

CHAPTER 2
STRUCTURE AND FUNCTIONS OF CELLS OF THE NERVOUS SYSTEM

Topic	Question Type	Remember the Facts	Understand the Concepts	Apply What You Know	Analyze It
Cells of the Nervous System	Multiple Choice	3, 8, 10, 11, 12, 14, 15, 17, 18, 19, 20, 22, 23, 25, 28, 34, 35, 36	2, 6, 9, 13, 16, 21, 24, 26, 27, 29, 33, 38, 40	4, 7, 30, 31, 32, 39	5, 37
	Short Answer	98	99		97
	Essay				106
Communication within a Neuron	Multiple Choice	41, 49, 50, 51, 54, 56, 59, 60, 61, 63, 64	52, 45, 47, 48, 57, 62, 66, 67, 68, 71, 72	43, 44, 46, 52, 55, 65, 69, 70	53, 58, 73
	Short Answer	102			100, 101
	Essay			107, 108	109
Communication between Neurons	Multiple Choice	77, 78, 83, 84, 87, 90, 94, 95, 96	76, 79, 80, 81, 82, 85, 86, 91, 92	88, 93	89
	Short Answer	103, 105		104	
	Essay			110	

Multiple Choice Questions

1) In the chapter prologue, the major symptom experienced by Kathryn D. was _____.

- A) manic symptoms while at her job
- B) taking a long time to get to sleep at night
- C) excessive tiredness
- D) seizure-like activity just before a meal

Answer: C

Learning Objective: None

Topic: Introduction

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

2) The brain and spinal cord make up the _____ nervous system; the nerves and sensory organs make up the _____ nervous system.

- A) peripheral; central
- B) central; sympathetic
- C) central; peripheral
- D) peripheral; sympathetic

Answer: C

Learning Objective: 2.1 Contrast the location of the central and peripheral nervous systems.

Topic: The Nervous System: An Overview

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

3) _____ gather information from the environment related to light, odors, and bodily contact with objects.

- A) Sensory neurons
- B) Motor neurons
- C) Relay interneurons
- D) Efferent neurons

Answer: A

Learning Objective: 2.1 Contrast the location of the central and peripheral nervous systems.

Topic: The Nervous System: An Overview

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

4) Rami uses these neurons to bend his arm to flex his muscles for his girlfriend.

- A) sensory neurons
- B) motor neurons
- C) afferent neurons
- D) local interneurons

Answer: B

Learning Objective: 2.1 Contrast the location of the central and peripheral nervous systems.

Topic: The Nervous System: An Overview

Difficulty Level: Easy

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

5) Similarities between sensory and motor neurons include _____.

- A) functioning along a retrograde pathway
- B) functioning along an anterograde pathway
- C) synapsing with interneurons
- D) detecting information from the environment

Answer: C

Learning Objective: 2.1 Contrast the location of the central and peripheral nervous systems.

Topic: The Nervous System: An Overview

Difficulty Level: Moderate

Skill Level: Analyze It

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

6) A primary difference between sensory and motor neurons is that _____.

- A) sensory neurons help to control muscle movements
- B) motor neurons help to bring information to the brain
- C) only sensory neurons synapse onto interneurons
- D) sensory neurons send information to the brain

Answer: D

Learning Objective: 2.1 Contrast the location of the central and peripheral nervous systems.

Topic: The Nervous System: An Overview

Difficulty Level: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

7) As you study for your neuroscience exam, you feel a tickle on your arm that feels like a spider, so you jerk your arm. What is the neural pathway of this action?

- A) sensory neuron – interneuron – motor neuron – muscle
- B) interneuron – sensory neuron – motor neuron – muscle
- C) motor neuron – sensory neuron – interneuron – muscle
- D) sensory neuron – motor neuron – interneuron – muscle

Answer: A

Learning Objective: 2.1 Contrast the location of the central and peripheral nervous systems.

Topic: The Nervous System: An Overview

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

8) The _____ contain(s) the nerve cell nucleus and functions to _____.

- A) soma; provide for the life processes of the cell
- B) axon; conduct action potentials
- C) dendrites; provide for the life processes of the cell
- D) mitochondria; conduct action potentials

Answer: A

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

9) The neuron region that resembles a tree is the _____.

- A) soma
- B) axon
- C) dendrites
- D) terminal buttons

Answer: C

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

10) When an impulse enters a neuron, it is received by the _____ and passed to the next cell via the _____.

- A) dendrite; axon
- B) axon; dendrite
- C) soma; axon
- D) soma; dendrite

Answer: A

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

11) The portion of a neuron that carries a signal toward the cell body is the _____.

- A) soma
- B) axon terminal
- C) presynaptic membrane
- D) dendrite

Answer: D

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

12) The physical gap between two nerve cells across which messages are transmitted is the _____.

- A) glial junction
- B) axonal contact
- C) synapse
- D) neural gap

Answer: C

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

13) Which statement is true regarding the action potential?

- A) The action potential is carried along the glial membrane.
- B) The action potential is always of the same amplitude and duration in a given cell.
- C) The action potential is a graded signal.
- D) The action potential is a long-lasting electrical signal.

Answer: B

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

14) The process in which substances are transported from the soma to the terminal buttons at the end of the axon is referred to as _____.

- A) retrograde somatoplasmic transport
- B) anterograde somatoplasmic transport
- C) anterograde axoplasmic transport
- D) retrograde axoplasmic transport

Answer: C

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Difficult

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

15) The process in which substances are transported from the terminal buttons at the end of the axon back to the soma is referred to as _____.

- A) retrograde somatoplasmic transport
- B) anterograde somatoplasmic transport
- C) anterograde axoplasmic transport
- D) retrograde axoplasmic transport

Answer: D

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Difficult

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

16) Which statement is correct regarding axoplasmic transport?

- A) Anterograde transport involves moving substances from the dendrites to the soma.
- B) Retrograde transport involves moving substances from the soma to the axon terminals.
- C) Vesicles are the major factor involved in retrograde transport.
- D) Retrograde transport is half as fast as anterograde transport.

Answer: D

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

17) To cross the synapse between two cells, a _____ is released from the first cell (pre-synapse) to activate or inhibit the second cell (post-synapse).

- A) neurotransmitter
- B) protein
- C) kinesin
- D) mitochondrion

Answer: A

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

18) Neurotransmitter molecules are secreted from a(n) _____ in response to the arrival of an action potential.

- A) glial cell
- B) dendrite
- C) axon terminal
- D) mitochondrion

Answer: C

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Difficult

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

19) A key function of specialized lipid molecules located in the nerve cell is to _____.

- A) detect the presence of hormones outside the cell
- B) form the membrane
- C) form channels to carry ions in and out of the cell
- D) transport molecules into the cell

Answer: B

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

20) The membrane of a nerve cell is composed of _____.

- A) protein molecules
- B) a double layer of lipid molecules
- C) cytoplasm
- D) a double layer of protein molecules

Answer: B

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Difficult

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

21) Which pairing of a cell structure and function is correct?

