Multiple-Choice Questions

1) Which of the following is a function of the motor division of the nervous system?
A) providing sensation of the internal and external environments
B) integrating sensory information
C) coordinating voluntary and involuntary activities
D) sending signals to muscles
E) regulating or controlling peripheral structures and systems
Answer: D
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms

2) The brain and spinal cord comprise the
A) autonomic nervous system.
B) peripheral nervous system.
C) central nervous system.
D) efferent nervous system.
E) afferent nervous system.
Answer: C
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms

3) The three general functions of the nervous system are
A) sensory, motor, and predictive.
B) sensory, motor, and manipulative.
C) sensory, motor, and integrative.
D) reflexive, predictive, and motor.
E) emotion, memory, and movement.
Answer: C
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms
4) Information received by the brain concerning internal or external environmental conditions is called a(n)
A) action potential.
B) effector.
C) stimulus.
D) sensation.
E) response.
Answer: D
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms

5) In general, the nervous system
A) controls everything.
B) is fast acting.
C) is long lasting.
D) responds to changes in the external environment only.
E) all of the above
Answer: B
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms

6) The part of the peripheral nervous system that brings information to the central nervous system is the
A) motor division.
B) afferent division.
C) efferent division.
D) autonomic division.
E) somatic division.
Answer: B
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms

7) Most neurons in the brain are
A) bipolar.
B) unipolar.
C) anaxonic.
D) multipolar.
E) tripolar.
Answer: D
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms
8) Neurons normally derive ATP solely through  
A) aerobic respiration.  
B) anaerobic respiration.  
C) formation of creatine phosphate.  
D) use of stored glycogen.  
E) both A and D  
Answer: A  
Diff: 1  
Learning Outcome: 8.2  
Skill Level: 1 Reviewing Facts and Terms

9) The glial cells responsible for maintaining the blood-brain barrier are the  
A) astrocytes.  
B) Schwann cells.  
C) microglia.  
D) ependymal cells.  
E) fiber cells.  
Answer: A  
Diff: 1  
Learning Outcome: 8.2  
Skill Level: 1 Reviewing Facts and Terms

10) The cytoplasmic extensions that, together with the cell body, provide the main receptive surfaces for neurons are the  
A) axons.  
B) soma.  
C) synapses.  
D) dendrites.  
E) neurofibrils.  
Answer: D  
Diff: 1  
Learning Outcome: 8.2  
Skill Level: 1 Reviewing Facts and Terms

11) Which of the following is a function of neurons?  
A) support  
B) information processing  
C) secretion of cerebrospinal fluid  
D) isolation of neuroglia  
E) phagocytosis  
Answer: B  
Diff: 1  
Learning Outcome: 8.2  
Skill Level: 1 Reviewing Facts and Terms
12) The largest and most numerous of the glial cells in the central nervous system are the
A) astrocytes.
B) Schwann cells.
C) oligodendrocytes.
D) microglia.
E) ependymal cells.
Answer: A
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

13) The myelin sheaths that surround the axons of some of the neurons in the CNS are formed by
A) astrocytes.
B) Schwann cells.
C) oligodendrocytes.
D) microglia.
E) ependymal cells.
Answer: C
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

14) Which of the following is a glial cell?
A) astrocytes
B) Schwann cells
C) oligodendrocytes
D) microglia
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

15) Small phagocytic cells that are especially obvious in damaged tissue in the CNS are the
A) astrocytes.
B) Schwann cells.
C) oligodendrocytes.
D) microglia.
E) ependymal cells.
Answer: D
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms
16) The neurilemma of axons in the peripheral nervous system is formed by
A) astrocytes.
B) ependymal cells.
C) oligodendrocytes.
D) microglia.
E) Schwann cells.
Answer: E
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

17) Cells responsible for information processing and transfer are
A) neuroglia.
B) Schwann cells.
C) neurons.
D) astrocytes.
E) microglia.
Answer: C
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

18) Aggregations of ribosomes in neurons are referred to as
A) neurofilaments.
B) neurofibrils.
C) synapses.
D) Nissl bodies.
E) microglia.
Answer: D
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

19) Branches that sometimes occur along the length of an axon are called
A) action potentials.
B) synaptic knobs.
C) collaterals.
D) hillocks.
E) synapse.
Answer: C
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms
20) Neurons that have one axon and one dendrite with the soma between them are called
A) polypolar.
B) unipolar.
C) bipolar.
D) tripolar.
E) multipolar.
Answer: C
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

21) Neurons that have several dendrites and a single axon extending away from the soma are called
A) polypolar.
B) unipolar.
C) bipolar.
D) tripolar.
E) multipolar.
Answer: E
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

22) Interneurons
A) are found only in the central nervous system.
B) carry only sensory impulses.
C) carry only motor impulses.
D) only connect motor neurons to other motor neurons.
E) are found between neurons and their effectors.
Answer: A
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

23) Most neurons lack centrioles. This observation explains
A) why neurons grow such long axons.
B) why these neurons cannot regenerate.
C) the conducting ability of neurons.
D) the ability of neurons to communicate with each other.
E) the ability of neurons to live long lives.
Answer: B
Diff: 1
Learning Outcome: 8.2
Skill Level: 2 Reviewing Concepts
24) The polarization of a nerve fiber refers to having the
A) sodium and potassium ions inside the cell.
B) sodium ions inside the cell and potassium outside the cell.
C) potassium ions inside the cell and sodium outside the cell.
D) chloride ions inside the cell.
E) hillock and knob at opposite ends.
Answer: C
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

25) Saltatory conduction
A) occurs only if the myelin sheath is continuous.
B) occurs only if nodes of Ranvier are lacking.
C) is faster than conduction on an unmyelinated axon.
D) is slower than conduction on an unmyelinated axon.
E) occurs at the synapse.
Answer: C
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

26) The most rapid action potentials are conducted on
A) thick, myelinated axons.
B) thick, unmyelinated axons.
C) thin, myelinated axons.
D) thin, unmyelinated axons.
E) dendrites.
Answer: A
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

