Neurobiology Functional Approach 1st edition Striedter Test Bank

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Ch2 TestBank

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Question 1.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

1. Neurons send signals to which of the following?
a) other neurons
b) muscles
c) glands
d) all of the above

Answer: d

Question 2.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

2. A staining technique invented by Camillo Golgi _____.
a) stains all neurons black
b) stains only some neurons black
c) allowed researchers to see that neurons were not discrete cells but rather were arranged in a single, connected web
d) all of the above

Answer: b

Question 3.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

3. Santiago Ramon y Cajal's contributions to science included which of the following?
a) The Golgi stain which allowed neurons to be visualized for the first time
b) The idea that neurons are not discrete cells but rather were arranged in a single connected web
c) The idea that neurons are discrete cells
d) all of the above

Answer: c

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Question 4.
Section 2.1
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

4. The text describes how Santiago Ramon y Cajal determined that cells were "functionally polarized". Which of the following statements most accurately restates this term?
a) Each end of the neuron (dendritic end vs. axonal end) has a different function
b) Polarized light is most useful for viewing cells stained by the Golgi stain
c) Each end of the neuron (dendritic end vs. axonal end) has a different electrical charge
d) all of the above

Answer: a

Question 5.
Section 2.1
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

5. Which of the following findings support the neuron doctrine?
a) The speed of reflexes is slower than would be expected based on the speed of electrical impulses in neurons
b) The Golgi stain revealed that neurons are not discrete cells, but rather arranged in single connected web
c) The finding that in most neurons, dendrites communicate with dendrites
d) all of the above

Answer: a

Question 6.
Section 2.1
Bloom's Scale: SYNTHESIS
Short Answer

6. In your own words, what is the neuron doctrine? Give 4 examples of evidence from the text that supports the neuron doctrine.

Question 7.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Matching.

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7. Match each scientist to the idea proposed by writing in one of the following names in the blank: Santiago Ramon y Cajal, Camillo Golgi, Charles Sherrington, Theodor Schwann/Matthias Schleiden.
_____ Using sheep brains and the Golgi stain, made detailed drawings of the cells in the brain
_____ Created a method of staining neurons so they could be seen under a microscope
_____ Proposed that biological tissues were composed of distinct cells
_____ Performed early studies on the electrical function of nerves and muscles

Answer:
__Ramon y Cajal_____ Using sheep brains and the Golgi stain, made detailed drawings of the cells in the brain
__Camillo Golgi_____ Created a method of staining neurons so they could be seen under a microscope
__Schwann/Schleiden__Proposed that biological tissues were composed of distinct cells
__Sherrington_____ Performed early studies on the electrical function of nerves and muscles

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Question 8.
Section 2.1
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

8. Section 2.1 describes a debate going on between scientists about the organization of the nervous system. Which of these questions best characterizes this debate?
a) Is it possible to stain all neurons with the Golgi stain, or just a few?
b) Are neurons discrete cells, or a single connected web?
c) In a neuron, does information flow from axon to dendrite or dendrite to axon?
d) Is light microscopy a better tool for understanding the brain than electrical recordings?

Answer: b

Question 9.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

9. Synapses
a) were discovered using light microscopy by Santiago Ramon y Cajal
b) carry electrical signals along the length of an axon
c) are gaps between neurons where chemical signals are used to transmit information
d) all of the above

Answer: c

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Question 10.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

10. Which of the following structures are unique to neurons?
a) axons
b) dendrites
c) Nissl substance
d) all of the above

Answer: d

Question 11.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Ordering.

11. How is information transmitted from neuron to neuron? After a signal crosses a synapse, place the following structures in order of their involvement using the numbers 1 to 6.
_____ axon
_____1_____ dendrite
_____ synapse
_____ axon hillock
_____ cell body
_____ axon terminal

Answer:
_____4_____ axon
_____1_____ dendrite
_____6_____ synapse
_____3_____ axon hillock
_____2_____ cell body
_____5_____ axon terminal

Question 12.
Section 2.1
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

12. Neurons contain two types of processes: axons and dendrites. Which of the following statements best describes a difference between the two?