- A) mitochondria; production of cytoplasm
- B) double layer of lipid molecules; formation of the cell membrane
- C) synapse; production of filaments
- D) microtubules; production of cytoplasm

Answer: B

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

22) _____ is made up of thirteen filaments arranged around a hollow core and is involved in axoplasmic transport.

- A) The myelin sheath
- B) A neurofilament
- C) A nanotubule
- D) A microtubule

Answer: D

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

23) Which pairing of neuronal organelle and function is correct?

- A) cell membrane; production of fatlike molecules
- B) mitochondria; formation of vesicles
- C) DNA; breakdown of proteins
- D) microtubules; transport of molecules between the soma and the axon terminals

Answer: D

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

24) The recipes for generating individual proteins are contained within the _____.

- A) mitochondria
- B) cytoskeleton
- C) genes
- D) terminal buttons

Answer: C

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

25) Enzymes _____.

- A) are formed from lipids
- B) control chemical reactions
- C) control the absorption of glucose into cells
- D) provide energy to the cell

Answer: B

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

26) Which pairing of neuronal organelles and their function is correct?

- A) mitochondria; extraction of energy from nutrients
- B) mitochondria; formation of vesicles
- C) microtubules; breakdown of proteins
- D) microtubules; transport of chemicals across the synapse

Answer: A

Learning Objective: 2.2 Describe the structures of a neuron, including their general function.

Topic: Neurons

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's concept domains.

27) Which statement is true of neurons?

- A) Neurons have a high metabolic rate and require a continuous source of fuel.
- B) The dendrites store nutrients and oxygen for later use by the soma of the neuron.
- C) Neurons make up 89 percent of the volume of the brain.
- D) Dead glial cells are replaced by newly formed neurons.

Answer: A

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

28) The _____ cells are the most important support cells of the central nervous system.

- A) Schwann
- B) glial
- C) Golgi
- D) platelet

Answer: B

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

29) A key function of glial cells is to _____.

- A) provide nutrition to the brain
- B) remove physical debris from the blood
- C) secrete cerebrospinal fluid
- D) insulate a nerve cell from other nerve cells

Answer: D

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's concept domains.

30) A drug that specifically killed _____ cells would be expected to alter the physical and nutritional support of brain cells.

- A) phagocyte
- B) Schwann
- C) microglia
- D) astrocyte

Answer: D

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Easy

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

31) A star athlete experienced a significant blow to the head. What would happen if phagocytosis occurred?

- A) the removal of neuronal debris
- B) the transfer of lactate from a glial cell to a neuron
- C) the wrapping of layers of fatty material around an axon membrane
- D) structural support of a nerve cell

Answer: A

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

32) Oligodendrocytes perform which of the following functions?

- A) physical support of nerve cells
- B) provision of nourishment to neurons
- C) clean up debris within the brain
- D) enhancement of conduction velocity along an axon

Answer: D

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.2 Develop a working knowledge of psychology's concept domains.

33) A node of Ranvier is created by _____.

- A) the junction between a Schwann cell and an oligodendrocyte
- B) the junction between a pre- and postsynaptic neuron
- C) the gap between separate pieces of myelin, formed either by oligodendrocytes or Schwann cells
- D) the gap between separate pieces of myelin, but only for the oligodendrocytes

Answer: C

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

34) Which of the following cells are important for the removal of nerve cell debris?

- A) Schwann cells
- B) enzymes
- C) oligodendrocytes
- D) microglia

Answer: D

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

35) Which of the following cells are important for the immune system reaction to brain damage?

- A) Schwann cells
- B) phagocytes
- C) astrocytes
- D) microglia

Answer: D

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's concept domains.

36) Which statement is true of Schwann cells?

- A) Schwann cells are found within the brain.
- B) A single Schwann cell can myelinate up to 50 segments of axon membrane.
- C) A single Schwann cell wraps multiple segments around a peripheral nerve cell.
- D) Schwann cells provide myelin for peripheral nerve cells.

Answer: D

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Difficult

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

37) Which of the following is true regarding oligodendrocytes and Schwann cells?

- A) Oligodendrocytes are located in the peripheral nervous system, whereas Schwann cells are located in the central nervous system.
- B) Only oligodendrocytes have nodes of Ranvier along the length of an axon.
- C) Both of these glial cells have nodes of Ranvier along the length of the axon.
- D) Only Schwann cells have nodes of Ranvier along the length of the axon.

Answer: C

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.2 Develop a working knowledge of psychology's concept domains.

38) The presence of a barrier between the blood stream and the brain is suggested by the observation that _____.

- A) all cells of the body are stained by a dye injected into the bloodstream
- B) injection of dye into the bloodstream stains all cells but those of the brain and spinal cord
- C) injection of dye into the ventricles stains all cells of the body
- D) most chemicals rapidly reach the brain after oral ingestion

Answer: B

Learning Objective: 2.4 Describe the features and importance of the blood–brain barrier.

Topic: The Blood–Brain Barrier

Difficulty Level: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology’s concept domains.

39) Activation of cells within the area postrema would be predicted to produce _____.

- A) the experience of a visual hallucination
- B) consumption of a palatable food
- C) feelings of nausea and vomiting
- D) auditory hallucinations

Answer: C

Learning Objective: 2.4 Describe the features and importance of the blood–brain barrier.

Topic: The Blood–Brain Barrier

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

40) Which statement is true of the blood–brain barrier?

- A) The barrier is uniform throughout the brain.
- B) The barrier is selectively permeable.
- C) The barrier functions to regulate the chemical composition of the cerebrospinal fluid.
- D) The barrier is formed by microglia.

Answer: B

Learning Objective: 2.4 Describe the features and importance of the blood–brain barrier.

Topic: The Blood–Brain Barrier

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

41) Which of the following represents the normal order of activation in neuronal transmission?

- A) axon > dendrite > cell body > axon terminals
- B) axon terminals > cell body > axon > dendrite
- C) dendrite > cell body > axon > terminal button
- D) cell body > axon > dendrite > axon terminal

Answer: C

Learning Objective: 2.5 Explain neural communication in withdrawal reflexes.

Topic: Neural Communication: An Overview

Difficulty: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

42) A simple version of a withdrawal reflex involves a _____.

- A) pain receptor synapsing onto a motor neuron in the spinal cord
- B) pain receptor that projects to the thalamus, which then projects to the motor cortex and then down to the spinal cord
- C) motor neuron within the spinal cord that is spontaneously active
- D) sensory neuron in the visual cortex that synapses onto a motor neuron in the spinal cord

Answer: A

Learning Objective: 2.5 Explain neural communication in withdrawal reflexes.

Topic: Neural Communication: An Overview

Difficulty: Easy

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

43) Marianela takes a huge drink of her coffee, assuming that it is at a tolerable temperature, and the heat sears her mouth. Although the pain is so great that her reflex is to spit out the coffee, she does not do so. The reflex to spit out the coffee is inhibited at the _____.

- A) sensory neuron
- B) interneuron
- C) motor neuron
- D) glial cell

Answer: C

Learning Objective: 2.5 Explain neural communication in withdrawal reflexes.