27) Opening of sodium channels in the membrane of a neuron results in
A) depolarization.
B) repolarization.
C) hyperpolarization.
D) increased negative charge inside the membrane.
E) none of the above
Answer: A
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms
28) The following are the main steps in the generation of an action potential.
1. Sodium channels are inactivated.
2. Potassium channels open and potassium moves out of the cell, initiating repolarization.
3. Sodium channels regain their normal properties.
4. A graded depolarization brings an area of an excitable membrane to threshold.
5. A temporary hyperpolarization occurs.
6. Sodium channel activation occurs.
7. Sodium ions enter the cell and depolarization occurs.
The proper sequence of these events is
A) 4, 6, 7, 3, 2, 5, 1
B) 4, 6, 7, 1, 2, 3, 5
C) 5, 7, 4, 1, 2, 3, 5
D) 2, 4, 6, 7, 1, 3, 5
E) 4, 2, 5, 6, 7, 3, 1
Answer: B
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

29) When a neuron is at rest, which ion passes through its membrane most easily?
A) sodium
B) chloride
C) sulfate
D) potassium
E) proteins
Answer: D
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

30) The all-or-none principle states that
A) all stimuli will produce identical action potentials.
B) all stimuli great enough to bring the membrane to threshold will produce identical action potentials.
C) the greater the magnitude of the stimuli, the greater the intensity of the action potential.
D) only sensory stimuli can activate action potentials.
E) only motor stimuli can activate action potentials.
Answer: B
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms
31) During continuous conduction,
A) action potentials move in all directions along an axon.
B) action potentials occur at successive nodes along the length of the stimulated axon.
C) local currents depolarize adjacent areas of membrane so that action potentials continue to form along the membrane.
D) action potentials produce a local current that is strong enough to spread along the length of the axon.
E) local potentials produce a continuous outward flow of potassium ions.
Answer: C
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

32) If a resting potential becomes more negative, the cell
A) repolarizes.
B) hyperpolarizes.
C) depolarizes.
D) refracts.
E) summates.
Answer: B
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

33) A neuron that is excited to subthreshold is said to be
A) summed.
B) facilitated.
C) hyperpolarized.
D) converged.
E) graded.
Answer: B
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

34) Which of the following is a function of the brain interstitium?
A) provides cushioning for delicate neural tissues
B) provides buoyant support for the brain
C) acts as a transport medium for nutrients
D) provides a medium for nerve impulse transmission
E) acts as a transport medium for chemical messengers
Answer: D
Diff: 1
Learning Outcome: 8.3
Skill Level: 2 Reviewing Concepts
35) If the sodium–potassium pumps in the plasma membrane fail to function,
A) the extracellular concentration of potassium ions will increase.
B) the intracellular concentration of sodium ions will increase.
C) the membrane will lose its capacity to generate action potentials.
D) the inside of the membrane will have a resting potential that is more positive than normal.
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 8.3
Skill Level: 2 Reviewing Concepts

36) Tetrodotoxin is a toxin that blocks the sodium channels from opening. What effect would this have on the function of neurons?
A) Neurons would depolarize more rapidly.
B) Action potentials would lack a repolarization phase.
C) The refractory period would be shorter than normal.
D) The neurons would not be able to propagate action potentials.
E) none of the above
Answer: D
Diff: 1
Learning Outcome: 8.3
Skill Level: 3 Critical Thinking & Clinical Applications

37) Synaptic knobs occur at the ends of
A) dendrites.
B) somas.
C) telodendria.
D) peduncles.
E) axons.
Answer: A
Diff: 1
Learning Outcome: 8.4
Skill Level: 1 Reviewing Facts and Terms

38) Neurotransmitters are released from the
A) dendrites.
B) synaptic terminals/knobs.
C) collaterals.
D) hillock.
E) synapse.
Answer: B
Diff: 1
Learning Outcome: 8.4
Skill Level: 1 Reviewing Facts and Terms
39) Which type of synapse dominates the nervous system?
A) chemical
B) electrical
C) mechanical
D) processing
E) radioactive
Answer: A
Diff: 1
Learning Outcome: 8.4
Skill Level: 1 Reviewing Facts and Terms

40) The ion needed to initiate the release of acetylcholine into the synaptic cleft is
A) sodium.
B) potassium.
C) calcium.
D) chloride.
E) zinc.
Answer: C
Diff: 1
Learning Outcome: 8.4
Skill Level: 1 Reviewing Facts and Terms

41) Adrenergic synapses release the neurotransmitter
A) acetylcholine.
B) norepinephrine.
C) dopamine.
D) serotonin.
E) GABA.
Answer: B
Diff: 1
Learning Outcome: 8.4
Skill Level: 1 Reviewing Facts and Terms

42) The processing of the same information at the same time by several neuronal pools is called
A) serial processing.
B) parallel processing.
C) divergent processing.
D) convergent processing.
E) facilitation.
Answer: B
Diff: 1
Learning Outcome: 8.4
Skill Level: 1 Reviewing Facts and Terms
43) Which of the following lists the parts of a reflex arc in the correct order?
A) receptor, sensory neuron, interneuron, motor neuron, effector
B) receptor, effector, sensory neuron, interneuron, motor neuron
C) receptor, sensory neuron, effector, interneuron, motor neuron
D) effector, receptor, sensory neuron, interneuron, motor neuron
E) receptor, interneuron, sensory neuron, motor neuron, effector
Answer: A
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

44) The following is a series of events that occur at a typical cholinergic synapse. Place the events in the correct sequence.
1. Calcium ions enter the cytoplasm of the synaptic knob and ACh release occurs.
2. Arriving action potential depolarizes the synaptic knob and the presynaptic membrane.
3. Depolarization ends as ACh is broken down into acetate and choline by AChE.
4. ACh release ceases because calcium ions are removed from the cytoplasm of the synaptic knob.
5. The synaptic knob reabsorbs choline from the synaptic cleft and uses it to resynthesize ACh.
6. ACh diffuses across the synaptic cleft and binds to receptors on the postsynaptic membrane.
7. Sodium channels on postsynaptic surface are activated, producing a graded depolarization.
The correct sequence of events is
A) 2, 1, 6, 7, 4, 3, 5.
B) 2, 6, 4, 1, 3, 5, 7.
C) 1, 3, 5, 7, 2, 4, 6.
D) 1, 2, 4, 5, 3, 6, 7.
E) 7, 4, 5, 6, 2, 3, 1.
Answer: A
Diff: 3
Learning Outcome: 8.4
Skill Level: 2 Reviewing Concepts