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a) Dendrites are of uniform diameter while axons vary widely in diameter.
b) Dendrites receive incoming signals from other neurons while axons carry the output of the neurons.
c) A cell body gives rise to a single dendrite and multiple axons.
d) Dendrites travel long distances while axons are generally much shorter.
e) All of the above are true

Answer: b

Question 13.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Fill in the blank

13. The gap between neurons where chemical communication occurs is known as a _____.

Answer: synapse

Question 14.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Fill in the blank

14. The movement of substances from the axon terminal to the cell body is known as _____ axoplasmic transport.

Answer: retrograde

Question 15.
Section 2.1
Bloom's Scale: SYNTHESIS
Multiple Choice

15. In your research, you label two proteins (P1 and P2), with fluorescent dyes and watch as they move the length of a cultured neuron toward the axon terminal. P1 moves very quickly relative to P2. You might conclude that
a) P1 is not a protein
b) P1 is involved in retrograde axoplasmic transport
c) P1 is likely a protein that is associated with transport vesicles
d) P1 is a protein that is unlikely to be associated with transport vesicles
e) All of the above are true

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Answer: c

Question 16.
Section 2.1
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

16. Animal cells (including neurons) typically maintain a voltage difference between their outside and inside of (very roughly)
a) 1/100 volts
b) 1/10 volts
c) 1 volt
d) 10 volts

Answer: b

Question 17.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Fill in the blank

17. The voltage difference between the outside and inside of a neuron is known as its _____ potential.

Answer: resting

Question 17.
Section 2.1
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

17. Which of the following does NOT accurately describe an action potential?
a) It can be measured with both intracellular and extracellular recording methods
b) It is a temporary reversal of neuronal membrane polarity
c) It is the basis of electrical communication in neurons
d) None of the accurately describe an action potential

Answer: b

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Question 18.
Section 2.1
Bloom's Scale: SYNTHESIS
Short Answer

18. What is the resting membrane potential? Consider a cell at rest. How might you expect extracellular sodium (a positively charged ion) to behave if a small hole was opened through the neuronal membrane?

Question 19.
Section 2.2
Bloom's Scale: SYNTHESIS
Short Answer

19. Give two examples from the text of how experimentation on animals has contributed to our understanding of the brain and nervous system. Do you believe this experimentation is justified? Why or why not?

Question 20.
Section 2.2
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

20. How does the sodium-potassium pump help to establish and maintain the resting membrane potential?
a) pumps sodium ions into the cell, potassium ions out
b) pumps sodium ions out of the cell, potassium ions in
c) pumps sodium and potassium outside the cell
d) pumps sodium and potassium inside the cell
e) none of the above

Answer: b

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Question 21.
Section 2.2
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

21. Which statement most accurately describes the role of the squid in early neurophysiology experiments?
a) To understand electrical signaling in nerves, squid giant axons must be used because they are the only animal where multiple electrodes can be used for recordings.
b) The squid giant axon makes a good model system for understanding general electrical signaling principles in all types of nervous systems.
c) Studies of the squid giant axon revealed that electrical signaling in nerves depends on the movement of fluid along the length of an axon.
d) Squid giant axons were critical in determining which molecules use ATP in transporting ions across the neuronal membrane.

Answer: b

Question 22.
Section 2.2
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

22. Which of the following is generally true when a cell is at rest?
a) extracellular sodium and chloride are 10X that of the intracellular solution
b) intracellular sodium and chloride are 10X that of the extracellular solution
c) the intracellular calcium concentration is generally about 100X higher outside the cell than inside
d) the intracellular calcium concentration is generally about 1000X higher outside the cell than inside
e) none of the above are true when a cell is at rest

Answer: a

Question 23.
Section 2.2
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

23. Which of the following is most critical in maintaining a neuron's resting membrane potential?
a) active transport
b) passive transport
c) axoplasmic transport
d) none of the above

Answer: b
Note: passive transport of potassium ions down their electrochemical gradient is the primary means of establishing the RMP.

Question 24.
Section 2.2
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

24. Which of the following is most critical in maintaining a neuron's resting membrane potential?
a) active transport
b) passive transport
c) axoplasmic transport
d) none of the above

Answer: b
Note: passive transport of potassium ions down their electrochemical gradient is the primary means of establishing the RMP.

