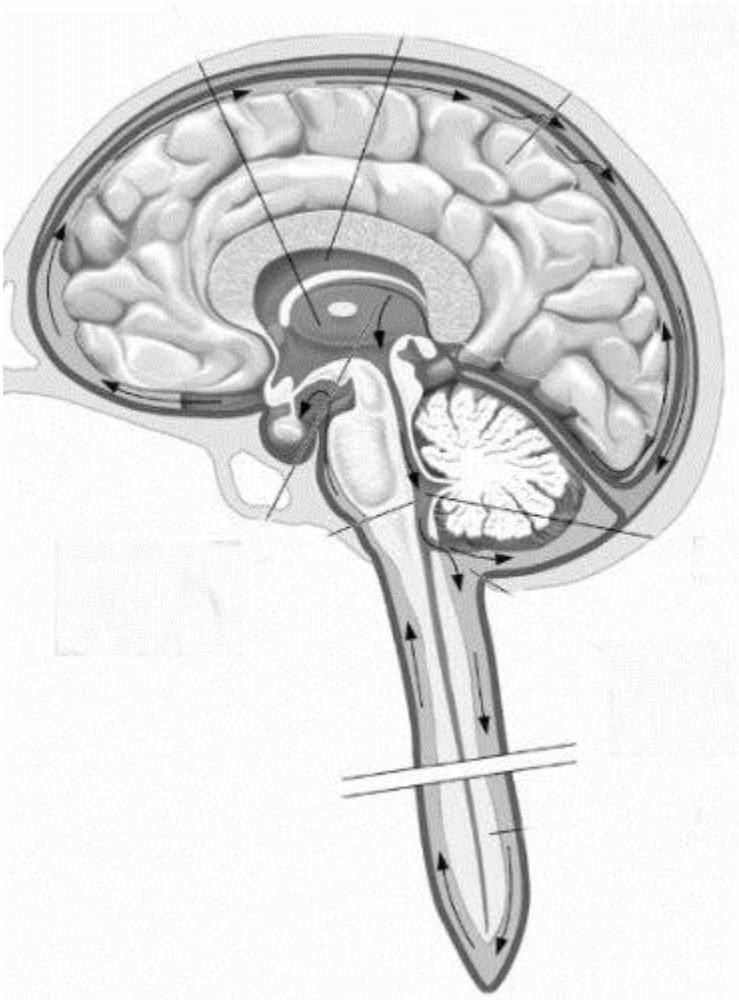
screams in pain. The parent asks you what to do. Given what you have read in this chapter, what would you suggest?

a. Have the child lie down; she'll probably be fine.
b. Call the pediatrician in the morning.
c. Get the child immediately to a physician to be evaluated for meningitis.
d. Get the child to see a neurologist without delay, as she likely has a brain tumor.

ANSWER: d

44.



This figure illustrates the circulation of

a. blood through the brain and spinal cord.
b. CSF between the meninges and the upper layer of cortex.
c. CSF through the ventricles, the central canal of the spinal cord, and in the subarachnoid space.
d. CSF, from its manufacture in the subarachnoid space into the ventricles and central canal of the spinal cord.

ANSWER: c

45. A condition that results when the circulation of CSF is blocked is known as

a. hydrocephalus.

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b. meningioma.
c. meningitis.
d. septicemia.

ANSWER: a

46. If you go to the doctor with a horrible headache and a stiff neck, why might she suggest a spinal tap?
a. A spinal tap will tell if you have a brain tumor
b. The CSF can help diagnose specific diseases.
c. The CSF is the same as the blood supply, and the doctor can tell if you have an infection.
d. The CSF is the only way the doctor can tell if you are on drugs.

ANSWER: b

47. Why would your doctor want to do a spinal tap if she suspected that you had an infection of the brain?
a. Because the CSF of the spinal cord is continuous with the CSF of the brain.
b. Because the spinal cord is part of the CNS.
c. Because the peripheral and central nervous systems are connected.
d. She wouldn't do a spinal tap because the spinal cord is made of different kinds of neurons than the brain.

ANSWER: a

48. The blood supply to the brain is provided by the
a. carotid and vertebral arteries.
b. subclavian and axillary arteries.
c. celiac artery.
d. aorta.

ANSWER: a

49. Which of the following is a component of the peripheral nervous system?
a. the corpus callosum
b. the red nucleus
c. the sympathetic nervous system
d. the central canal

ANSWER: c

50. Which of the following allows the left and right hemispheres to communicate?
a. the corpus callosum
b. the red nucleus
c. the sympathetic nervous system
d. the central canal

ANSWER: a

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51. Which of the following statements is correct?
    a. The CNS is encased in bone but has no CSF.
    b. The peripheral nervous system is encased in bone but has no CSF.
    c. The peripheral nervous system is encased with bone and is bathed with CSF.
    d. The CNS is encased with bone and is bathed with CSF.

ANSWER: d

52. The spinal cord extends _____ of the vertebral column.
    a. down the entire length
    b. down about two-thirds the length
    c. about halfway down the length
    d. about a third of the way down the length

ANSWER: b

53. Running down the center of the spinal cord is the
    a. subarachnoid space.
    b. fourth ventricle.
    c. central canal.
    d. spinal ventricle.

ANSWER: c

54. The region consisting of the head, neck, and arms is served by nerves exiting the _____ division of the spinal cord.
    a. sacral
    b. lumbar
    c. thoracic
    d. cervical

ANSWER: d

55. The correct order of the spinal divisions from rostral to caudal is
    a. cervical, thoracic, lumbar, sacral, and coccygeal.
    b. cervical, lumbar, thoracic, sacral, and coccygeal.
    c. thoracic, cervical, lumbar, sacral, and coccygeal.
    d. cervical, thoracic, lumbar, coccygeal, and sacral.

ANSWER: a

56. A thoracic surgeon operates in the vicinity of the thoracic division of the spinal cord; that is, the structures located in the
    a. neck.
    b. torso.

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c. lower back.
d. genitals and legs.

ANSWER: b

57. As a result of an accident that occurred while playing football, Michael must wear a device known as a cervical collar until his injuries heal. Based on this information, we know that Michael injured his
a. shoulder.
b. knee.
c. neck.
d. lower back.