45) The specialized membranes that protect the spinal cord are termed
A) cranial meninges.
B) cranial mater.
C) spinal meninges.
D) spinal mater.
E) epidural membranes.
Answer: C
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms
46) Blood vessels servicing the spinal cord are found in the
A) pia mater.
B) dura mater.
C) epidural space.
D) subdural space.
E) subarachnoid space.
Answer: A
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms

47) The dural sinuses are located in the
A) dura mater.
B) arachnoid.
C) pia mater.
D) cortex.
E) subarachnoid space.
Answer: A
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms

48) What contains a delicate network of collagen and elastin fibers through which cerebrospinal fluid circulates?
A) epidural space
B) dural sinus
C) arachnoid villi
D) subarachnoid space
E) pia mater
Answer: D
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms

49) Diffusion across the arachnoid villi returns excess CSF to
A) the third ventricle.
B) arterial circulation.
C) venous circulation.
D) the fourth ventricle.
E) the central canal.
Answer: C
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms
50) Head injuries that damage cerebral blood vessels are serious conditions because
A) they could cause severe pain.
B) these spaces compress and distort the relatively soft tissues of the brain.
C) epicardial tissue will be affected.
D) the venous sinus will not drain.
E) pathways will be blocked.
Answer: B
Diff: 1
Learning Outcome: 8.5
Skill Level: 3 Critical Thinking & Clinical Applications

51) The projections of gray matter toward the outer surface of the spinal cord are called
A) wings.
B) horns.
C) pyramids.
D) fibers.
E) tracts.
Answer: B
Diff: 1
Learning Outcome: 8.6
Skill Level: 1 Reviewing Facts and Terms

52) Masses of myelinated nerve fibers appear
A) gray.
B) white.
C) yellow.
D) brown.
E) transparent.
Answer: B
Diff: 1
Learning Outcome: 8.6
Skill Level: 1 Reviewing Facts and Terms

53) Axons crossing from one side of the spinal cord to the other within the gray matter are found in the
A) anterior gray horns.
B) lateral gray horns.
C) posterior gray horns.
D) gray commissures.
E) white commissures.
Answer: D
Diff: 1
Learning Outcome: 8.6
Skill Level: 1 Reviewing Facts and Terms
54) The white matter of the spinal cord contains
A) bundles of axons that share common origins, destinations, and functions.
B) bundles of dendrites that share common origins, destinations, and functions.
C) sensory and motor nuclei.
D) both axons and dendrites.
E) interneurons.
Answer: A
Diff: 1
Learning Outcome: 8.6
Skill Level: 1 Reviewing Facts and Terms

55) Enlargements of the spinal cord occur
A) near the posterior median sulcus.
B) adjacent to the anterior median fissure.
C) in segments of the spinal cord that control the limbs.
D) in the thoracic region of the spinal cord.
E) none of the above
Answer: C
Diff: 1
Learning Outcome: 8.6
Skill Level: 1 Reviewing Facts and Terms

56) The entire spinal cord is divided into ________ segments.
A) 5
B) 12
C) 25
D) 31
E) 35
Answer: D
Diff: 1
Learning Outcome: 8.6
Skill Level: 1 Reviewing Facts and Terms

57) The horns of the spinal cord contain
A) nerve tracts.
B) columns.
C) meninges.
D) nerve cell bodies.
E) all of the above
Answer: D
Diff: 1
Learning Outcome: 8.6
Skill Level: 1 Reviewing Facts and Terms
58) The posterior horns of the spinal cord contain  
A) sensory nuclei.  
B) somatic motor nuclei.  
C) autonomic motor nuclei.  
D) nerve tracts.  
E) all of the above  
Answer: A  
Diff: 1  
Learning Outcome: 8.6  
Skill Level: 1 Reviewing Facts and Terms

59) Gray matter in the spinal cord is mostly  
A) fissures.  
B) cerebrospinal fluid.  
C) interneurons.  
D) axons.  
E) myelin.  
Answer: C  
Diff: 1  
Learning Outcome: 8.6  
Skill Level: 1 Reviewing Facts and Terms

60) If the dorsal root of a spinal nerve is severed,  
A) motor control of skeletal muscles would be impaired.  
B) motor control of visceral organs would be impaired.  
C) the spinal cord would not be able to process information at that level.  
D) the brain would not be able to communicate with that level of the spinal cord.  
E) incoming sensory information would be disrupted.  
Answer: E  
Diff: 1  
Learning Outcome: 8.6  
Skill Level: 2 Reviewing Concepts

61) Which of the following link(s) the cerebral hemispheres with the brain stem?  
A) medulla oblongata  
B) pons  
C) midbrain  
D) diencephalon  
E) cerebellum  
Answer: D  
Diff: 1  
Learning Outcome: 8.7  
Skill Level: 1 Reviewing Facts and Terms
62) The walls of the diencephalon form the
A) hypothalamus.
B) thalamus.
C) brain stem.
D) midbrain.
E) cerebellum.
Answer: B
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

63) The part of the brain that functions to control skeletal muscles is the
A) medulla oblongata.
B) cerebral cortex.
C) midbrain.
D) diencephalons.
E) thalamus.
Answer: B
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

64) Major centers concerned with autonomic control of breathing, blood pressure, heart rate, and digestive activities are located in the
A) medulla oblongata.
B) pons.
C) midbrain.
D) diencephalons.
E) cerebellum.
Answer: A
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

65) A neural cortex is found on the surface of the
A) cerebrum.
B) midbrain.
C) cerebellum.
D) pons.
E) both A and C
Answer: E
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms
66) The ventricle associated with the pons and upper medulla is the
A) first.
B) second.
C) third.
D) fourth.
E) lateral.
Answer: D
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

