1. The long, thin extension of the brain that runs along the body axis is the:
A) esophagus
B) medulla oblongata
C) spinal cord
D) brainstem

2. Longitudinal transmission of information is a key feature of _____ symmetric organisms.
A) distally
B) bilaterally
C) vertically
D) radially

3. Developing vertebrate brains contain three main divisions: the prosencephalon, mesencephalon, and the _____.
A) forebrain
B) rhombencephalon
C) telencephalon
D) diencephalon

4. The three fundamental bulges of the brain are clearly visible in a developing embryo at about:
A) 4 months
B) 4 days
C) 4 weeks
D) 4 hours

5. The metencephalon is subdivided into the pons and the:
A) midbrain
B) cerebellum
C) medulla
D) hypothalamus

6. The vertebrate forebrain subdivides into the telencephalon and the:
A) brainstem
B) myelencephalon
C) diencephalon
D) metencephalon

7. The thalamus and hypothalamus are both subdivisions of the:
A) peripheral nervous system
B) cerebellum
C) brainstem
D) diencephalon

8. The vertebrate hindbrain subdivides into the myelencephalon and the:
A) brainstem
B) metencephalon
C) telencephalon
D) diencephalon

9. The vertebrate hindbrain subdivides into the metencephalon and the:
A) diencephalon
B) brainstem
C) telencephalon
D) myelencephalon

10. The spinal cord has input and output connections to the rest of the body via the _____ nervous system.
A) sympathetic
B) central
C) lateral
D) peripheral

11. The cerebral cortex is a subdivision of the:
A) diencephalon
B) hindbrain
C) telencephalon
D) peripheral nervous system

12. The basal ganglia are a subdivision of the:
A) diencephalon
B) peripheral nervous system
C) hindbrain
D) telencephalon

13. The cerebral cortex, subcortical white matter, basal ganglia, and basal forebrain nuclei are all subdivisions of the:

A) mesencephalon
B) hindbrain
C) diencephalon
D) telencephalon

14. The diencephalon is divided into the:

A) thalamus and pons
B) basal ganglia and hippocampus
C) pons and medulla
D) thalamus and hypothalamus

15. The anatomical directions anterior and posterior mean toward the _____ and _____, respectively.

A) top; bottom
B) outside; inside
C) front; back
D) left; right

16. The anatomical word for "on the same side" is:

A) medial
B) ipsilateral
C) caudal
D) contralateral

17. The temporal lobe is _____ to the corpus callosum.

A) superior
B) lateral
C) medial
D) anterior

18. The anatomical word for "toward the middle" is:

A) rostral
B) lateral
C) medial
D) caudal

19. Sensory neurons are sensitive to:
A) fatigue
B) pain
C) temperature
D) all of the above

20. When you digest your lunch or your heart rate speeds up, you are using the _____ nervous system.
A) somatic
B) automatic
C) autonomic
D) central

21. The anatomical word for "on the opposite side" is:
A) ipsilateral
B) medial
C) caudal
D) contralateral

22. An axial slice would divide the human body along its long axis, whereas a sagittal slice would divide the body into:
A) anterior and posterior
B) left and right
C) top and bottom
D) front and back

23. A slice through the exact midline of the body or nervous system is called a:
A) transverse slice
B) midsagittal slice
C) lateral slice
D) medial slice

24. Motor neurons extend to the muscles of the body, making contact at the:
A) spinal cord
B) primary motor cortex
C) neuromuscular junction
D) lateral geniculate nucleus

25. The anatomical term for "toward the point where the limb attaches to the body" is:

A) anterior
B) distal
C) proximal
D) ventral

26. These neurons convey a multitude of different kinds of sensory input to the body:

A) input neurons
B) sensory neurons
C) perceptions
D) motor neurons

27. When you raise your arm, kick a ball, or withdraw your hand from a hot plate, you are using the _____ nervous system.

A) autonomic
B) parasympathetic
C) sympathetic
D) somatic

28. The body has two major compartments: the soma, including skin and bones, and the _____, containing the internal organs.