Topic: Neural Communication: An Overview

Difficulty: Easy

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

44) Marinela takes a huge drink of her coffee, assuming that it is at a tolerable temperature, and the heat sears her mouth. Although the pain is so great that her reflex is to spit out the coffee, she does not do so. In this case, what causes the inhibition at the motor neuron?

- A) sensory neuron
- B) interneuron
- C) motor neuron
- D) glial cell

Answer: B

Learning Objective: 2.5 Explain neural communication in withdrawal reflexes.

Topic: Neural Communication: An Overview

Difficulty: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

45) The interior of a neuron at rest _____.

- A) is positively charged relative to the outside
- B) is at the same voltage potential as the outside
- C) has the same ionic concentrations as the outside
- D) is negatively charged relative to the outside

Answer: D

Learning Objective: 2.6 Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Topic: Electrical Potentials of Axons

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

46) Which best describes hyperpolarization?

- A) a move from -70 mV to 0 mV
- B) an action potential
- C) a move from -70 mV to -75 mV
- D) an increase in positive charge within the cell

Answer: C

Learning Objective: 2.6 Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Topic: Electrical Potentials of Axons

Difficulty: Moderate

Skill Level: Apply What You Know

APA Learning Objectives: 1.2 Develop a working knowledge of psychology's content domains.

47) Movement of the axon membrane potential from -70 mV to -90 mV would be termed _____.

- A) an action potential
- B) a threshold potential
- C) depolarization
- D) hyperpolarization

Answer: D

Learning Objective: 2.6 Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Topic: Electrical Potentials of Axons

Difficulty: Easy

Skill Level: Understand the Concepts

APA Learning Objectives: 1.2 Develop a working knowledge of psychology's content domains.

- 48) Movement of the axon membrane potential from -90 mV to -80 mV would be termed _____.
- A) depolarization
 - B) threshold potential
 - C) action potential
 - D) hyperpolarization

Answer: A

Learning Objective: 2.6 Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Topic: Electrical Potentials of Axons

Difficulty: Easy

Skill Level: Understand the Concepts

APA Learning Objectives: 1.2 Develop a working knowledge of psychology's content domains.

- 49) The membrane voltage level at which an action potential is triggered is termed the _____.
- A) refractory period
 - B) hyperpolarization event
 - C) threshold of excitation
 - D) rate level

Answer: C

Learning Objective: 2.6 Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Topic: Electrical Potentials of Axons

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objectives: 1.1 Describe key concepts, principles, and overarching themes in psychology.

- 50) An electrical charge applied to an axon that moves the membrane potential from -70 mV to -45 mV will result in a(n) _____.
- A) action potential
 - B) postsynaptic potential
 - C) downward shift of the threshold of excitation
 - D) upward shift of the membrane threshold

Answer: A

Learning Objective: 2.6 Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Topic: Electrical Potentials of Axons

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objectives: 1.2 Develop a working knowledge of psychology's content domains.

51) The process by which molecules are evenly distributed throughout a medium is _____.

- A) retrograde transport
- B) diffusion
- C) anterograde transport
- D) electrostatic pressure

Answer: B

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology

52) When adding sugar to a hot cup of tea, the sugar dissolves and the sugar molecules spread themselves out in the liquid. In biological terms, this effect would be _____.

- A) ionic status
- B) electrostatic force
- C) diffusion
- D) ionic movement

Answer: C

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

53) Spreading out in a classroom is to sitting by people you find more pleasant or positive as _____.

- A) ionic movement is to electrostatic pressure
- B) diffusion is to electrostatic pressure
- C) electrostatic pressure is to diffusion
- D) diffusion is to ionic movement

Answer: B

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.3 Describe applications of psychology.

54) The process by which similarly charged particles repel each other and are thus distributed throughout a medium is termed _____.

- A) diffusion
- B) carrier-mediated transport
- C) refraction
- D) electrostatic pressure

Answer: D

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

55) Students often choose to sit by other students that they find to be a positive influence rather than a negative influence. In biological terms, this effect would be _____.

- A) ionic status
- B) electrostatic pressure
- C) diffusion
- D) ionic movement

Answer: B

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

56) _____ are negatively charged particles.

- A) Transmitters
- B) Electrolytes
- C) Cations
- D) Anions

Answer: D

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

57) Cation is to anion as _____.

- A) transport is to diffusion
- B) positive is to negative
- C) diffusion is to transport
- D) negative is to positive

Answer: B

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

58) Intracellular is to extracellular as _____.

- A) positively charged is to negatively charged
- B) -70 mV is to 70 mV
- C) negatively charged is to positively charged
- D) -70 mV is to 40 mV

Answer: C

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Difficult

Skill Level: Analyze It

APA Learning Objectives: 1.2 Develop a working knowledge of psychology’s content domains.

59) Which statement is true of ion distribution across the axon membrane?

- A) Sodium ions are concentrated outside the axon membrane.
- B) Potassium ions are concentrated outside the axon membrane.
- C) Chloride ions are concentrated inside the axon membrane.
- D) Sodium ions are concentrated inside the axon membrane.

Answer: A

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

60) The force of diffusion would tend to move _____ ions _____ the axon.

- A) chloride; out of
- B) sodium; into
- C) potassium; into
- D) sodium; out of

Answer: B

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.2 Develop a working knowledge of psychology’s content domains.

61) The force of _____ moves potassium ions _____ the axon.

- A) diffusion; into
- B) retrograde transport; out of
- C) electrostatic pressure; into
- D) electrostatic pressure; out of

Answer: D

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.2 Develop a working knowledge of psychology’s content domains.

62) Which of the following is a consequence of the activity of the sodium–potassium transporters?

- A) Extracellular sodium concentrations are kept low.
- B) Intracellular sodium concentrations are kept very high.
- C) Extracellular potassium concentrations are kept very high.
- D) Intracellular sodium concentrations are kept low.

Answer: D

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

63) Which statement is true of the sodium–potassium pump?

- A) More potassium ions are removed than sodium ions brought in.
- B) More sodium ions are removed than potassium ions brought in.
- C) More potassium ions are brought in than sodium ions removed.
- D) More sodium ions are brought in than potassium ions removed.

Answer: B

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

64) The specialized pores located in the axon membrane that open or close are termed _____.

- A) receptors
- B) voltage transporters
- C) autoreceptors
- D) ion channels

Answer: D

Learning Objective: 2.8 Summarize the series of ion movements during the action potential.

Topic: The Action Potential

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

65) Which statement is true of an action potential?

- A) The sodium channels are opened at a lower voltage than are potassium channels.
- B) An action potential requires 5 msec for completion.
- C) During an action potential, the interior becomes even more negative.
- D) The potassium channels are opened at a lower voltage than are sodium channels.

Answer: A

Learning Objective: 2.8 Summarize the series of ion movements during the action potential.

Topic: The Action Potential

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

66) Which of the following events restores the membrane potential from the peak of the action potential back to the resting level?

- A) Sodium ions move into the cell.
- B) Potassium ions move out of the cell.
- C) Potassium ions move into the cell.
- D) Chloride ions move into the cell.

Answer: B

Learning Objective: 2.8 Summarize the series of ion movements during the action potential.