67) The visual cortex is located in the
A) frontal lobe.
B) parietal lobe.
C) temporal lobe.
D) occipital lobe.
E) cerebellum.
Answer: D
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

68) Regions of the brain that are involved in interpreting data or coordinating motor responses are
A) commissural areas.
B) sensory areas.
C) association areas.
D) motor areas.
E) processing areas.
Answer: C
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

69) The region of the brain that is involved in conscious thought and intellectual function as well as
processing somatic sensory and motor information is the
A) medulla.
B) pons.
C) midbrain.
D) cerebellum.
E) cerebrum.
Answer: E
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms
70) If Broca's area is damaged, what might result?
   A) loss of sensation
   B) loss of ability to speak
   C) loss of upper limb control
   D) loss of memory
   E) mental retardation
   Answer: B
   Diff: 1
   Learning Outcome: 8.7
   Skill Level: 1 Reviewing Facts and Terms

71) The two cerebral hemispheres are separated by the
   A) longitudinal fissure.
   B) central sulcus.
   C) lateral sulcus.
   D) frontal lobe.
   E) postcentral sulcus.
   Answer: A
   Diff: 1
   Learning Outcome: 8.7
   Skill Level: 1 Reviewing Facts and Terms

72) The area anterior to the central sulcus is the
   A) parietal lobe.
   B) temporal lobe.
   C) frontal lobe.
   D) occipital lobe.
   E) postcentral gyrus.
   Answer: C
   Diff: 1
   Learning Outcome: 8.7
   Skill Level: 1 Reviewing Facts and Terms

73) The cortex inferior to the lateral sulcus is the
   A) parietal lobe.
   B) temporal lobe.
   C) frontal lobe.
   D) occipital lobe.
   E) cerebellar lobe.
   Answer: B
   Diff: 1
   Learning Outcome: 8.7
   Skill Level: 1 Reviewing Facts and Terms
74) The primary connection between cerebral hemispheres is the
A) cerebellum.
B) precentral gyrus.
C) postcentral gyrus.
D) midbrain.
E) corpus callosum.
Answer: E
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

75) The surface of the postcentral gyrus contains the
A) primary sensory cortex.
B) primary motor cortex.
C) visual cortex.
D) olfactory cortex.
E) auditory cortex.
Answer: A
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

76) Stimulation of the reticular formation results in
A) sleep.
B) increased consciousness.
C) coma.
D) decreased cerebral function.
E) none of the above
Answer: B
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

77) The ________ acts as a switching and relay center for integration of conscious and unconscious sensory and motor pathways.
A) cerebellum
B) midbrain
C) diencephalon
D) pons
E) medulla
Answer: C
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms
78) Overseeing the postural muscles of the body and making rapid adjustments to maintain balance and equilibrium are functions of the
A) cerebrum.
B) midbrain.
C) cerebellum.
D) pons.
E) medulla.
Answer: C
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

79) What is the function of the cerebral association areas?
A) to analyze and interpret sensory information
B) memory
C) reasoning
D) learning
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

80) The basal nuclei include which of the following?
A) sensory nuclei
B) caudate nucleus
C) autonomic motor nuclei
D) thalamus
E) all of the above
Answer: B
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

81) Which of the following is glandular tissue?
A) third ventricle
B) posterior pituitary
C) thalamus
D) hypothalamus
E) anterior pituitary
Answer: E
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms
82) Which part of the following develops from the forebrain?
A) central canal
B) cerebellum
C) pons
D) thalamus
E) midbrain
Answer: D
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

83) The cerebrum is separated from the cerebellum by the
A) longitudinal fissure.
B) central sulcus.
C) lateral sulcus.
D) transverse fissure.
E) corpus callosum.
Answer: D
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

84) Which of the following is a function of the cerebellum?
A) temperature regulation
B) thirst sensation
C) hunger sensation
D) postural reflexes
E) hormone production
Answer: D
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

85) Brain waves found on an EEG in normal adults under resting conditions are
A) theta waves.
B) alpha waves.
C) beta waves.
D) delta waves.
E) all of the above
Answer: B
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms
86) Complex motor activities such as riding a bicycle or eating
A) only require neural processing at the level of the cerebrum.
B) involve little input from the brain.
C) require the coordinated activity of several regions of the brain.
D) are controlled at the level of the spinal cord.
E) do not require input from the cerebellum.
Answer: C
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

87) The highest levels of information processing occur in the
A) cerebrum.
B) midbrain.
C) cerebellum.
D) medulla.
E) spinal cord.
Answer: A
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

88) The area of the CNS most concerned with balance is the
A) spinal cord.
B) thalamus.
C) basal nuclei.
D) cerebellum.
E) cerebrum.
Answer: D
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

89) After suffering a stroke, Cindy finds that she cannot move her right arm. This would suggest that
the stroke damage is in the area of the
A) right frontal lobe.
B) left frontal lobe.
C) right temporal lobe.
D) left temporal lobe.
E) occipital lobe.
Answer: B
Diff: 1
Learning Outcome: 8.7
Skill Level: 3 Critical Thinking & Clinical Applications
90) A disorder affecting the comprehension and use of words is termed
A) amnesia.
B) aphasia.
C) apraxia.
D) dyslexia.
E) hemiaplasia.
Answer: D
Diff: 1
Learning Outcome: 8.7
Skill Level: 3 Critical Thinking & Clinical Applications

91) ________ refers to the loss of memory from disease or trauma.
A) Hemiaplasi 
B) Aphasia
C) Dyslexia
D) Amnesia
E) Apraxia
Answer: D
Diff: 1
Learning Outcome: 8.7
Skill Level: 3 Critical Thinking & Clinical Applications

92) The phrenic nerves arise from the
A) cervical plexus.
B) thoracic plexus.
C) lumbar plexus.
D) sacral plexus.
E) brain.
Answer: A
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