A) central nervous system
B) peripheral nerves
C) viscera
D) vasculature

29. The motor side of the somatic nervous system is organized into segments within the musculature called:

A) muscle tones
B) myopias
C) myotomes
D) dermatomes

30. Paralysis of all four limbs is called:

A) quadraparalysis
B) quadriplegia
C) quadritoma
D) paraplegia

31. The section of the spine nearest to the brainstem is called the _____ spine.
A) thoracic
B) lumbar
C) sacral
D) cervical

32. The section of the spine between the cervical spine and lumbar spine is the:
A) sacral
B) thermic
C) thoracic
D) segmental

33. Visceral motor neurons are the output neurons of the sympathetic and parasympathetic nervous systems, sending control signals to the body's:
A) muscles
B) internal organs
C) cranial nerves
D) skin

34. The neurons in the ventral layers of gray matter are mostly _____ neurons.
A) input
B) reflex
C) sensory
D) motor

35. Raising the hair follicles in response to cold is a:
A) conditioned response
B) visceral response
C) reflex
D) none of the above

36. T. Graham Brown proposed that the main functional unit of the nervous system is the:
A) reflex arc
B) neuron
C) interneuron
D) central pattern generator

37. The hindbrain contains the pons and the:
A) thalamus
B) amygdala
C) medulla oblongata
D) hippocampus

38. The involuntary functions essential to life such as breathing and heart rate are controlled by the:
A) insula
B) hippocampus
C) parietal lobe
D) medulla oblongata

39. Chewing, swallowing, yawning, and sneezing are examples of rhythmical movements generated by the:
A) frontal lobe
B) parietal lobe
C) occipital lobe
D) brainstem

40. Destruction of the _____, which regulates heart rate and blood pressure, is fatal.
A) substantia nigra
B) insula
C) amygdala
D) medulla oblongata

41. The organ in the inner ear that senses balance is the:
A) eardrum
B) vestibular organ
C) cochlea
D) stapes

42. The _____ reflex keeps the eye steady if the head is suddenly turned.
A) ocular
B) vestibular
C) vestibuloocular
D) oculomotor

43. The midbrain area called the _____ uses auditory inputs to direct movements.
A) ventral tegmental area
B) thalamus
C) inferior colliculus
D) superior colliculus

44. The _____ coordinates the key survival behavior of reproduction.
A) hindbrain
B) midbrain
C) cerebellum
D) forebrain

45. More complex behaviors such as defense, aggression, and reproduction are controlled by the:
A) inferior colliculus
B) superior colliculus
C) periaqueductal gray matter
D) lateral geniculate nucleus

46. The midbrain area called the _____ is involved in locating visual stimuli in space and using this information to direct movements.
A) retina
B) superior colliculus
C) thalamus
D) lateral geniculate nucleus

47. A midbrain cell group called the _____ sends alerting signals using norepinephrine.
A) red nucleus
B) reticular formation
C) substantia nigra
D) locus coeruleus

48. A diffuse network of midbrain cells known as the midbrain _____ plays a central role in regulating states of consciousness.
A) locus coeruleus
B) substantia nigra
C) red nucleus
D) reticular formation

49. The midbrain raphe nuclei, which lie along the seam between the two sides of the brainstem, are the main source of the neurotransmitter:

A) dopamine
B) norepinephrine
C) serotonin
D) acetylcholine

50. The main source of the neurotransmitter dopamine for the motor system is the:

A) locus coeruleus
B) reticular formation
C) substantia nigra
D) red nucleus

51. .When you swallow, you are using the _____ cranial nerve.

A) optic
B) olfactory
C) vestibulocochlear
D) glossopharyngeal

52. Making eye movements requires the _____ cranial nerve.

A) trigeminal
B) oculomotor
C) glossopharyngeal
D) olfactory

53. Moving your head and neck requires signals carried by the _____ cranial nerve.

A) glossopharyngeal
B) oculomotor
C) optic
D) spinal accessory

54. This cranial nerve controls the muscles of chewing:

A) olfactory
B) trigeminal
C) optic
D) oculomotor

55. The signals for the senses of hearing and balance are carried by the _____ cranial nerve.
A) olfactory
B) optic
C) glossopharyngeal
D) vestibulocochlear

56. The _____, or "little brain," contains an enormous number of neurons compared to its size.
A) cerebral cortex
B) frontal lobe
C) cerebellum
D) brainstem

57. Generating a forward model is a possible strategy used by the _____ to execute fast, precise movements.
A) primary visual cortex
B) cerebellum
C) orbitofrontal cortex
D) vestibular organ

58. The neurons that drive homeostasis can be found in the:
A) frontal lobe
B) lateral geniculate nucleus
C) hippocampus
D) hypothalamus

59. Although the hypothalamus detects deviations from homeostasis, it must rely on the _____ to execute the necessary actions to restore homeostasis.
A) cerebellum
B) insula
C) hippocampus
D) cerebral cortex

60. Because it controls the pituitary gland, the _____ can be considered the controller of the hormone-secreting systems.
A) brainstem
B) amygdala
C) thalamus
D) hypothalamus

61. When a mother hugs her child, there is likely a release of the hormone:
A) norepinephrine
B) prolactin
C) oxytocin
D) serotonin

62. Controlled by the hypothalamus, the _____ releases growth hormone into the body.
A) amygdala
B) dorsal raphe nuclei
C) adrenal gland
D) pituitary gland