ANSWER: c

58. Julie's physician tells her that she damaged a disk in the lumbar region of her spinal cord. It is likely that Julie sought medical advice due to pain she experienced in her
a. neck.
b. upper back.
c. shoulder.
d. lower back.

ANSWER: d

59. Injuries to the lower back from lifting heavy objects are the cause of damage to which region of the spinal cord?
a. sacral
b. lumbar
c. thoracic
d. cervical

ANSWER: b

60. Spinal neurons that pass motor information to the body's muscles may be found in _____ of the spinal cord.
a. the white matter
b. the dorsal horns
c. the ventral horns
d. both the dorsal and ventral horns

ANSWER: c

61. Axons carrying sensory information to the brain may be found in
a. the ventral white matter of the spinal cord.
b. the dorsal white matter of the spinal cord.
c. both the ventral and dorsal white matter of the spinal cord.
d. the lateral gray matter of the spinal cord only.

ANSWER: b

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62. The knee jerk reflex, in which your foot kicks in response to a tap on your knee, is also known as a _____ reflex.

a. withdrawal
b. postural
c. patellar
d. polysynaptic

ANSWER: c

63. You've just heard that someone's spinal cord has been injured at L2 (lumbar nerve 2). Given what you've learned in this chapter, which of the following will likely be true?

a. The person will be totally paralyzed from the neck down.
b. The person will be totally paralyzed from just below the arms.
c. Depending on how severe the injury, the person may be unable to move or feel anything from around the waist down.
d. Depending on how severe the injury, the person may be unable to move or feel anything from around the chest down.

ANSWER: c

64. A person with cervical spinal cord damage is known as a _____ and experiences loss of sensation and motor control in the _____.

a. paraplegic; arms and legs
b. paraplegic; legs only
c. quadriplegic; arms, legs, and torso
d. quadriplegic; legs only

ANSWER: c

65. The myelencephalon and metencephalon are located in the

a. hindbrain.
b. midbrain.
c. forebrain.
d. cerebellum.

ANSWER: a

66. Another name for the midbrain is the

a. myelencephalon.
b. metencephalon.
c. mesencephalon.
d. diencephalon.

ANSWER: c

67. The brainstem contains the

a. hindbrain only.

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b. midbrain only.
c. hindbrain and midbrain.
d. hindbrain, midbrain, and forebrain.

ANSWER: c

68. The brainstem contains the
a. rhombencephalon only.
b. mesencephalon only.
c. rhombencephalon and mesencephalon.
d. rhombencephalon, mesencephalon, and prosencephalon.

ANSWER: c

69. The _____ is the most caudal portion of the brain and is a gradual swelling of tissue that lies above the cervical spine.
a. medulla
b. cerebellum
c. pons
d. reticular formation

ANSWER: a

70. Jonathan has been diagnosed with a tumor located in his medulla. His physician warns him that until treated, the tumor will most directly affect his
a. balance and motor coordination.
b. breathing, heart rate, and blood pressure.
c. control of aggression.
d. decision making.

ANSWER: b

71. The pons and cerebellum make up which of the following divisions?
a. telencephalon
b. diencephalon
c. mesencephalon
d. metencephalon

ANSWER: d

72. Which of the following structures is in the brainstem?
a. the central sulcus
b. the corpus callosum
c. the medulla
d. the hypothalamus

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ANSWER: c

73. The medulla contains nuclei responsible for which of the following functions?
    a. balance and motor coordination
    b. heart rate and respiration
    c. visual reflexes
    d. auditory reflexes

ANSWER: b

74. The cochlear and vestibular nuclei are located in the
    a. midbrain.
    b. medulla.
    c. pons.
    d. cerebellum.

ANSWER: c

75. Lucy is experiencing problems with maintaining both her muscle tone and her balance. Her physician is likely to look for the source of her problems in the
    a. vestibular system and the cerebellum.
    b. reticular formation.
    c. red nucleus and the cerebellum.
    d. cochlear nucleus and the inferior colliculi.

ANSWER: a

76. The reticular formation is involved with regulation of
    a. appetite.
    b. heart rate and respiration.
    c. sexual activity.
    d. consciousness and arousal.

ANSWER: d

77. The reticular formation is located in the
    a. medulla.
    b. medulla and pons.
    c. pons.
    d. medulla, pons, and midbrain.

ANSWER: d

78. The locus coeruleus is located in the
    a. medulla.

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b. pons.
c. midbrain.
d. cerebellum.

ANSWER: b

79. Which of the following structures does NOT contain any parts of the reticular formation?
a. the midbrain
b. the diencephalon
c. the medulla
d. the pons

ANSWER: b

80. Which of the following structures are important to the regulation of mood, states of arousal, and sleep?
a. the vestibular nucleus and the cochlear nucleus
b. the raphe nuclei and the locus coeruleus
c. the red nucleus and substantia nigra
d. periaqueductal gray and the red nucleus

ANSWER: b

81. Alcohol interferes with skilled movements primarily through its action on the
a. reticular formation.
b. hypothalamus.
c. cerebellum.
d. medulla.

ANSWER: c

82. Autism spectrum disorder is often associated with abnormal development in the
a. cerebellum.
b. reticular formation.
c. medulla.
d. vestibular nuclei.

ANSWER: a

83. Which of the following structures is found in humans but not in other animals?
a. periaqueductal gray
b. the superior colliculi
c. the neodentate nucleus
d. the substantia nigra

ANSWER: c

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84. Stanley is experiencing ongoing degeneration in his cerebellum. Consequently, which of the following behaviors may become progressively more difficult for him?

a. breathing
b. maintaining a normal core body temperature
c. sleeping
d. language skills

ANSWER: d

85. The dorsal portion of the midbrain is also known as the

a. tegmentum.
b. tectum.
c. cerebral aqueduct.
d. reticular formation.

ANSWER: b

86. A pathway considered important to our experience of reward and pleasure originates in the ventral tegmentum. Where would we look to find this area?

a. in the spinal cord
b. in the hindbrain
c. in the midbrain
d. in the forebrain

ANSWER: c

87. The cerebral aqueduct links the

a. third and fourth ventricles.
b. two lateral ventricles.
c. fourth ventricle and the spinal canal.
d. fourth ventricle and the subarachnoid space.