93) The area of skin supplied by sensory nerve fibers from a particular dorsal root is called a
A) somite.
B) microtome.
C) dermatome.
D) sensory unit.
E) motor unit.
Answer: C
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms
94) The nerve that controls the biceps brachii muscle is the
A) ulnar.
B) radial.
C) median.
D) axillary.
E) musculocutaneous.
Answer: E
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

95) Nerves exit the vertebral canal through
A) vertebral foramen.
B) intervertebral foramina.
C) sacral foramina.
D) intervertebral discs.
E) both B and C
Answer: E
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

96) There are ________ pairs of cranial nerves.
A) 6
B) 8
C) 10
D) 12
E) 31
Answer: D
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

97) The only cranial nerve that is attached to the cerebrum is the
A) optic.
B) oculomotor.
C) trochlear.
D) olfactory.
E) vestibulocochlear.
Answer: D
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms
98) The cranial nerves that are involved in sensing taste are
A) VIII, IX, and XII.
B) III, IV, and VI.
C) II, III, and IV.
D) VII, IX, and X
E) III and V.
Answer: D
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

99) The cranial nerve that has three branches is the
A) abducens.
B) facial.
C) vagus.
D) trigeminal.
E) glossopharyngeal.
Answer: D
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

100) The cranial nerves that are primarily sensory include
A) I, II, and V.
B) I, V, and VIII.
C) II, III, and VIII.
D) I, II, and VIII.
E) I, III, and VIII.
Answer: D
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

101) Motor innervation of the muscles of facial expression is through the
A) abducens nerve.
B) facial nerve.
C) accessory nerve.
D) trigeminal nerve.
E) vagus nerve.
Answer: B
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms
102) Damage to which of the following cranial nerves could result in death?
A) abducens
B) facial
C) glossopharyngeal
D) vagus
E) hypoglossal
Answer: D
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

103) Which of the following pairs is not properly matched?
A) cervical spinal nerves: 8
B) thoracic spinal nerves: 12
C) lumbar spinal nerves: 4
D) sacral spinal nerves: 5
E) coccygeal spinal nerves: 1
Answer: C
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

104) Muscles of the intercostal spaces are innervated by nerves from the
A) cervical region.
B) thoracic region.
C) lumbar region.
D) sacral region.
E) coccygeal region.
Answer: B
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

105) Spinal nerves from the sacral region of the cord innervate
A) the shoulder muscles.
B) the chest muscles.
C) the abdominal muscles.
D) the leg muscles.
E) both C and D
Answer: D
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms
106) The joining of adjacent spinal nerves is termed a
A) cranial nerve.
B) conjoined spinal nerve.
C) lateral nerve group.
D) tract.
E) plexus.
Answer: E
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

107) Neural reflexes
A) are automatic motor responses.
B) are triggered by specific stimuli.
C) help preserve homeostasis.
D) show little variability in response.
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

108) Reflexes help to control
A) heart rate.
B) blood pressure.
C) digestion.
D) pupil size.
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

109) Pulling away from a painful stimulus is an example of the ________ reflex.
A) cross-extensor
B) pupillary
C) withdrawal
D) knee-jerk
E) ankle-jerk
Answer: C
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms
110) The expected response to the triceps-jerk reflex is
A) the Babinski sign.
B) elbow flexion.
C) elbow extension.
D) plantar flexion.
E) arm extension.
Answer: C
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

111) In which of the following would the delay between stimulus and response be greater?
A) a reflex that involves many synapses
B) a reflex that involves fewer synapses
Answer: A
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

112) An abnormal stretch response would indicate
A) damage to the spinal cord.
B) damage to the stretch receptors.
C) damage to the nerve serving the area.
D) damage to the joint.
E) All of the above are possible, and more tests would be necessary.
Answer: E
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

113) Another name for the patellar reflex is the
A) knee-jerk reflex.
B) spinal short reflex.
C) dorsiflexion reflex.
D) long spinal reflex.
E) none of the above
Answer: A
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

114) Which of the following are capable of producing the more complex reflexes?
A) monosynaptic reflexes
B) polysynaptic reflexes
Answer: B
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms
115) Golgi tendon organs
A) are found in skeletal muscles.
B) are found within joint capsules.
C) are controlled through the cranial nerves.
D) help prevent muscle damage that would result from overstretching.
E) both A and D
Answer: B
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

116) The flexor reflex
A) prevents a muscle from overstretching.
B) prevents a muscle from generating damaging tension.
C) moves a limb away from a painful stimulus.
D) makes adjustments in other parts of the body in response to a particular stimulus.
E) is an example of a monosynaptic reflex.
Answer: C
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

117) The established motor patterns for walking, running, and jumping are primarily directed by neuronal pools in the
A) precentral gyrus.
B) spinal cord.
C) cerebellum.
D) postcentral gyrus.
E) limbic system.
Answer: B
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

118) Reflexes that humans are born with are called
A) adapted.
B) congenital.
C) learned.
D) patterned.
E) innate.
Answer: E
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms
119) Which of the following are responsible for reciprocal inhibition?
A) sensory neurons
B) motor neurons
C) interneurons in the spinal cord
D) extensor neurons
E) none of the above
Answer: C
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

120) Which of the following is abnormal in the adult?
A) plantar reflex
B) Babinski sign
C) withdrawal reflex
D) flexor reflex
E) knee-jerk reflex
Answer: B
Diff: 1
Learning Outcome: 8.9
Skill Level: 3 Critical Thinking & Clinical Applications

121) Which of the following is a descending tract?
A) spinothalamic
B) spinocerebellar
C) fasciculus gracilis
D) corticospinal
E) none of the above
Answer: D
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms

122) The spinothalamic tract conducts impulses
A) from the thalamus to the cerebral cortex.
B) up the spinal cord to the thalamus.
C) down the spinal cord to the thalamus.
D) down the spinal cord from the thalamus.
E) up the spinal cord to the cerebral cortex.
Answer: B
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms
123) The corticospinal tracts function in the control of
   A) involuntary motor activities.
   B) autonomic function.
   C) sweat glands.
   D) skin.
   E) skeletal muscles.
   Answer: E
   Diff: 1
   Learning Outcome: 8.10
   Skill Level: 1 Reviewing Facts and Terms