63. A major function of the hypothalamus is controlling:
A) eye movements
B) blood pressure
C) satiety
D) heart rate

64. Removing which structure would have the largest impact on conscious perception of the outside world?
A) amygdala
B) thalamus
C) hippocampus
D) orbitofrontal cortex

65. Damage to the prefrontal cortex may result in the inability to:
A) become full after a meal
B) regulate heart rate
C) regulate body temperature
D) reason and plan goals

66. The _____ consists of a thin sheet of neurons that wraps around the entire surface of the thalamus.
A) corpus callosum
B) amygdala
C) reticular nucleus
D) hypothalamus

67. Which part of the brain is responsible for our most advanced cognitive functions?
A) cerebellum
B) amygdala
C) cerebral cortex
D) insula

68. Deep brain stimulation delivers _____ signals directly to specific brain structures.
A) radio
B) electrical
C) chemical
D) magnetic

69. The cerebral cortex controls such higher functions as:
A) circadian rhythms
B) fight-or-flight responses
C) satiety
D) goal planning

70. The lobes of the cerebral cortex include the:
A) occipital
B) frontal
C) parietal
D) all of the above

71. The _____ is devoted to processing visual input and contains many different subregions for mapping out the various features of visual stimuli.
A) parietal lobe
B) cingulate cortex
C) occipital lobe
D) frontal lobe

72. The _____ plays an important role in setting priorities and determining how valuable an action or a resource might be, given current needs.
A) primary somatosensory cortex
B) orbitofrontal cortex
C) prefrontal cortex
D) primary motor cortex

73. The _____ is active when we are imagining scenes and when we are navigating.
A) amygdala
B) ventral tegmental area
C) precuneus
D) lateral geniculate nucleus

74. The _____ assembles more elaborate sequences of movement and behavior and is a major player in cognition and goal planning.
A) primary somatosensory cortex
B) orbitofrontal cortex
C) prefrontal cortex
D) primary motor cortex

75. The olfactory cortex is important in the sense of:
A) balance
B) smell
C) vision
D) hearing

76. On the surface, the rounded convolutions of the cerebral cortex are called gyri, and the grooves between gyri are called _____.
A) troughs
B) valleys
C) nuclei
D) sulci

77. The _____ are a set of closely interconnected gray matter structures involved in a diverse functions such as limb movements, eye movements, planning and goal setting, motivation, and reward.
A) gyri
B) cranial nerves
C) basal ganglia
D) cerebellum

78. A stroke that damages the posterior temporal lobe is most likely to affect which ability?
A) complex motor planning
B) fine olfactory ability
C) visual perception
D) spoken language comprehension

79. The primary auditory cortex is located within the:
A) parietal lobe
B) frontal lobe
C) occipital lobe
D) temporal lobe

80. The widely used Brodmann atlas divides the cortex into around _____ numbered regions.
A) 5000
B) 50
C) 5
D) 500

81. Processing emotions from sights, sounds, and smells of would be handled by this limbic structure:
A) thalamus
B) amygdala
C) hippocampus
D) hypothalamus

82. The hippocampus plays an important role in spatial navigation and:
A) circadian rhythms
B) sleeping
C) episodic memory
D) eating

83. A man remembers that on his 8th birthday, he received a red bicycle from his parents. This type of memory relies on the:
A) occipital lobe
B) frontal lobe
C) hippocampus
D) hypothalamus

84. This substance protects the brain from injury and helps to maintain a stable chemical environment for the neurons:
A) serotonin
B) norepinephrine
C) cerebrospinal fluid
D) acetylcholine

85. The system that puts the body in the mode of reacting to threats or opportunities in the external world is the _____ nervous system.
A) automatic
B) central
C) parasympathetic
D) sympathetic

86. The _____ nervous system is activated when a predator approaches and we must prepare for fight or flight.
A) central
B) sympathetic
C) somatic
D) parasympathetic

87. _____ integrate sensory and motor functions, allowing more complex forms of sensory processing and motor planning.
A) Ventral regions
B) Association areas
C) Interneurons
D) Dorsal regions

88. The four _____ in the brain are filled with cerebrospinal fluid, not neurons.
A) compartments
B) modules
C) lobes
D) ventricles

89. In the spinal cord, sensory input enters the _____ side and motor output exits the _____ side.
A) ipsilateral; contralateral
B) medial; lateral
C) dorsal; ventral
D) rostral; caudal

90. The brains of all mammals have a common underlying structure.
A) True
B) False

91. The brains of insects have underlying similarities to our own.
A) True
B) False

92. The fundamental organization of the nervous system is ancient and has been highly conserved over time.
A) True
B) False

93. One key feature of a bilateral nervous system is the presence of local, centralized networks with each body segment.
A) True
B) False