Topic: The Action Potential

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

67) Which of the following is an advantage associated with myelination?

- A) Myelin changes the height of the action potential.
- B) Myelin increases the energy requirements of the nerve cell.
- C) Myelin slows down conduction speed.
- D) Myelin speeds up axon conduction speed.

Answer: D

Learning Objective: 2.9 Describe the propagation of an action potential.

Topic: Conduction of the Action Potential

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

68) Sensory stimuli that vary in intensity are coded by variations in the _____ of a neuron.

- A) firing rate
- B) resting membrane potential
- C) speed of conduction of action potentials
- D) total amplitude of the action potential

Answer: A

Learning Objective: 2.9 Describe the propagation of an action potential.

Topic: Conduction of the Action Potential

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

- 69) Comparing a feather in the left hand with a full lunchbox in the right, _____.
- A) the action potentials received would be the same in frequency but the action potentials for the lunchbox would increase in amplitude
 - B) the action potentials received would be the same in frequency but the action potentials for the lunchbox would show variable amplitude
 - C) the frequency of action potentials would increase for the lunchbox
 - D) the frequency of action potentials would decrease for the feather

Answer: C

Learning Objective: 2.9 Describe the propagation of an action potential.

Topic: Conduction of the Action Potential

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

- 70) If a bowling ball fell on your foot, the action potentials would differ from those fired after a feather fell on your foot. The action potentials for the bowling ball would be _____.

- A) larger in size and faster in occurrence
- B) the same size as for the feather but they would be slower in occurrence
- C) the same size as for the feather but they would be faster in occurrence
- D) smaller in size and faster in occurrence

Answer: C

Learning Objective: 2.9 Describe the propagation of an action potential.

Topic: Conduction of the Action Potential

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

- 71) Ions enter and leave the membrane of a myelinated axon at the _____.

- A) terminal buttons
- B) axon hillock
- C) nodes of Ranvier
- D) release zone

Answer: C

Learning Objective: 2.9 Describe the propagation of an action potential.

Topic: Conduction of the Action Potential

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

- 72) A key advantage of saltatory conduction is that _____.

- A) more sodium ions have to be pumped out of the cell after an action potential
- B) less transmitter is required to send a message across the next synapse
- C) myelin speeds up the velocity at which an axon can conduct an action potential
- D) myelin requires that nerve cell axons be larger in order to rapidly conduct a signal

Answer: C

Learning Objective: 2.9 Describe the propagation of an action potential.

Topic: Conduction of the Action Potential

Difficulty Level: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

73) Saltatory conduction is rapid because _____.

- A) the action potential does not have to depolarize every segment of the axon membrane
- B) myelinated axons are larger in diameter
- C) myelinated cells have more ion channels per unit area than do non-myelinated cells
- D) myelinated fibers have a lower threshold of activation

Answer: A

Learning Objective: 2.9 Describe the propagation of an action potential.

Topic: Conduction of the Action Potential

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

74) Neuronal signals are carried across the synapse by _____.

- A) direct electrical connections between the two cells
- B) the secretion of transmitter molecules into the synapse
- C) the transfer of ions from one cell to another
- D) an inhibitory effect of a transmitter molecule on the postsynaptic membrane

Answer: B

Learning Objective: None

Topic: Communication between Neurons

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

75) Which statement is true of synapses?

- A) Action potentials open chloride channels to release neurotransmitters.
- B) Presynaptic voltage changes past threshold trigger the release of neurotransmitters.
- C) The interior of the nerve cell becomes more negative during the action potential.
- D) The exterior of the nerve cell becomes more positive during the action potential.

Answer: B

Learning Objective: None

Topic: Communication between Neurons

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

76) Which statement is true of synapses?

- A) Synapses only occur between presynaptic terminal buttons and postsynaptic dendrites.
- B) Synapses can occur between presynaptic terminal buttons and postsynaptic dendrites, somas, or axons.
- C) The synaptic cleft contains fluid that mirrors the intracellular fluid of the cell.
- D) Terminal buttons include ribosomes and mitochondria.

Answer: B

Learning Objective: 2.10 Describe the structures and functions of presynaptic cells that are involved in synaptic communication.

Topic: Structure of Synapses

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

77) Which statement is true about vesicles?

- A) Most terminal buttons contain only a few hundred vesicles.
- B) Vesicles are located in the postsynaptic dendrites.
- C) A single terminal button can contain up to a million vesicles.
- D) Vesicles are found in greatest concentration in the periphery of the terminal button.

Answer: C

Learning Objective: 2.10 Describe the structures and functions of presynaptic cells that are involved in synaptic communication.

Topic: Structure of Synapses

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

78) A key event for the release of neurotransmitter from the presynaptic membrane is the _____.

- A) hyperpolarization of the axon membrane
- B) arrival of an action potential at the axon terminal
- C) influx of potassium ions into the axon terminal
- D) activation of the sodium–potassium pump

Answer: B

Learning Objective: 2.11 Describe neurotransmitter release.

Topic: Release of Neurotransmitters

Difficulty: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

79) Which statement is true of receptors?

- A) The effects of hormones do not involve receptor activation.
- B) Neurotransmitters act on binding sites on receptors to exert their effects.
- C) Receptors are insensitive to drugs.
- D) Neuromodulators are ligands that come from outside the body.

Answer: B

Learning Objective: 2.12 Contrast ionotropic and metabotropic receptors.

Topic: Activation of Receptors

Difficulty: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

80) Which pairing of receptor type and action is correct?

- A) ionotropic; direct opening of an ion channel
- B) ionotropic; more time required to open an ion channel
- C) ionotropic; G-protein activation leads to activation of a second messenger
- D) metabotropic; second messenger effects that are specific to neuronal communication

Answer: A

Learning Objective: 2.12 Contrast ionotropic and metabotropic receptors.

Topic: Activation of Receptors

Difficulty: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

81) Which pairing of receptor type and action is correct?

- A) metabotropic; direct opening of an ion channel
- B) ionotropic; more time required to open an ion channel
- C) metabotropic; G-protein activation leads to activation of a second messenger
- D) metabotropic; second messenger effects are specific to opening ion channels

Answer: C

Learning Objective: 2.12 Contrast ionotropic and metabotropic receptors.

Topic: Activation of Receptors

Difficulty: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

82) Which pairing of postsynaptic potential effect with ion channel action is correct?

- A) ionotropic; direct opening of an ion channel
- B) ionotropic; more time required to open an ion channel
- C) ionotropic; G-protein activation leads to activation of a second messenger
- D) metabotropic; second messenger effects that are specific to neuronal communication

Answer: A

Learning Objective: 2.12 Contrast ionotropic and metabotropic receptors.

Topic: Activation of Receptors

Difficulty: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

83) Which of the following ion channel events will produce an EPSP?

- A) opening a sodium channel
- B) closing a sodium channel
- C) opening a potassium channel
- D) opening a manganese channel

Answer: A

Learning Objective: 2.13 Compare the functions of EPSPs and IPSPs in postsynaptic cells.

Topic: Postsynaptic Potentials

Difficulty: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

84) Which of the following will “neutralize” the effect of an EPSP?