124) The motor nerve tracts that link the cerebellum with the brain stem are contained within the
   A) precentral gyrus.
   B) postcentral gyrus.
   C) cerebellar peduncles.
   D) hypothalamus.
   E) cerebral peduncles.
   Answer: C
   Diff: 1
   Learning Outcome: 8.10
   Skill Level: 1 Reviewing Facts and Terms

125) Bundles of axons in the spinal cord are called
   A) nerves.
   B) tracts.
   C) centers.
   D) nuclei.
   E) ganglia.
   Answer: B
   Diff: 1
   Learning Outcome: 8.10
   Skill Level: 1 Reviewing Facts and Terms

126) Ascending tracts
   A) carry sensory information to the brain.
   B) carry motor information to the brain.
   C) carry sensory information from the brain.
   D) carry motor information from the brain.
   E) none of the above
   Answer: A
   Diff: 1
   Learning Outcome: 8.10
   Skill Level: 1 Reviewing Facts and Terms
127) The spinal tract or pathway that carries highly localized sensory information concerning fine touch and pressure is (are) the
A) spinothalamic.
B) posterior column.
C) corticospinal pathway.
D) medial and lateral pathways.
E) spinocerebellar.
Answer: B
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms

128) The spinal tract or pathway that carries information regulating skeletal muscle tone is the
A) posterior column.
B) spinothalamic.
C) corticospinal.
D) medial and lateral.
E) spinocerebellar.
Answer: D
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms

129) Which of the following is a descending tract or pathway of the spinal cord?
A) posterior column
B) spinothalamic
C) corticospinal
D) medial and lateral
E) both C and D
Answer: E
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms

130) Which of the following is located in the posterior column?
A) fasciculus gracilis
B) spinothalamic tract
C) corticospinal tract
D) medial tract
E) gray matter
Answer: A
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms
131) Voluntary control of skeletal muscles is provided by the
A) posterior column.
B) reticular formation.
C) spinothalamic tract.
D) corticospinal pathway.
E) medullary centers.
Answer: D
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms

132) The area of sensory cortex devoted to a body region is relative to the
A) size of the body area.
B) distance of the body area from the brain.
C) number of motor units in the area of the body.
D) number of sensory receptors in the area of the body.
E) size of the nerves that serve the area of the body.
Answer: D
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms

133) The most sensitive area of the body is the
A) chest.
B) face.
C) feet.
D) back.
E) legs.
Answer: B
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms

134) An autonomic motor neuron whose cell body lies in the CNS is called a(n)
A) upper motor neuron.
B) lower motor neuron.
C) preganglionic neuron.
D) postganglionic neuron.
E) somatic motor neuron.
Answer: C
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms
135) Control of the viscera is the job of the
A) spinal cord.
B) conscious control.
C) brain.
D) autonomic nervous system.
E) all of the above
Answer: D
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

136) Which of the following are usually adrenergic fibers?
A) sympathetic postganglionic
B) sympathetic preganglionic
C) parasympathetic preganglionic
D) parasympathetic postganglionic
E) somatic
Answer: A
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

137) The autonomic division of the nervous system directs
A) voluntary motor activity.
B) conscious control of skeletal muscles.
C) unconscious control of skeletal muscles.
D) processes that maintain homeostasis.
E) all of the above
Answer: D
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

138) Control of glands is through the
A) PNS.
B) ANS.
C) SNS.
D) CNS.
E) RAS.
Answer: B
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms
139) Postganglionic fibers of autonomic neurons are usually
A) connected to effector organs.
B) short in length.
C) larger than preganglionic fibers.
D) located in the brain.
E) located in the spinal cord.
Answer: A
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

140) The division of the autonomic nervous system that prepares the body for activity and stress is
the
A) sympathetic division.
B) parasympathetic division.
C) craniosacral division.
D) arachnoid division.
E) somatic motor division.
Answer: A
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

141) The division of the autonomic nervous system that maintains homeostasis during stressful
conditions is the
A) sympathetic division.
B) parasympathetic division.
C) thoracolumbar division.
D) arachnoid division.
E) somatic motor division.
Answer: A
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

142) Preganglionic neurons of the sympathetic nervous system are located in the
A) gray matter of the cervical region of the spinal cord.
B) gray matter of the cervical and thoracic region of the spinal cord.
C) gray matter of segments T1 to L2 of the spinal cord.
D) gray matter of segments T1 to L5 of the spinal cord.
E) gray matter of segments T1 to S2 of the spinal cord.
Answer: C
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms
143) Nerves that innervate organs in the ventral body cavities are the
A) cervical spinal nerves.
B) thoracic spinal nerves.
C) cranial nerves.
D) autonomic nerves.
E) somatic motor nerves.
Answer: D
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

144) Each of the following effects is associated with the action of postganglionic sympathetic fibers EXCEPT one. Identify the exception.
A) increased sweat secretion
B) reduced circulation to the skin
C) decreased heart rate
D) dilation of the pupils
E) increased blood flow to skeletal muscles
Answer: C
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

145) Sympathetic innervation of the urinary bladder and sex organs is by way of the
A) celiac ganglion.
B) superior mesenteric ganglion.
C) optic ganglion.
D) inferior mesenteric ganglion.
E) pelvic ganglion.
Answer: D
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

146) There is(are) _______ sympathetic collateral ganglia located in the abdominal cavity.
A) one
B) two
C) three
D) four
E) six
Answer: C
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms
147) Preganglionic fibers of parasympathetic neurons can be found in cranial nerve
A) III.
B) VII.
C) IX.
D) X.
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

148) Almost 75 percent of all parasympathetic outflow travels along the
A) oculomotor nerve.
B) splanchnic nerves.
C) vagus nerve.
D) pelvic nerves.
E) collateral nerve.
Answer: C
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