94. It is not possible that both neurons and brains arose independently in several different lines of living creatures at different times.
A) True
B) False

95. Signaling mechanisms are so similar that, in many cases, the gene of one organism can still perform its usual signaling function even when placed inside the nervous system of a distantly related organism.
A) True
B) False

96. The vertebrate nervous system may actually be an upside-down relative of the invertebrate nervous system.
A) True
B) False

97. The vertebrate brain contains three main bulges or zones of expansion: the forebrain, the midbrain, and the hindbrain.
A) True
B) False

98. Most neurons are unconnected to other neurons.
A) True
B) False

99. When the brain refines one of its functions over evolutionary time scales, it often does so by inserting an additional layer of neurons between the existing inputs and outputs.

A) True
B) False

100. All sensory input, somatic and visceral, enters the spinal cord through the dorsal nerve root at the back of the spinal cord.

A) True
B) False

101. If damage occurred to the hippocampus, we would expect to see a decreased ability to process visual stimuli.

A) True
B) False

102. The occipital lobe is located directly behind the eyes.

A) True
B) False

103. Damage to the cerebellum interferes with the smooth, efficient movements of body parts to their targets in the surrounding environment.

A) True
B) False

104. A dopamine imbalance may result in sleep disturbances.

A) True
B) False

105. Activation of the sympathetic nervous system would likely result in increased respiration and quickened heartbeat.

A) True
B) False

106. Anterior means "toward the back."

A) True
B) False

107. A spinal cord injury would have no bearing on the ability to feel pain.
A) True
B) False

108. A disruption in hormonal regulation may be a sign of problems in the hypothalamus.
A) True
B) False

109. The relay nuclei of the thalamus are tightly connected to the cerebral cortex.
A) True
B) False

110. Although they do possess _____, jellyfish and sea anemones are literally spineless and brainless.

111. The peripheral nervous system connects not only to the skin and muscles, but also to the _____ of the body.

112. The pons and _____ are both subdivisions of the metencephalon.

113. The thalamus and _____ are both subdivisions of the diencephalon.

114. The primary visual cortex is located in the _____ lobe.

115. The neurotransmitter _____ is critical for movement, cognition, motivation, and reward.

116. The _____ system includes the amygdala and hippocampus.

117. The _____ cortex provides the nervous system's most elaborate circuitry for sensory and motor functions.

118. The _____ coordinates homeostatic functions, including sleep and eating, to keep the body's internal environment in balance.

119. The primary motor cortex lies just anterior to the ____ sulcus.

120. Give an in-depth example of how the hypothalamus works to maintain homeostasis (e.g., when someone is hungry or thirsty).

121. Compare and contrast the benefits of monosynaptic versus polysynaptic reflexes. Give an example where each type of connection would be best.

122. A person sustains extensive injuries to the prefrontal cortex during a car crash. Describe three activities that would be impacted by this injury.

123. Much of what we know about human neuroanatomy comes from studying nonhumans. Give 2 reasons justifying extrapolating from nonhumans to humans and 2 reasons why we cannot learn everything about humans from studying animals.

124. What are some pros and cons of having the vast majority of the human nervous system in a small area, instead of distributed throughout the body?

125. Would it be more debilitating for you to lose your sensory or motor neurons?

126. Deep brain stimulation is a technique that delivers localized electrical impulses to try to correct a malfunctioning part of the brain. How might DBS be better/worse than taking a medication aimed at treating the same behavioral deficit?

Answer Key

1. C
2. B
3. B
4. C
5. B
6. C
7. D
8. B
9. D
10. D
11. C
12. D
13. D
14. D
15. C
16. B
17. B
18. C
19. D
20. C
21. D
22. B
23. B
24. C
25. C
26. B
27. D
28. C
29. C
30. B
31. D
32. C
33. B
34. D
35. C
36. D
37. C
38. D
39. D
40. D
41. B
42. C
43. C
44. B

45. C
46. B
47. D
48. D
49. C
50. C
51. D
52. B
53. D
54. B
55. D
56. C
57. B
58. D
59. D
60. D
61. C
62. D
63. C
64. B
65. D
66. C
67. C
68. B
69. D
70. D
71. C
72. B
73. C
74. C
75. B
76. D
77. C
78. D
79. D
80. B
81. B
82. C
83. C
84. C
85. D
86. B
87. B
88. D
89. C
90. A

91. A
92. A
93. A
94. B
95. A
96. A
97. A
98. B
99. A
100. A
101. B
102. B
103. A
104. B
105. A
106. B
107. B
108. A
109. A
110. neurons
111. internal organs
112. cerebellum
113. hypothalamus
114. occipital
115. dopamine
116. limbic
117. cerebral
118. hypothalamus
119. central
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