- A) further opening a sodium channel
- B) allowing intracellular anions to leave the cell
- C) closing a potassium channel
- D) opening a chloride channel

Answer: D

Learning Objective: 2.13 Compare the functions of EPSPs and IPSPs in postsynaptic cells.

Topic: Postsynaptic Potentials

Difficulty: Difficult

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

85) Which of the following ion channel events will reliably produce an IPSP, regardless of the current level of the membrane potential?

- A) opening a sodium channel
- B) losing a potassium channel
- C) opening a potassium channel
- D) opening a chloride channel

Answer: C

Learning Objective: 2.13 Compare the functions of EPSPs and IPSPs in postsynaptic cells.

Topic: Postsynaptic Potentials

Difficulty: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

86) The process that terminates the postsynaptic potentials induced by most neurotransmitters is _____.

- A) disruption of the postsynaptic receptor
- B) enzymatic degradation of the transmitter molecule
- C) inhibition of transmitter synthesis
- D) reuptake of the molecule into the axon terminal

Answer: D

Learning Objective: 2.14 Explain how postsynaptic potentials are terminated.

Topic: Termination of Postsynaptic Potentials

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

87) The process that terminates the postsynaptic potentials induced by acetylcholine is _____.

- A) disruption of the postsynaptic receptor
- B) enzymatic deactivation via AChE
- C) inhibition of ACh synthesis
- D) facilitation of ACh release

Answer: B

Learning Objective: 2.14 Explain how postsynaptic potentials are terminated.

Topic: Termination of Postsynaptic Potentials

Difficulty: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

88) A drug that inactivates AChE would be expected to _____.

- A) prolong the effects of ACh in the synapse
- B) terminate the effects of ACh in the synapse
- C) speed up the synthesis of ACh
- D) impair the synthesis of ACh

Answer: A

Learning Objective: 2.14 Explain how postsynaptic potentials are terminated.

Topic: Termination of Postsynaptic Potentials

Difficulty: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

89) If Cell A and Cell B generate EPSPs in Cell C, and Cell D generates an IPSP in Cell C, what is the likely result?

- A) Cell D fires an action potential.
- B) Cell C does not fire an action potential.
- C) Cell C fires an action potential.
- D) Cell D experiences a hyperpolarization.

Answer: C

Learning Objective: 2.15 Summarize the process of neural integration of EPSPs and IPSPs.

Topic: Effects of Postsynaptic Potentials: Neural Integration

Difficulty: Moderate

Skill Level: Analyze It

APA Learning Objective: 1.3 Describe applications of psychology.

90) Action potentials are generated at the _____ and are conducted along the _____.

- A) axon hillock; axon
- B) axon hillock; glial membrane
- C) terminal buttons; dendrite
- D) axon; terminal buttons

Answer: A

Learning Objective: 2.15 Summarize the process of neural integration of EPSPs and IPSPs.

Topic: Effects of Postsynaptic Potentials: Neural Integration

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

91) Autoreceptors _____.

- A) are sensitive to the presence of neuropeptides in the synapse
- B) control the release of calcium ions from the axon terminal
- C) mostly facilitate neuron function
- D) are metabotropic in nature

Answer: D

Learning Objective: 2.16 Differentiate between the locations and functions of autoreceptors and postsynaptic receptors.

Topic: Autoreceptors

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

92) Axoaxonic synapses differ from axodendritic synapses in that _____.

- A) they alter the intracellular fluid composition of the neighboring cell
- B) they can alter the function of the neighboring cell by reducing or increasing the release of neurotransmitter
- C) axoaxonic synapses alter the neurotransmitter production of both pre- and postsynaptic cells
- D) axodendritic synapses alter the neurotransmitter production of both pre- and postsynaptic cells

Answer: B

Learning Objective: 2.17 Identify the function of axoaxonic synapses.

Topic: Axoaxonic Synapses

Difficulty: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1:1 Describe key concepts, principles, and overarching themes in psychology.

93) If action at Axon A that synapses onto Axon B resulted in an increase in dopamine release in the postsynaptic cell, this would be considered _____.

- A) presynaptic inhibition
- B) postsynaptic inhibition
- C) presynaptic facilitation
- D) postsynaptic facilitation

Answer: C

Learning Objective: 2:17 Identify the function of axoaxonic synapses.

Topic: Axoaxonic Synapses

Difficulty: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1:3 Describe applications of psychology.

94) Neuromodulators _____.

- A) have a lipid structure
- B) directly elicit postsynaptic potentials
- C) are usually found in small dense-core vesicles in terminal buttons
- D) diffuse widely to affect many neurons

Answer: D

Learning Objective: 2.18 Describe examples of nonsynaptic communication.

Topic: Nonsynaptic Chemical Communication

Difficulty: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

95) Neuromodulators _____.

- A) are rarely of a peptide form
- B) are secreted from a neuron and only affect an adjacent neuron
- C) are inevitably inhibitory
- D) are secreted from neurons but dispersed widely in the brain

Answer: D

Learning Objective: 2.18 Describe examples of nonsynaptic communication.

Topic: Nonsynaptic Chemical Communication

Difficulty: Difficult

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

96) Most _____ are secreted into the extracellular fluid from endocrine glands or tissues.

- A) neurotransmitters
- B) neuropeptides
- C) modulators
- D) hormones

Answer: D

Learning Objective: 2.18 Describe examples of nonsynaptic communication.

Topic: Nonsynaptic Chemical Communication

Difficulty: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

Short Answer Questions

97) Contrast sensory neurons and motor neurons by their connections and functions.

Answer: Sensory neurons carry information toward the brain while motor neurons carry signals to the muscles and glands of the periphery. Sensory neurons and motor neurons both synapse onto interneurons.

Learning Objective: 2.1 Contrast the location of the central and peripheral nervous systems.

Topic: The Nervous System: An Overview

Difficulty Level: Easy

Skill Level: Analyze It

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

98) Name and discuss the general functions of the three glial cell types in the brain.

Answer: Oligodendrocytes form CNS myelin. Astrocytes provide support and nutrition for neurons.

Microglia are involved in brain immune function.

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

99) Explain how the area postrema may play a role in minimizing poison toxicity.

Answer: Because the blood–brain barrier is weak near this structure, toxins in blood can stimulate this brain region to initiate vomiting, which would void the stomach and in turn may reduce the total amount of toxicity to the organism.

Learning Objective: 2.4 Describe the features and importance of the blood–brain barrier.

Topic: The Blood–Brain Barrier

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

100) Compare the impact of opening Na⁺ channels and Cl⁻ channels in the axon membrane.

Answer: Sodium ions would enter the cell, pushed by both diffusion and electrostatic pressure, increasing the polarity of the cell more positively. Chloride, however, would not change much given the relatively equal pressures of diffusion and electrostatic pressure.

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty Level: Moderate

Skill Level: Analyze It

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

101) Compare the impact on an organism treated with a drug that blocks neuronal sodium channels versus potassium channels.