149) Effects produced by the parasympathetic branch of the autonomic nervous system include
A) dilation of the pupils.
B) increased secretion by digestive glands.
C) dilation of respiratory passages.
D) increased heart rate.
E) all of the above
Answer: B
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

150) Increased parasympathetic stimulation
A) increases heart rate.
B) increases the general level of activity of the digestive system.
C) causes sweat glands to release sweat.
D) causes blood vessels in the skin to dilate.
E) causes the pupils to dilate.
Answer: B
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms
151) Dual innervation refers to
A) an organ receiving two nerves from the spinal cord.
B) an organ receiving both autonomic and somatic motor nerves.
C) an organ receiving both sympathetic and parasympathetic nerves.
D) an organ receiving nerves from both the brain and the spinal cord.
E) none of the above
Answer: C
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

152) Proper control of the respiratory passages depends upon
A) sympathetic stimulation only.
B) parasympathetic stimulation only.
C) somatic motor stimulation only.
D) both parasympathetic and sympathetic levels of stimulation.
E) none of the above
Answer: D
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

Matching Questions

1) Match the term in the first column with its description in the second.
   _____ 1. exteroceptor A. neuron cell body
   _____ 2. neuroglia  B. neurotransmitter
   _____ 3. astrocytes  C. provide(s) information about the external environment
   _____ 4. dopamine  D. provide(s) a supporting framework
   _____ 5. soma  E. largest and most numerous type of glial cells
Answer: 1-C, 2-D, 3-E, 4-B, 5-A
Diff: 1
Learning Outcome: 8.2
Skill Level: 2 Reviewing Concepts

2) Match the cranial nerve in the first column with its innervation in the second column.
   _____ 1. optic A. palate, pharynx, larynx, sternocleidomastoid, trapezius
   _____ 2. abducens B. superior oblique muscle
   _____ 3. facial C. retina of eye
   _____ 4. accessory D. lateral rectus muscle of eye
   _____ 5. trochlear E. taste receptors, lacrimal gland, sublingual glands
Answer: 1-C, 2-D, 3-E, 4-A, 5-B
Diff: 2
Learning Outcome: 8.8
Skill Level: 2 Reviewing Concepts
3) Match the cranial nerve in the first column with its innervation in the second column.

_____ 1. oculomotor   A. 3 out of 4 rectus muscles of the eye
_____ 2. trigeminal B. tongue muscles
_____ 3. hypoglossal  C. teeth, muscles of mastication
_____ 4. vagus     D. ear
_____ 5. vestibulocochlear E. thoracic and abdominal organs
Answer: 1-A, 2-C, 3-B, 4-E, 5-D
Diff: 2
Learning Outcome: 8.8
Skill Level: 2 Reviewing Concepts

Fill in the Blank Questions

1) All of the nervous tissue outside of the central nervous system comprises the ______________________ nervous system.
Answer: peripheral
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms

2) The __________________ division of the nervous system brings sensory information to the central nervous system.
Answer: afferent
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms

3) The __________________ nervous system provides involuntary regulation of smooth muscle, cardiac muscle, and glandular activity.
Answer: autonomic
Diff: 1
Learning Outcome: 8.1
Skill Level: 1 Reviewing Facts and Terms

4) The __________________ of the neuron is the cell body.
Answer: soma
Diff: 1
Learning Outcome: 8.2
Skill Level: 1 Reviewing Facts and Terms

5) The gaps between adjacent Schwann cells along the length of an axon are called ___________________.
Answer: nodes
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms
6) The minimum amount of stimulus required to depolarize an excitable membrane and generate an action potential is known as the _____________________.
Answer: threshold
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

7) The time during which an excitable membrane cannot respond to further stimulation is the _____________________.
Answer: refractory period
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

8) An action potential traveling along an axon is called a(n) _____________________.
Answer: nerve impulse
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

9) The layer of lipid around an axon is called _____________________.
Answer: myelin
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

10) When more than one stimulus is added together, it is called _____________________.
Answer: summation
Diff: 1
Learning Outcome: 8.3
Skill Level: 1 Reviewing Facts and Terms

11) Adrenergic neurons release the neurotransmitter _____________________.
Answer: norepinephrine
Diff: 1
Learning Outcome: 8.4
Skill Level: 1 Reviewing Facts and Terms

12) Cholinergic neurons release the neurotransmitter _____________________.
Answer: acetylcholine
Diff: 1
Learning Outcome: 8.4
Skill Level: 1 Reviewing Facts and Terms
13) The _________________________ is the layer of the meninges that is in direct contact with the surface of the brain.
Answer: pia mater
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms

14) The fluid that surrounds and bathes the central nervous system is
_________________________.
Answer: cerebrospinal fluid or CSF
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms

15) _________________________ are chambers within the brain that contain CSF.
Answer: Ventricles
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms

16) The _________________________ ventricle is at the level of the pons and cerebellum.
Answer: fourth
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms

17) CSF is drained through the _________________________.
Answer: arachnoid granulations
Diff: 1
Learning Outcome: 8.5
Skill Level: 1 Reviewing Facts and Terms

18) The _________________________ root contains motor axons.
Answer: ventral
Diff: 1
Learning Outcome: 8.6
Skill Level: 1 Reviewing Facts and Terms

19) The _________________________ system controls emotion.
Answer: limbic
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms
20) The lowest structure in the CNS is the _________________________.
Answer: medulla oblongata
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

21) The major motor cortex of the cerebrum is located in the _________________________ gyrus.
Answer: precentral
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

22) The major sensory cortex of the cerebrum is located in the _________________________ gyrus.
Answer: postcentral
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

23) The _________________________ plexus is located between the neck and the axilla.
Answer: brachial
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

24) The _________________________ nerve is pinched in carpal tunnel syndrome.
Answer: median
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

25) The trigeminal nerve is cranial nerve _________________________.
Answer: V (5)
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

26) The optic nerve is cranial nerve _________________________.
Answer: II (2)
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms
27) The vestibulocochlear (acoustic) nerve is cranial nerve _________________________.
Answer: VIII (8)
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

28) The _________________________ nerve innervates the diaphragm.
Answer: phrenic
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