ANSWER: a

88. Which of the following structures participates in our experience of pain?

a. the red nucleus
b. the substantia nigra
c. periaqueductal gray
d. the superior colliculi

ANSWER: c

89. Our enjoyment of a good surround sound system, which makes it seem like sounds are coming from different directions in our environment, depends on our

a. superior colliculi.
b. inferior colliculi.

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c. periaqueductal gray.
d. substantia nigra.

ANSWER: b

90. The basal ganglia, substantia nigra, and red nucleus are important for which of the following functions?
a. memory
b. motor control
c. sympathetic nervous system control
d. emotion

ANSWER: b

91. Several visual reflexes are managed by the
a. red nucleus.
b. periaqueductal gray.
c. superior colliculi.
d. inferior colliculi.

ANSWER: c

92. Your morning alarm includes a gradual increase in room lighting to help you awaken. This increase in ambient light triggers the _____ in your brain to constrict your pupils in response to the increase in light.
a. superior colliculi
b. periaqueductal gray
c. red nucleus
d. inferior colliculi

ANSWER: a

93. The diencephalon contains which of the following structures?
a. the thalamus and hypothalamus
b. the thalamus and the basal ganglia
c. the inferior and superior colliculi
d. the substantia nigra and the basal ganglia

ANSWER: a

94. Before proceeding to the cerebral cortex, input from all sensory systems except smell converges on the
a. hypothalamus.
b. thalamus.
c. amygdala.
d. hippocampus

ANSWER: b

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95. The thalamus receives information from all sensory systems except
- a. olfaction.
- b. taste.
- c. touch.
- d. temperature.

ANSWER: a

96. Katie has a tumor that is disrupting her ability to maintain her body temperature. Near which of the following structures is Katie's tumor most likely to be located?
- a. hypothalamus
- b. periaqueductal gray
- c. locus coeruleus
- d. raphe nuclei

ANSWER: a

97. Major regulatory functions, including eating, drinking, sex, biorhythms, and temperature control, are managed primarily by the
- a. hypothalamus.
- b. thalamus.
- c. amygdala.
- d. hippocampus.

ANSWER: a

98. The release of hormones by the pituitary gland is regulated primarily by the
- a. hypothalamus.
- b. thalamus.
- c. amygdala.
- d. hippocampus.

ANSWER: a

99. The caudate nucleus, globus pallidus, putamen, and subthalamic nucleus are found in the
- a. hypothalamus.
- b. reticular formation.
- c. basal ganglia.
- d. limbic system.

ANSWER: c

100. Anatomists often group the nucleus accumbens, which participates in our sense of pleasure and reward, with the
- a. reticular formation.
- b. vestibular system.

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c. cranial nerve nuclei.
d. basal ganglia.

ANSWER: d

101. Some anatomists group the _____ with the basal ganglia.
a. thalamus
b. hippocampus
c. reticular formation
d. substantia nigra

ANSWER: d

102. Degeneration of the basal ganglia is a feature of which of the following conditions, which is noted for its interference in initiating movement?
a. Alzheimer's disease
b. Parkinson's disease
c. schizophrenia
d. autism

ANSWER: b

103. The structures of the limbic system are particularly important in
a. motivated behavior, emotion, and learning.
b. sensation and perception.
c. motor control and sensory regulation.
d. regulation of hunger and thirst.

ANSWER: a

104. The hippocampus is important in which of the following functions?
a. learning and memory
b. motor control
c. recognition of biological danger
d. regulation of hunger and thirst

ANSWER: a

105. Stephen's surgery for epilepsy has made it very difficult for him to learn the names of new people he meets. It is most likely that Stephen's surgery affected the _____ in both of his temporal lobes.
a. hippocampus
b. locus coeruleus
c. hypothalamus
d. nucleus accumbens

ANSWER: a

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106. Damage to the hippocampus in both cerebral hemispheres is associated with
a. Parkinson's disease.
b. schizophrenia.
c. inability to form procedural memories.
d. anterograde amnesia.

ANSWER: d

107. The amygdala participates in which of the following behaviors?
a. language
b. motor control
c. fear, rage, and aggression
d. regulation of hunger and thirst

ANSWER: c

108. Students in a biological psychology laboratory were investigating the ability of rats to form associations between tones and electrical shock. Lesions to which of the following structures would make it very difficult for the students to teach their rats to be afraid of the tones?
a. the nucleus accumbens
b. the amygdala
c. the substantia nigra
d. the hypothalamus

ANSWER: b

109. Cindy brought a fake rubber snake into the lab where her rhesus monkeys lived. Most of the monkeys responded with fear vocalizations, but one did not. Cindy knew this monkey had been in a lesion experiment prior to coming to her lab, but she didn't know what type of lesion had been done. What would you tell Cindy about her monkey?
a. He probably didn't have a lesion at all, as ignoring fake snakes is considered normal for rhesus monkeys.
b. He probably had a lesion in the hippocampus of both hemispheres.
c. He probably had a lesion in the amygdala of both hemispheres.
d. He probably had a lesion of the ventromedial nucleus of the hypothalamus.

ANSWER: c

110. The limbic system includes all of the following brain structures EXCEPT the
a. hypothalamus.
b. thalamus.
c. cingulate cortex.
d. amygdala.

ANSWER: b

111. The olfactory bulbs participate in the processing of which sensory modality?
a. vision

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b. touch
c. audition
d. smell

ANSWER: d

112. The ventral striatum is another name for the
a. caudate nucleus.
b. subthalamic nucleus.
c. lenticular nucleus.
d. nucleus accumbens.