Answer: The drug that blocks sodium channels would cause rapid death, owing to the cessation of action potentials. The organism would experience a similar fate after taking a drug that blocks potassium channels, as potassium would not be able to leave the cells when necessary, creating a depolarizing force within the cells that cannot be counteracted.

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty Level: Moderate

Skill Level: Analyze It

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

102) Explain why saltatory conduction speeds up the velocity of action potentials.

Answer: In saltatory conduction, the action potential does not have to depolarize every segment of membrane, only those at the widely separated nodes of Ranvier.

Learning Objective: 2.9 Describe the propagation of an action potential.

Topic: Conduction of an Action Potential

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

103) Contrast postsynaptic potentials versus action potentials.

Answer: Postsynaptic potentials are graded in size, degrade with distance, and can summate to produce an action potential. Action potentials are fixed in size, do not degrade, and cannot summate.

Learning Objective: 2.13 Compare the functions of EPSPs and IPSPs in postsynaptic cells.

Topic: Postsynaptic Potentials

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

104) What would happen if the enzyme AChE were disabled in a person's body?

Answer: The ACh activity would greatly increase, because AChE normally serves to degrade ACh. Later, this would lead to overstimulation of cholinergic receptors.

Learning Objective: 2.14 Explain how postsynaptic potentials are terminated.

Topic: Termination of Postsynaptic Potentials

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

105) What is the general function of autoreceptors?

Answer: Autoreceptors modulate the internal biochemical activity of the presynaptic cell.

Learning Objective: 2.16 Differentiate between the locations and functions of autoreceptors and postsynaptic receptors.

Topic: Autoreceptors

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

Essay Questions

106) Argue that one type of glial cell is most important based on its function in the nervous system.

Answer: All glial cells offer different services to the nervous system, so it can be difficult to decide which is more important. One could argue that microglia are most important due to their role in the immune system. Astrocytes help keep neurons healthy by regulating the chemicals in the fluid around neurons. The astrocyte role in the blood–brain barrier is also critical.

Learning Objective: 2.3 Differentiate functions of supporting cells of the central and peripheral nervous systems.

Topic: Supporting Cells

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 2.3 Engage in innovating and integrative thinking and problem-solving.

107) What would happen if ion channels had lower thresholds than they do now?

Answer: If ion channels had lower thresholds than they do now, the nervous system would be more responsive to stimuli of lesser intensity. In the real world, this might mean greater sensitivity in touch, smell, and sounds.

Learning Objective: 2.6 Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Topic: Electrical Potentials of Axons

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

108) When a sense receptor detects a stimulus, it reacts to send that information to the brain. Provide an overview, in layman's terms, of the ionic events that produce the action potential based on the received stimulation.

Answer: Movements of the membrane potential past threshold open sodium channels, which moves the membrane potential from -60 to roughly 40 mV. The sodium channels then close, and the potential is restored to resting by an opening of the potassium channels.

Learning Objective: 2.6 Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Topic: Electrical Potentials of Axons

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

109) Compare and contrast the movements of ions using the forces of diffusion and electrostatic pressure.

Answer: Sodium wants to move into the cell based on both the diffusion gradient (more outside than in) and the electrostatic pressure gradient (more positive outside, more negative inside). Chloride, an anion, wants to diffuse to the inside of the cell due to diffusion but is attracted to the outside of the cell as an anion in a positive space. Finally, potassium, a cation, is located predominantly inside the cell, so it wants to move out based on diffusion, but also wants to stay due to electrostatic pressure (cation in a negative space).

Learning Objective: 2.7 Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump toward establishing membrane potential.

Topic: The Membrane Potential: Balance of Two Forces

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

110) Explain why the reuptake process has become a critical target for therapeutic drugs.

Answer: The postsynaptic action of many neurotransmitters is terminated via reuptake of the molecule through the membrane transporter. A drug that blocks such a transporter would be expected to raise the synaptic levels of that neurotransmitter. For a disease or disorder that is thought to result from low synaptic activity of that transmitter, blockade of the reuptake process would generate a beneficial effect.

Learning Objective: 2.14 Explain how postsynaptic potentials are terminated.

Topic: Termination of Postsynaptic Potentials

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

Revel Quiz Questions

The following questions appear at the end of each module and at the end of the chapter in Revel for *Foundations of Behavioral Neuroscience*, 10e.

Assignment: Quiz: 2.1 Cells of the Nervous System

EOM_2.1.1

Question: This division of the nervous system is entirely contained within the brain and spinal cord.

- a) parasympathetic nervous system
- b) autonomic nervous system
- c) central nervous system
- d) peripheral nervous system

Answer: c

Consider This: This division of the nervous system contains cells outside of the brain and spinal cord; LO 2.1: Contrast the location of the central and peripheral nervous systems.

Learning Objective: 2.1: Contrast the location of the central and peripheral nervous systems.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOM_2.1.2

Question: A neuron first receives a message in a _____ and passes the message along a long, thin portion of the cell called the _____.

- a) dendrite; axon
- b) terminal; axon
- c) axon; dendrite
- d) terminal; soma

Answer: a

Consider This: Each part of a neuron has a specific function; LO 2.2: Describe the structures of a neuron, including their general function.

Learning Objective: 2.2: Describe the structures of a neuron, including their general function.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOM_2.1.3

Question: _____ are supporting cells with paddle-shaped protrusions that help produce the myelin sheath insulating neurons in the central nervous system.

- a) Microglia
- b) Astrocytes
- c) Oligodendrocytes
- d) Schwann cells

Answer: c

Consider This: Recall the major types of glial cells and their structures and functions; LO 2.3:

Differentiate functions of supporting cells of the central and peripheral nervous systems.

Learning Objective: 2.3: Differentiate functions of supporting cells of the central and peripheral nervous systems.

Difficulty Level: Moderate

Skill Level: Remember the Facts

EOM_2.1.4

Question: _____ are multi-function glial cells that participate in phagocytosis, provide nourishment to neurons, and structurally support neurons in the brain.

- a) Microglia
- b) Astrocytes
- c) Oligodendrocytes
- d) Schwann cells

Answer: b

Consider This: The majority of the glial cells have more limited functions; LO 2.3: Differentiate functions of supporting cells of the central and peripheral nervous systems.

Learning Objective: 2.3: Differentiate functions of supporting cells of the central and peripheral nervous systems.

Difficulty Level: Moderate

Skill Level: Understand the Concepts

EOM_2.1.5

Question: The purpose of the blood–brain barrier is to

- a) protect the brain from expanding during an injury.
- b) block the entrance of some substances into the brain.
- c) block neurotransmitters from being released.
- d) provide a cushion for the brain.

Answer: b

Consider This: It may be harmful if every substance introduced into our bloodstream could enter the brain; LO 2.4: Describe the features and importance of the blood–brain barrier.

Learning Objective: 2.4: Describe the features and importance of the blood–brain barrier.

Difficulty Level: Easy

Skill Level: Understand the Concepts

Assignment: Quiz: 2.2 Communication within a Neuron

EOM_2.2.1

Question: As you study for your neuroscience exam, you feel a tickle on your arm. You see a large spider and you jerk your arm automatically. What is the neural path for this action?