29) The radial nerve arises from the _________________________ plexus and functions to _______ muscle(s) of the forearm, arm, and hand.
Answer: brachial; extend
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

30) The groin is served by the _________________________ nerve.
Answer: obturator
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

31) The quadriceps muscles are controlled by the _________________________ nerve.
Answer: femoral
Diff: 1
Learning Outcome: 8.8
Skill Level: 1 Reviewing Facts and Terms

32) _________________________ reflexes involve skeletal muscles.
Answer: Somatic
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms

33) _________________________ reflexes involve visceral organs.
Answer: Visceral
Diff: 1
Learning Outcome: 8.9
Skill Level: 1 Reviewing Facts and Terms
34) The _________________________ pathway exercises voluntary control of skeletal muscles throughout the body.
Answer: pyramidal or corticospinal
Diff: 1
Learning Outcome: 8.10
Skill Level: 1 Reviewing Facts and Terms

35) The "rest and digest" division of the ANS is the _________________________.
Answer: parasympathetic
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

36) Nerves that control normal digestive activity come from the ________________ division of the ANS.
Answer: parasympathetic
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

37) The "fight or flight" division of the ANS is the _________________________.
Answer: sympathetic
Diff: 1
Learning Outcome: 8.11
Skill Level: 1 Reviewing Facts and Terms

Essay Questions

1) In multiple sclerosis, there is progressive and intermittent damage to the myelin sheath of peripheral nerves. This results in poor motor control of the affected area. Why does destruction of the myelin sheath affect motor control?
Answer: Action potentials travel faster along fibers that are myelinated than fibers that are nonmyelinated. Destruction of the myelin sheath slows the time it takes for motor neurons to communicate with their effector muscles. This delay in response results in varying degrees of uncoordinated muscle activity. The situation is very similar to a newborn, where the infant cannot control its arms and legs very well because the myelin sheaths are still being laid down for the first year of life. Since not all motor neurons to the same muscle may be demyelinated to the same degree, there would be some fibers that are slow to respond while there would be others that are responding normally, thus producing contractions that are erratic and poorly controlled.
Diff: 2
Learning Outcome: 8.3
Skill Level: 3 Critical Thinking & Clinical Applications
2) Kelsey falls down a flight of stairs and suffers spinal cord damage due to hyperextension of the cord during the fall. The injury results in edema of the central cord with resulting compression of the anterior horn cells of the lumbar region. What symptoms would you expect to observe as a result of this injury?
Answer: The anterior horn cells of the spinal cord are somatic motor neurons that direct the activity of skeletal muscles. The lumbar region of the spinal cord controls the skeletal muscles that are involved with the control of the muscles of the hip, leg, and foot. As a result of the injury, Kelsey would have poor control of most leg muscles, a problem with walking if she could walk at all, and if she could stand, problems maintaining balance.
Diff: 1
Learning Outcome: 8.6
Skill Level: 3 Critical Thinking & Clinical Applications

3) Meningitis is a condition in which the meninges of the brain become inflamed as the result of a viral or bacterial infection. This condition can be life-threatening. Explain why.
Answer: As in any inflamed tissue, there is edema in the area of the inflammation. The accumulation of fluid in the subarachnoid space can cause damage by pressing against the neurons. If the intracranial pressure is excessive, brain damage can occur; and if the pressure involves vital autonomic reflex areas, death could occur.
Diff: 2
Learning Outcome: 8.7
Skill Level: 2 Reviewing Concepts

4) Phil had to have his arm amputated after an accident. He tells you that he can sometimes still feel pain in his fingers even though the hand is gone. He says this is especially true when he bumps the stub of his arm where it is amputated. How can this be?
Answer: Phil is experiencing phantom pain. Since pain perception occurs in the sensory cortex of the brain, he can still feel pain in his fingers if the brain projects feeling to that area. When he bumps the arm at the elbow, sensory receptors are stimulated that send impulses to the sensory cortex. The brain perceives a sensation from a general area and projects that feeling to a body part. Since more sensory information reaches the brain from the hands and fingers, it is not unusual for the brain to project to this area.
Diff: 2
Learning Outcome: 8.7
Skill Level: 3 Critical Thinking & Clinical Applications

5) A condition known as Bell's palsy is thought to be caused by an inflammation of the facial nerve (VII). What symptoms would you expect to see in a person suffering from this condition?
Answer: Patients suffering from Bell's palsy usually experience numbness or a feeling of stiffness in the face on the affected side. Weakness of the facial muscles on the affected side may produce an inability to wrinkle the forehead, close the eye, pucker the lips, or retract the mouth. Other possible symptoms include loss of taste sensations, reduction in the amount of saliva from the salivary glands on the affected side, pain behind the ear, ringing sensation in the ear, or possibly some hearing loss.
Diff: 1
Learning Outcome: 8.8
Skill Level: 3 Critical Thinking & Clinical Applications

Labeling Exercises
Using the figure above, identify the labeled part.

1) Label A: __________
Answer: Central sulcus
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

2) Label B: __________
Answer: Postcentral gyrus
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

3) Label C: __________
Answer: Thalamus
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

4) Label D: __________
Answer: Hypothalamus
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms
5) Label E: ________
Answer: Pineal gland
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

6) Label F: ________
Answer: Diencephalon
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

7) Label G: ________
Answer: Parieto-occipital sulcus
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

8) Label H: ________
Answer: Cerebellum
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

9) Label I: ________
Answer: Medulla oblongata
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

10) Label J: ________
Answer: Pons
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

11) Label K: ________
Answer: Midbrain
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

12) Label L: ________
Answer: Brain stem
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms
13) Label M: ________
Answer: Temporal lobe
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

14) Label N: ________
Answer: Mamillary body
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

15) Label O: ________
Answer: Optic chiasm
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

16) Label P: ________
Answer: Frontal lobe
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

17) Label Q: ________
Answer: Corpus callosum
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms

18) Label R: ________
Answer: Precentral gyrus
Diff: 1
Learning Outcome: 8.7
Skill Level: 1 Reviewing Facts and Terms