ANSWER: d

113. Jessica was playing poker while on a vacation in Las Vegas, and in a fit of exuberance, bet all of her money on one hand. Unfortunately, it turned out to be a losing hand. If we were using functional magnetic resonance imaging (fMRI) to observe Jessica's reactions to losing, which structure might have shown especially increased activation?
a. her ACC
b. her PCC
c. her amygdala
d. her hippocampus

ANSWER: a

114. Which part of the brain is also referred to as "the fifth lobe?"
a. the orbitofrontal cortex
b. the dorsolateral prefrontal cortex
c. the insula
d. the fusiform face area

ANSWER: c

115. Lesions of the _____ usually produce rage and attack behaviors.
a. hippocampus
b. amygdala
c. septal area
d. thalamus

ANSWER: c

116. The "hills" of the cerebral cortex are known as
a. gyri.
b. sulci.
c. fissures.
d. ganglia.

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ANSWER: a

117. The "valleys" between ridges of cerebral cortex are known as
   a. gyri.
   b. sulci.
   c. nuclei.
   d. ganglia.

ANSWER: b

118. A particularly large sulcus is known as a
   a. gyrus.
   b. fasciculus.
   c. fissure.
   d. lemniscus.

ANSWER: c

119. The degree of cortical convolution in the brain predicts a species'
   a. cognitive abilities.
   b. physical size.
   c. identity as an herbivore, a carnivore, or an omnivore.
   d. identity as nocturnal or diurnal.

ANSWER: a

120. How many distinct layers are typically found in the cerebral cortex?
   a. two
   b. four
   c. six
   d. eight

ANSWER: c

121. Which of the cortical layer(s) contain(s) no cell bodies?
   a. layer I
   b. layers II and IV
   c. layers III and V
   d. layer VI

ANSWER: a

122. Granule cells are usually found in cortical
   a. layer I.
   b. layers II and IV.

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c. layers III and V.
d. layer VI.

ANSWER: b

123. Pyramidal cells are usually found in cortical
a. layer I.
b. layers II and IV
c. layers III and V.
d. layer VI.

ANSWER: c

124. Output from the cortex to other parts of the nervous system usually originates in which of the cortical layers?
a. II and IV
b. III and V
c. II and III
d. V and VI

ANSWER: b

125. Korbinian Brodmann's system for dividing the cerebral cortex into 52 areas is based on
a. divisions of the surface by sulci and fissures
b. regular units covering one square inch.
c. the function of the underlying cortex of each area.
d. the distribution of cell bodies in the six layers of cortex.

ANSWER: d

126. Although the human cerebral cortex performs many higher order cognitive functions,
a. its volume is similar to the cortex of cats and dogs.
b. its functions are quite different from the functions performed by the cortex of other mammals.
c. it makes up nearly the entire volume of the cerebral hemisphere.
d. it makes up only a thin layer of tissue covering the cerebral hemispheres.

ANSWER: d

127. The caudal boundary of the frontal lobe is formed by the
a. longitudinal fissure.
b. lateral sulcus.
c. calcarine fissure.
d. central sulcus.

ANSWER: d

128. The most rostral lobes of the cerebral cortex are the _____ lobes.

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a. frontal
b. parietal
c. temporal
d. occipital

ANSWER: a

129. At the very back of the cerebral cortex are the _____ lobes.
a. frontal
b. parietal
c. temporal
d. occipital

ANSWER: d

130. The primary somatosensory cortex is located within the _____ lobes.
a. frontal
b. parietal
c. temporal
d. occipital

ANSWER: b

131. The postcentral gyrus contains primary _____ cortex.
a. somatosensory
b. motor
c. auditory
d. visual

ANSWER: a

132. The primary visual cortex is located in the _____ lobes.
a. frontal
b. parietal
c. temporal
d. occipital

ANSWER: d

133. The primary auditory cortex is located in the _____ lobes.
a. frontal
b. parietal
c. temporal
d. occipital

ANSWER: c

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134. The primary motor cortex is located in the precentral gyrus of the _____ lobes.

a. frontal
b. parietal
c. temporal
d. occipital

ANSWER: a

135. Following a serious head injury, Robert began to make a series of impulsive decisions that led to negative consequences, such as quitting his job and leaving his wife for a woman he met in a bar. It is most likely that Robert's injury affected his _____ lobes.

a. occipital
b. frontal
c. parietal
d. temporal

ANSWER: b

136. Clare's head injury has left her with serious problems in planning and executive cognitive functions, such as being able to remember a new friend's telephone number long enough to put it in her cell phone. It is likely that Clare's injury damaged her

a. amygdala.
b. hippocampus.
c. dorsolateral prefrontal cortex.
d. PCC.

ANSWER: c

137. The two cerebral hemispheres are connected by the

a. anterior commissure and the corpus callosum.
b. anterior and medial commissures.
c. medial commissure and the corpus callosum.
d. arcuate fasciculus and the corpus callosum.

ANSWER: a

138.

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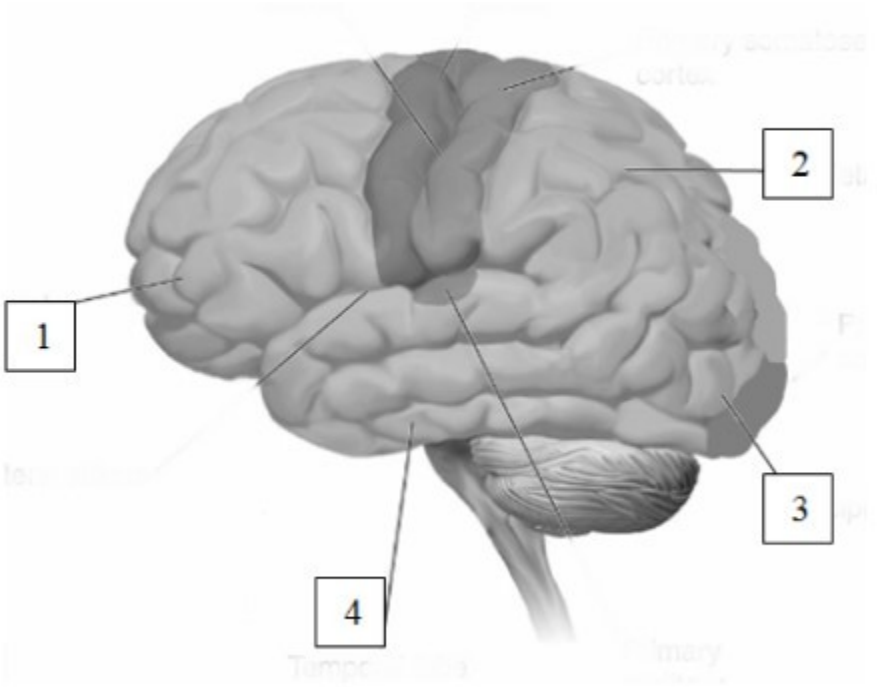

Among the functions localized in the area designated "1" in the given figure are

a. decision making and planning.
b. processing of sound and visual recognition of objects.
c. generating movement and perceiving body position.
d. primary visual processing and perception of movement.