- a) Sensory neuron – interneuron – motor neuron – muscle
- b) Interneuron – sensory neuron – motor neuron – muscle
- c) Motor neuron – sensory neuron – interneuron – muscle
- d) Sensory neuron – motor neuron – interneuron – muscle

Answer: a

Consider This: The sensation must first be detected, then relayed to convey a message to the muscles; LO 2.5: Explain neural communication in withdrawal reflexes.

Learning Objective: 2.5: Explain neural communication in withdrawal reflexes.

Difficulty Level: Moderate

Skill Level: Remember the Facts

EOM_2.2.2

Question: The neural membrane resting potential is _____.

- a) -70 mV
- b) 0 mV
- c) 10 mV
- d) 70 mV

Answer: a

Consider This: The inside of the cell is negatively charged; LO 2.6: Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Learning Objective: 2.6: Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOM_2.2.3

Question: When students enter a classroom, they tend to spread themselves throughout the room (provided there are enough desks to do so). In biological terms, this effect would be most similar to _____.

- a) electrostatic force
- b) the action of the sodium potassium pump
- c) diffusion
- d) antisocialism

Answer: c

Consider This: Other terms that mean the same thing include *disperse*; LO 2.7: Summarize the contributions of diffusion, electrostatic force, and the sodium potassium pump to establishing membrane potential.

Learning Objective: 2.7: Summarize the contributions of diffusion, electrostatic force, and the sodium potassium pump to establishing membrane potential.

Difficulty Level: Easy

Skill Level: Apply What You Know

EOM_2.2.4

Question: _____ push Na^+ ions into a cell.

- a) Intercellular fluids
- b) The force of gravity
- c) ATP molecules
- d) The forces of electrostatic pressure and diffusion

Answer: d

Consider This: There is tremendous pressure on Na^+ ions to enter into the cell; LO 2.7: Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump to establishing membrane potential.

Learning Objective: 2.7: Summarize the contributions of diffusion, electrostatic force, and the sodium potassium pump to establishing membrane potential.

Difficulty Level: Difficult

Skill Level: Understand the Concepts

EOM_2.2.5

Question: Na^+ channels open when the threshold of excitation is reached. This means that these channels are considered:

- a) passive-dependent.
- b) voltage-dependent.
- c) neurotransmitter-dependent.
- d) sodium-potassium transporters.

Answer: b

Consider This: This process refers to what causes a specific ion channel to open; LO 2.8: Summarize the series of ion movements during the action potential.

Learning Objective: 2.8: Summarize the series of ion movements during the action potential.

Difficulty Level: Moderate

Skill Level: Understand the Concepts

Assignment: Quiz: 2.3 Communication between Neurons

Assignment: Quiz: 2.3 Communication between Neurons

EOM_2.3.1

Question: _____ are small rounded structures made of membrane and filled with molecules.

- a) Microtubules
- b) Synaptic vesicles
- c) Dendritic spines
- d) Synaptic clefts

Answer: b

Consider This: These are often found in the region from which neurotransmitter is released; LO 2.10: Describe the structures and functions of presynaptic cells that are involved in synaptic communication. Learning Objective: 2.10: Describe the structures and functions of presynaptic cells that are involved in synaptic communication.

Difficulty Level: Difficult

Skill Level: Understand the Concepts

EOM_2.3.2

Question: When action potentials are conducted down an axon, what happens inside the terminal buttons?

- a) Synaptic vesicles fuse with the terminal membrane.
- b) Terminal buttons become momentarily “frozen.”
- c) Presynaptic membranes become postsynaptic membranes.
- d) Synaptic vesicles travel toward the soma.

Answer: a

Consider This: Imagine that an action potential is propagating down an axon; what is happening in that axon as the potential courses through it? LO 2.11: Describe neurotransmitter release.

Learning Objective: 2.11: Describe neurotransmitter release.

Difficulty Level: Difficult

Skill Level: Analyze It

EOM_2.3.3

Question: In comparison to ionotropic receptors, metabotropic receptors

- a) have effects that occur more quickly.
- b) have effects that occur more slowly.
- c) have effects that last for a limited duration.
- d) act directly on ion channels.

Answer: b

Consider This: Metabotropic receptors have to act via a G protein; LO 2.12: Contrast ionotropic and metabotropic receptors.

Learning Objective: 2.12: Contrast ionotropic and metabotropic receptors.

Difficulty Level: Difficult

Skill Level: Analyze It

EOM_2.3.4

Question: Influx of _____ or _____ ions result in excitatory postsynaptic potentials (EPSPs).

- a) Na^+ ; Ca^{2+}
- b) Cl^- ; Na^+
- c) Ca^{2+} ; Cl^-
- d) Ca^+ ; K^+

Answer: a

Consider This: Cations can produce excitatory effects; LO 2.13: Compare the functions of EPSPs and IPSPs in postsynaptic cells.

Learning Objective: 2.13: Compare the functions of EPSPs and IPSPs in postsynaptic cells.

Difficulty Level: Moderate

Skill Level: Apply What You Know

EOM_2.3.5

Question: After release of a neurotransmitter into the synapse, the neurotransmitter is transported by the presynaptic membrane back into the cell to be reused. This process is called _____.

- a) degradation.
- b) reuptake.
- c) exocytosis.
- d) release-ready.

Answer: b

Consider This: This method largely results in the neurotransmitter being recycled rather than destroyed;

LO 2.14: Explain how postsynaptic potentials are terminated.

Learning Objective: 2.14: Explain how postsynaptic potentials are terminated.

Difficulty Level: Easy

Skill Level: Remember the Facts

Assignment: Chapter 2 Quiz: Structure and Functions of Cells of the Nervous System

Assignment: Chapter 2 Quiz: Structure and Functions of Cells of the Nervous System

EOC_2.1

Question: Sally's stomach begins to rumble, reminding her that she skipped breakfast this morning. This hunger signal is sent to Sally's brain, which is part of her _____ nervous system.

- a) peripheral
- b) central
- c) autonomic
- d) sympathetic

Answer: b

Consider This: The brain is a major structure in this system; LO 2.1: Contrast the location of the central and peripheral nervous systems.

Learning Objective: 2.1: Contrast the location of the central and peripheral nervous systems.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOC_2.2

Question: When substances are transported from the terminal buttons at the end of the axon back to the soma, this process is referred to as _____.

- a) retrograde axoplasmic transport
- b) systemic axoplasmic transport
- c) anterograde axoplasmic transport
- d) peripheral axoplasmic transport

Answer: a

Consider This: The substance would be returning to the source, or moving backwards; LO 2.2: Describe the structures of a neuron, including their general function.

Learning Objective: 2.2: Describe the structures of a neuron, including their general function.

Difficulty Level: Difficult

Skill Level: Understand the Concepts

EOC_2.3

Question: In order to cross the synapse between two cells, a substance called _____ is released from the first cell (presynaptic) to activate or inhibit the second cell (postsynaptic).

- a) Neurotransmitter
- b) Protein
- c) Kinesin
- d) Dynein

Answer: a

Consider This: These substances come in many varieties, producing different outcomes in the cells they affect; LO 2.2: Describe the structures of a neuron, including their general function.