ANSWER: a

139. A patient who demonstrates uncharacteristically poor judgment and is unable to maintain a typical attention span may have experienced damage to the _____ lobes.

a. frontal
b. parietal
c. temporal
d. occipital

ANSWER: a

140. Extreme antisocial behavior has been correlated with damage to the

a. hippocampus.
b. orbitofrontal cortex.
c. primary visual cortex.
d. corpus callosum.

ANSWER: b

141. Damage to which of the following areas results in problems producing speech?

a. Broca's area

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b. Wernicke's area
c. the orbitofrontal cortex
d. the cingulate cortex

ANSWER: a

142. For the vast majority of the population, which of the following functions are localized to the left hemisphere?
a. language
b. spatial abilities
c. intuition
d. artistic and musical abilities

ANSWER: a

143. Which of the following peripheral nerves enter and exit the brain itself?
a. cervical
b. thoracic
c. cranial
d. lumbar

ANSWER: c

144. How many pairs of cranial nerves do humans have?
a. 6
b. 8
c. 10
d. 12

ANSWER: d

145. Which of the following cranial nerves provides input and feedback from the heart, liver, and digestive tract?
a. the trochlear nerve (IV)
b. the abducens nerve (VI)
c. the hypoglossal nerve (XII)
d. the vagus nerve (X)

ANSWER: d

146. Which of the following cranial nerves do we use to produce facial expressions?
a. the trigeminal nerve (V)
b. the facial nerve (VII)
c. the trochlear nerve (IV)
d. the spinal accessory nerve (XI)

ANSWER: b

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147. Which of the following statements accurately describes the ability of cranial nerves to carry sensory and motor information?

a. Half of the cranial nerves carry sensory information and the other half of the cranial nerves carry motor information.
b. All cranial nerves carry both sensory and motor information.
c. Some cranial nerves carry just sensory information, while all of the others carry both sensory and motor information.
d. Some cranial nerves carry sensory information, others carry motor information, and still others carry both sensory and motor information.

ANSWER: d

148. Efferent spinal nerves arise from the _____ root of the spinal cord and carry _____ information.

a. ventral; sensory
b. ventral; motor
c. dorsal; sensory
d. dorsal; motor

ANSWER: b

149. Damage to a mixed nerve is likely to produce impairments in _____ for a part of the body.

a. both sensation and motor control
b. sensation only
c. motor control only
d. neither sensation nor motor control

ANSWER: a

150. Dorsal root ganglia

a. are located in the ventral horns of the spinal cord.
b. contain the cell bodies of efferent nerves.
c. are located in the dorsal horns of the spinal cord.
d. contain the cell bodies of afferent nerves.

ANSWER: d

151. _____ spinal nerves in adult humans0 are myelinated.

a. All
b. None of the
c. All efferent
d. All afferent

ANSWER: c

152.

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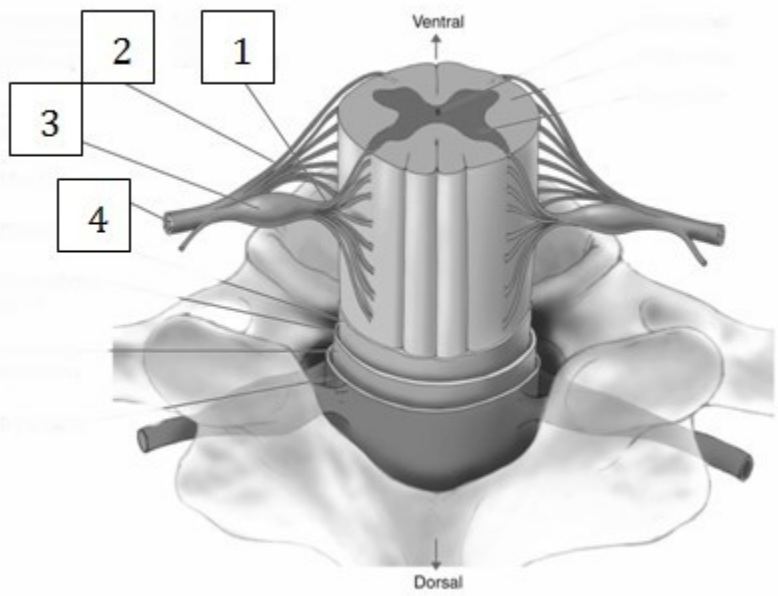

The structure designated “3” in this illustration

a. transmits efferent data from the CNS to muscles and glands.
b. transmits afferent data from the periphery to the CNS.
c. is a mixed nerve, carrying both afferent and efferent data to and from the CNS.
d. is a sympathetic ganglion and participates in autonomic arousal.

ANSWER: b

153. The dull, aching feeling that often follows injury is probably carried by _____ nerves.

a. myelinated efferent
b. unmyelinated efferent
c. myelinated afferent
d. unmyelinated afferent

ANSWER: d

154. The autonomic nervous system directly controls

a. the skeletal muscles.
b. the heart, lungs, and other organs.
c. the reticular formation.
d. temperature regulation.

ANSWER: b

155. Biofeedback training allows people to consciously control processes normally managed by the

a. frontal lobe.
b. reticular formation

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c. somatic nervous system.
d. autonomic nervous system.

ANSWER: d

156. Internal stimuli, such as the arrival of food in the digestive system, normally activate
a. the somatic nervous system.
b. the parasympathetic nervous system.
c. the sympathetic nervous system.
d. both the parasympathetic and sympathetic nervous systems.

ANSWER: b

157. _____ nervous system(s) control the body's "fight or flight" responses.
a. The somatic
b. The parasympathetic
c. The sympathetic
d. Both the parasympathetic and sympathetic

ANSWER: c

158. Salivation and digestion are inhibited during activation of
a. the somatic nervous system.
b. the parasympathetic nervous system.
c. the sympathetic nervous system.
d. both the parasympathetic and sympathetic nervous systems.

ANSWER: c

159. Which of the following is a consequence of sympathetic nervous system activity?
a. increased heart rate
b. increased digestion
c. increased salivation
d. decreased blood pressure

ANSWER: a

160. Sexual activity involves
a. the parasympathetic nervous system only.
b. the sympathetic nervous system only.
c. both the parasympathetic and sympathetic nervous systems.
d. neither the parasympathetic nor the sympathetic nervous system.

ANSWER: c

161. Constriction of blood vessels near the skin's surface is a characteristic of activity in

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a. the somatic nervous system.
b. the sympathetic nervous system.
c. the parasympathetic nervous system.
d. both the sympathetic and parasympathetic nervous systems.

ANSWER: b

162. The neurons associated with the parasympathetic nervous system are located in the _____ of the spinal cord.
a. lumbar and sacral divisions
b. thoracic and lumbar divisions
c. brain and sacral division
d. brain and lumbar division

ANSWER: c

163. The brain structure with the most direct responsibility over the autonomic nervous system is the
a. amygdala.
b. cingulate cortex.
c. hippocampus.
d. hypothalamus.

ANSWER: d

164. Evolution is understood as _____ with modification from a common ancestor.
a. natural selection
b. descent
c. abrupt change
d. genetics

ANSWER: b

165. Which of the following statements offers the best definition of evolution?
a. Evolution describes descent with modifications from a common ancestor.
b. Evolution describes how humans evolved from chimpanzees.
c. Evolution describes the origin of life from the big bang.
d. Evolution describes the transmission of dominant and recessive traits to offspring.

ANSWER: a

166. The process by which some genes become more prevalent in subsequent generations due to reproductive success is known as:
a. natural selection
b. descent
c. abrupt change
d. genetics

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ANSWER: a

167. Researchers studying two species of frogs found that one species seemed to be more numerous in ponds with lots of fishes, whereas the other species was more numerous in ponds with relatively fewer fishes. Using your understanding of the evolutionary concept of fitness, choose the statement that best describes the situation.

a. It is only a matter of time before one of these species becomes more numerous in both ponds because certain traits are reproduced more successfully than others regardless of environment.
b. It is likely that the two species differ in a trait that makes one better suited to ponds with lots of fishes and one better suited to ponds with fewer fishes.
c. Both species are likely to become extinct in the near future as neither can successfully cohabit with fishes.
d. Over time the numbers of the two species will become more equal, regardless of the type of pond they inhabit.

ANSWER: b

168. When industrialization covered British trees with soot, moths with darker coloring became more numerous. When pollution was reduced again, lighter colored moths became more numerous. This situation illustrates the process of

a. artificial selection.
b. epigenetics.
c. fitness.
d. mutation.

ANSWER: c

169. Natural selection refers to the

a. ability of farmers and breeders to develop animals with specific traits, such as fast horses and hairless Chihuahuas.
b. ability to select embryos with certain characteristics during in vitro fertilization.
c. success of one trait over another in the survival of a species.
d. dominance of genes for one trait, such as dark eye color, over another, such as blue eye color.

ANSWER: c

170. The first animals with simple nerve nets probably evolved about _____ years ago.

a. 4.5 billion
b. 3.5 billion
c. 700 million
d. 250 million

ANSWER: c

171. Animals with the first rudimentary brains probably evolved about _____ years ago.

a. 4.5 billion
b. 3.5 billion
c. 700 million
d. 250 million

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ANSWER: d

172. The first hominin brain probably developed about _____ million years ago.

a. 700
b. 250
c. 10
d. 7

ANSWER: d

173. True brains and spinal cords occur in

a. chordates.
b. mollusca.
c. crustacean.
d. hemichordates.

ANSWER: a

174. Chordate nervous systems differ from nonchordate nervous systems in that

a. chordate nervous systems run along the ventral, or front, side of the animal.
b. chordate nervous systems run along the dorsal, or back, side of the animal.
c. nonchordate nervous systems have brains rather than ganglia.
d. nonchordate nervous systems provide faster reactions to sensory information.

ANSWER: b

175. Among chordates, early brains have _____ than later developing brains.

a. larger cerebellums
b. more convoluted cortices
c. larger olfactory bulbs
d. smaller cerebellums and less convoluted cortices

ANSWER: a

176. The first *Homo sapiens* appeared between _____ years ago.

a. 4 million and 5 million
b. 1 million and 2 million
c. 300,000 and 500,000
d. 100,000 and 200,000

ANSWER: d

177. Brain development among hominid species

a. occurred very quickly.
b. occurred very slowly and unevenly.

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c. occurred very slowly and gradually.
d. has appeared to speed up in the last century.

ANSWER: a

178. Compared with early examples of *Homo erectus*, modern humans have
a. much larger brains.
b. smaller brains.
c. brains that are about the same size.
d. more convoluted brains.

ANSWER: a

179. Agriculture, urbanization, and literacy appear to have produced _____ in human brain size.
a. large amounts of additional growth
b. modest amounts of additional growth
c. no apparent changes
d. possible reductions

ANSWER: c

180. Factors that may limit human brain size include
a. the brain's requirements for calcium.
b. gender differences in brain size.
c. the brain's need for fatty acids.
d. difficulties in childbirth.

ANSWER: d

181.