Learning Objective: 2.2: Describe the structures of a neuron, including their general function.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOC_2.4

Question: What are the smallest supporting cells in the central nervous system?

- a) Microglia
- b) Schwann cells
- c) Oligodendrocytes
- d) Astrocytes

Answer: a

Consider This: These cells are a type of “nerve glue” in the central nervous system; LO 2.3: Differentiate functions of supporting cells of the central and peripheral nervous systems.

Learning Objective: 2.3: Differentiate functions of supporting cells of the central and peripheral nervous systems.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOC_2.5

Question: A scan shows that a particular substance has spread throughout Xiao Ling’s body via the bloodstream but has not entered her brain. This finding demonstrates the existence of

- a) the blood–brain barrier.
- b) the doctrine of specific nerve energies.
- c) blood efficacy.
- d) medicine effects.

Answer: a

Consider This: Certain substances are unable to enter the brain due to their composition; LO 2.4: Describe the features and importance of the blood–brain barrier.

Learning Objective: 2.4: Describe the features and importance of the blood–brain barrier.

Difficulty Level: Easy

Skill Level: Understand the Concepts

EOC_2.6

Question: Herlinda drinks hot coffee. Although the pain is so great that her reflex is to spit out the coffee, she does not do so. The reflex to spit out the coffee is inhibited by the release of an inhibitory neurotransmitter by the _____.

- a) sensory neurons
- b) interneurons
- c) motor neurons
- d) glial cells

Answer: b

Consider This: Herlinda will still feel the pain even if her reflex is inhibited; LO 2.5: Explain neural communication in withdrawal reflexes.

Learning Objective: 2.5: Explain neural communication in withdrawal reflexes.

Difficulty Level: Moderate

Skill Level: Apply What You Know

EOC_2.7

Question: If the inner voltage of a cell is -70 mV and application of stimulation results in a -95 mV charge, the stimulation had a _____ effect. On the other hand, a resultant charge of +40 mV would be a _____ effect.

- a) hyperpolarizing; depolarizing
- b) depolarizing; hyperpolarizing
- c) repolarizing; depolarizing
- d) repolarizing; hyperpolarizing

Answer: a

Consider This: “Hyper-” refers to becoming more of that characteristic whereas “de-” means to move toward the opposite of that characteristic; LO 2.6: Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Learning Objective: 2.6: Contrast resting potential, hyperpolarization, depolarization, and the action potential in neurons.

Difficulty Level: Moderate

Skill Level: Apply What You Know

EOC_2.8

Question: A cation would be attracted to _____.

- a) another cation.
- b) an anion.
- c) a sodium ion.
- d) a potassium ion.

Answer: b

Consider This: Ions work using attraction principles similar to magnets; LO 2.7: Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump to establishing membrane potential.

Learning Objective: 2.7: Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump to establishing membrane potential.

Difficulty Level: Difficult

Skill Level: Analyze It

EOC_2.9

Question: The Na⁺/K⁺ pump removes _____ Na⁺ ions from the intracellular fluid and adds _____ K⁺ ions to the intracellular of a neuron.

- a) 3; 2
- b) 2; 3
- c) 3; 4
- d) 2; 4

Answer: a

Consider This: The Na⁺/K⁺ pump helps restore resting membrane potential; LO 2.7: Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump to establishing membrane potential.

Learning Objective: 2.7: Summarize the contributions of diffusion, electrostatic force, and the sodium–potassium pump to establishing membrane potential.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOC_2.10

Question: Dropping a bowling ball or a feather on your foot will produce differences in action potentials. The action potentials associated with the bowling ball would be _____.

- a) larger in size than for the feather and occur at a faster rate.
- b) the same size as for the feather and occur at a slower rate.
- c) the same size as for the feather and occur at a faster rate.
- d) larger in size than for the feather and occur at a slower rate.

Answer: c

Consider This: Action potentials always involve the same process of ionic movements regardless of the experienced sensation; LO 2.9: Describe the propagation of an action potential.

Learning Objective: 2.9: Describe the propagation of an action potential.

Difficulty Level: Difficult

Skill Level: Analyze It

EOC_2.11

Question: Where do synaptic vesicles tend to be found in greatest numbers?

- a) In the middle of the axon of the postsynaptic cell
- b) Around the part of the presynaptic membrane that faces the synaptic cleft
- c) In the dendrites of the presynaptic membrane
- d) Around the part of the presynaptic membrane furthest from the synaptic cleft

Answer: b

Consider This: Synaptic vesicles are filled with molecules that are involved in synaptic communication; LO 2.10 Describe the structures and functions of presynaptic cells that are involved in synaptic communication.

Learning Objective: 2.10 Describe the structures and functions of presynaptic cells that are involved in synaptic communication.

Difficulty Level: Moderate

Skill Level: Analyze It

EOC_2.12

Question: Calcium ions (Ca^{2+}) are _____ and in highest concentration outside the cell. This means they have the effect of _____ the membrane, thereby contributing to excitatory postsynaptic potentials (EPSPs).

- a) negatively charged; depolarizing
- b) negatively charged; hyperpolarizing
- c) positively charged; depolarizing
- d) positively charged; hyperpolarizing

Answer: c

Consider This: Calcium ions act like sodium ions in this context; LO 2.13 Compare the functions of EPSPs and IPSPs in postsynaptic cells.

Learning Objective: 2.13 Compare the functions of EPSPs and IPSPs in postsynaptic cells.

Difficulty Level: Moderate

Skill Level: Analyze It

EOC_2.13

Question: Autoreceptors are located on the _____.

- a) postsynaptic cell
- b) microtubules
- c) astrocytes
- d) presynaptic cell

Answer: d

Consider This: Autoreceptors are responsible for monitoring the level of neurotransmitter in the synaptic cleft in order to upregulate or downregulate production; LO 2.16: Differentiate between the locations and functions of autoreceptors and postsynaptic receptors.

Learning Objective: 2.16: Differentiate between the locations and functions of autoreceptors and postsynaptic receptors.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOC_2.14

Question: _____ refers to the process of EPSPs and IPSPs interacting to generate excitation or inhibition.

- a) Immigration
- b) Innervation
- c) Importation
- d) Integration

Answer: d

Consider This: The correct term means “to combine together”; LO 2.15: Summarize the process of neural integration of EPSPs and IPSPs.

Learning Objective: 2.15: Summarize the process of neural integration of EPSPs and IPSPs.

Difficulty Level: Easy

Skill Level: Remember the Facts

EOC_2.15

Question: Neuromodulators differ from neurotransmitters in that _____.

- a) they are chemicals and neurotransmitters are not.
- b) they disperse more narrowly than do neurotransmitters.
- c) they are fast acting compared to neurotransmitters.
- d) they disperse more widely than do neurotransmitters.

Answer: c

Consider This: Neuromodulators contribute to pervasive changes in the body; LO 2.18: Describe examples of nonsynaptic communication.

Learning Objective: 2.18: Describe examples of nonsynaptic communication.

Difficulty Level: Moderate

Skill Level: Apply What You Know