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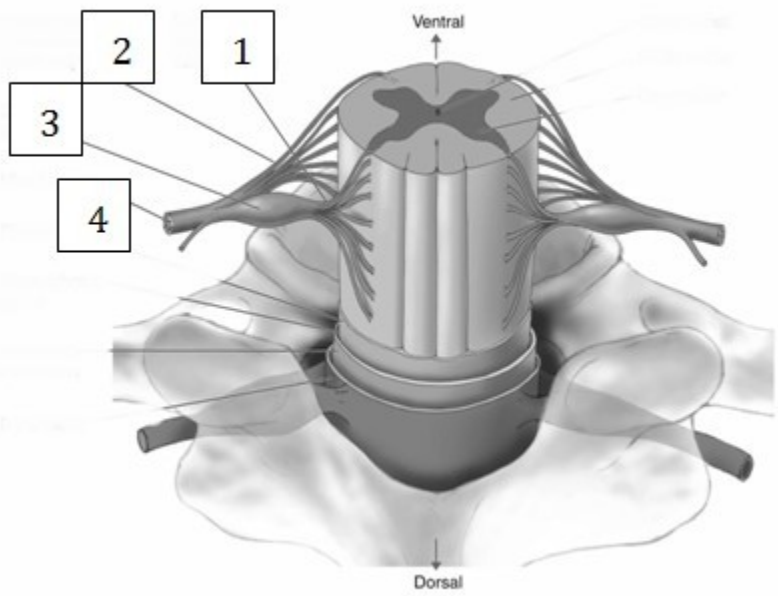

The structure indicated by "4" in this illustration

a. transmits afferent data to the CNS.
b. transmits efferent data from the CNS.
c. is a mixed nerve, carrying both afferent and efferent data to and from the CNS.
d. is a sympathetic ganglion.

ANSWER: c

182. Which of the following is NOT a major plane of section in brain anatomy?

a. coronal
b. saggital
c. horizontal
d. oblique

ANSWER: d

183. Which major plane of section in anatomy runs parallel to the midline?

a. coronal
b. saggital
c. horizontal
d. oblique

ANSWER: b

184. The brain floats in CSF so that

a. it is cushioned to protect it from impact or sudden changes in movement.
b. it can efficiently eliminate wastes from the brain into the CSF drainage.

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c. it can receive oxygen and glucose from the CSF bathing it.
d. to both eliminate wastes and take in oxygen and glucose.

ANSWER: a

185. The ____ is important in coordination of skilled movements.
a. hypothalamus
b. red nucleus
c. globus pallidus
d. cerebellum

ANSWER: d

186. The ____ is important in regulating body homeostasis.
a. hypothalamus
b. hippocampus
c. amygdala
d. cerebellum

ANSWER: d

187. The ____ is a collection of structures in the forebrain that participates in learning, emotion, and memory.
a. medulla
b. limbic system
c. reticular formation
d. cerebellum

ANSWER: b

188. The ____ lobe is primarily involved with visual processing.
a. frontal
b. parietal
c. occipital
d. temporal

ANSWER: c

189. A spinal nerve root on the right ventral side of the cord carries what type of information?
a. sensory information from the right side of the body
b. motor information to the right side of the body
c. sensory information from the left side of the body
d. motor information to the left side of the body

ANSWER: b

190. The sympathetic nervous system

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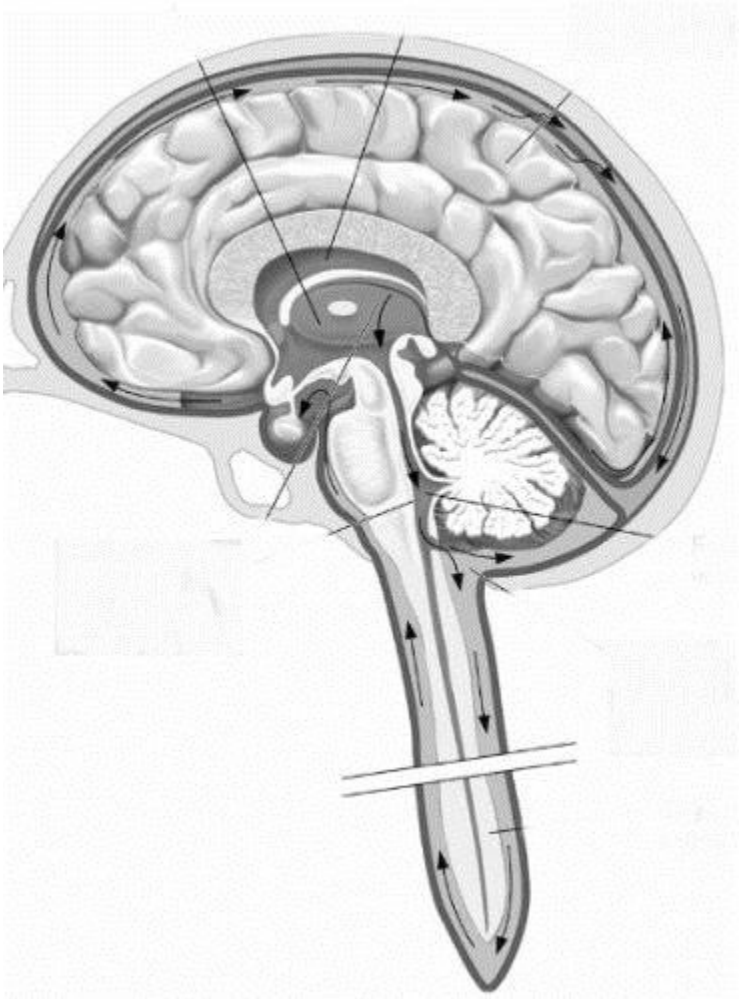
a. increases heart rate and respiration.
b. decreases digestion activity.
c. both increases heart rate/respiration and decreases digestion.
d. neither increases heart rate and respiration nor decreases digestion.

ANSWER: a

191.



In this illustration, CSF is shown moving from its place of synthesis in the _____ of the ventricles, through the third and fourth ventricles and then into the _____ of the spinal cord. Finally, it flows into the _____ within the meninges.

ANSWER: choroid plexus, central canal, subarachnoid space
(See Figure 2.5).

192.

Name: _____ Class: _____ Date: _____

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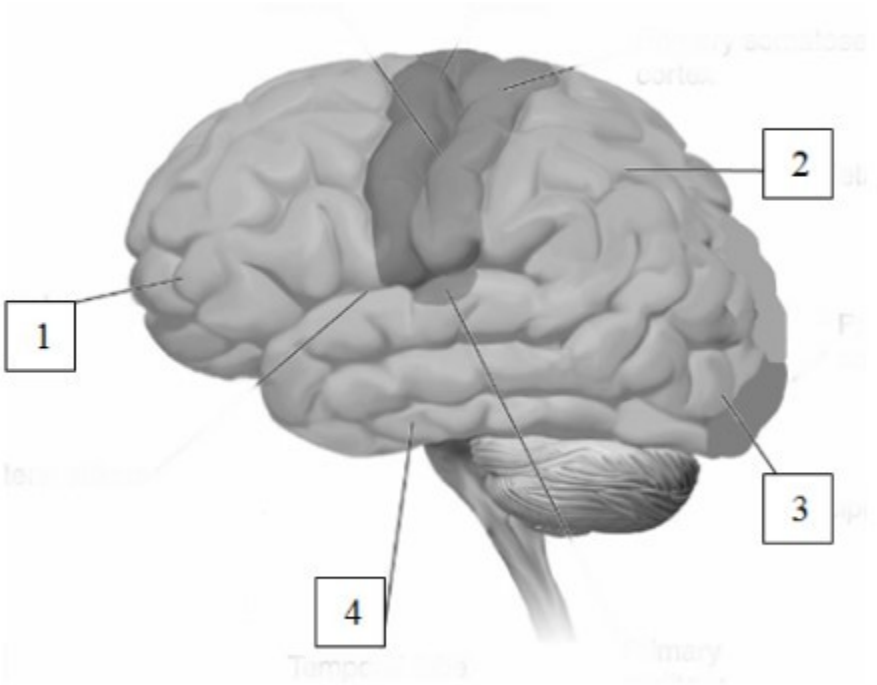

(see Figure 2.21)

Fill in the names of the four lobes depicted in this figure:
Area 1: _____
Area 2: _____
Area 3: _____
Area 4: _____
ANSWER: frontal, parietal, occipital, temporal

193.

Name: _____ Class: _____ Date: _____

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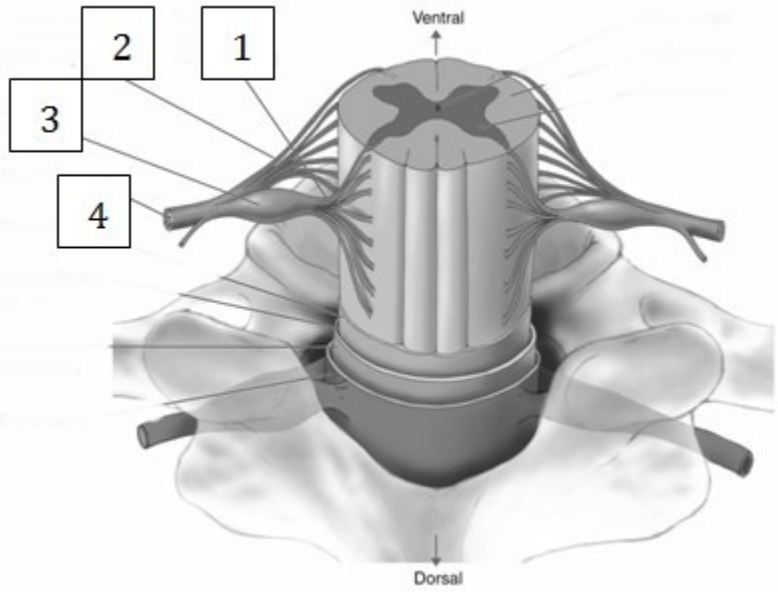

The nerve fibers designated as “1” in this illustration carry _____ information, and the nerve fibers designated as “2” carry _____ information.

ANSWER: sensory (afferent), motor (efferent)
sensory, motor
afferent, efferent
(see Figure 2.25)

194. _____ sections are parallel to the midline, _____ sections divide the brain from front to back, and _____ sections divide the brain from top to bottom.

ANSWER: Saggital, coronal, horizontal

195. The _____ contributes to muscle coordination, muscle tone, balance, and some types of learning.

ANSWER: cerebellum

196. The _____ nervous system is active during periods of arousal, stress, and emergency and prepares the body for “fight-or-flight.” The _____ nervous system is active during times of calm and participates in the storage of nutrients and the repair of the body

ANSWER: sympathetic, parasympathetic

197. The actor Christopher Reeve damaged his cervical spinal cord during a tragic horseback riding accident. Based on your knowledge of the structure and functions of the spinal cord, what challenges did Reeve face as a result of his accident?

ANSWER: Answers will focus on the nerves that radiate from the spine below the cervical level, and discuss that these nerves carry motor and sensory information for all four limbs. Students will likely include discussion of Reeve as a quadriplegic, and may also explain that cranial nerves would be unaffected, since they exit above the cervical spine.

198. Why is the enteric nervous system referred to as “the second brain?”

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ANSWER: Answers may include the number of neurons (equivalent to the spinal cord) and the importance of gut-brain interactions in healthy and disordered behaviors.

199. Why do contemporary neuroscientists believe that the cerebellum is responsible for much more than balance and motor coordination?

ANSWER: This answer will typically focus on the fact that the size of the cerebellum has kept pace with the cerebral hemispheres in the course of evolution and that damage and abnormalities in the cerebellum are associated with problems with higher order cognitive and executive functioning.

200. Reading a sentence aloud involves sequential activation of different areas of the brain. Identify the major brain regions activated in the order necessary to read aloud.

ANSWER: Answer will vary, with general form of visual cortex (occipital lobe) to Wernicke's area (temporal lobe) to Broca's area (frontal lobe) to motor cortex.

201. A major evolutionary step was the process of cephalization (getting a head), with chordates having a single brain rather than a series of ganglia. What advantages does a brain confer to an animal that is not possible with ganglia?

ANSWER: This answer should discuss the survival advantage of a single brain over a series of ganglia. The one brain allows integration of information from anywhere on the body and allows for a response that involves the entire body, so escape from a threat can be more effective.

202. The autonomic nervous system has two branches, sympathetic and parasympathetic. Activation of one branch typically suppresses activity of the other. If you eat a large meal, and then suddenly need to run, you will activate each system. Describe the likely chain of events that will transpire and include which system will take precedence.

ANSWER: Students often have personal experience with this, and know that the sympathetic system will predominate, so the meal will be regurgitated. They will usually explain that sympathetic activation will suppress parasympathetic, and that the body will also eliminate the meal from the system to allow the parasympathetic system to diminish while the sympathetic system is active.