Question 25.
Section 2.2
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

25. The resting membrane potential
a) is the difference in voltage across the membrane when at rest
b) is usually close to 0 mV, and represents the even distribution of charges from one side of the membrane to the other
c) is achieved when the inside of the cell is more positively charged than the outside
d) is achieved by actively pumping chloride ions outside of the cell
e) none of the above

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Answer: a

Question 26.
Section 2.2
Bloom's Scale: SYNTHESIS
Multiple Choice

26. Assume ions A and B are both positively charged. Extracellular [A] is 10X intracellular [A]. The neuronal membrane is permeable only to ion B. After B is added to the extracellular solution, which of the following would you expect to be true?
a) B would flow into the cell until it is found in equal concentrations on both sides of the membrane
b) B would flow into the cell and A would flow out of the cell.
c) B would flow into the cell until its equilibrium potential is reached
d) B would not enter the cell

Answer: c

Question 27.
Section 2.2
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

27. The movement of ions across a cell membrane that is permeable to those ions depends on
a) the concentration of the ions on either side of the membrane
b) the charges of the ions and the voltage difference between the extracellular solution and intracellular solution
c) the charges of the ions, the electrical potential of the cell, and the concentration of ions
d) all of the above

Answer: d

Question 28.
Section 2.2
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Fill in the blank.

28. At rest, the membrane of the cell is slightly permeable to _____, the positively charged ion that is most responsible for setting the resting membrane potential.

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Answer: potassium

Question 29.
Section 2.2
Bloom's Scale: APPLICATION/ANALYSIS
Fill in the blank.

29. Consider two sodium solutions separated by a cation-permeable membrane. One solution is 100 times more concentrated than the other. What is the voltage difference between the two solutions at room temperature? (2 pts)

Answer: 58 x 2 = 116mV (also acceptable: -116mV, this question does not specify a reference frame)

Question 30.
Section 2.2
Bloom's Scale: APPLICATION/ANALYSIS
Short Answer.

30. Consider two sodium solutions separated by a cation-permeable membrane. One solution is 100 times more concentrated than the other. What is the voltage difference between the two solutions at mammalian body temperature?

Answer: 61 x 2 = 122 mV (also acceptable: -122 mV, this question does not specify a reference frame)

Question 31.
Section 2.2
Bloom's Scale: SYNTHESIS
Short Answer.

31. Consider two sodium solutions separated by a cation-permeable membrane. One solution (we'll call it "outside") is 5mM. Each terminal from a 9V battery is attached to a wire, which in turn is dipped into one of the solutions (the positive terminal is placed in the "outside" solution). What concentration of potassium would need to be present on the other side of the membrane (the "inside") to ensure that no net movement of ions occurs between the two chambers at room temperature? Set up (but do not solve) an equation to find the answer.

Answer: 9000 = 58 log ([5 mM] / [x mM])

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Question 32.
Section 2.2
Bloom's Scale: APPLICATION/ANALYSIS
Short Answer.

32. Consider two potassium solutions separated by a cation-permeable membrane. Solution 1 is 450 mM, and solution 2 is 50 mM. Calculate the voltage difference across the membrane at room temperature.

Answer: -55.3 mV (55.3 mV is also acceptable – the question does not specify a reference frame).

Question 33.
Section 2.2
Bloom's Scale: APPLICATION/ANALYSIS
Short Answer.

33. Assume the following permeability ratios and ionic concentrations in a cell:

P_K:P_{Na}:P_{Cl} = 1 : 0.03 : 0.1
Where K+ inside = 400 mM, outside = 20 mM
Where Na+ inside = 50 mM, outside = 440 mM
Where Cl- inside = 100 mM, outside = 560 mM

Set up, but do not solve, an equation to calculate the membrane potential at room temperature.

Answer: $Em = 58 \log \frac{(0.03\ [440\ mM] + 1\ [20\ mM] + 0.1\ [100\ mM])}{(0.03\ [50\ Mm] + 1\ [400\ Mm] + 0.1\ [560\ Mm])}$

Question 34.
Section 2.2
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

34. The equilibrium potential (sometimes called the Nernst potential) describes
a) equilibrium that is dependent on concentration
b) equilibrium that is dependent on electrical charge
c) equilibrium that is dependent on both charge and concentration
d) all of the above

Answer: c

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Question 35.
Section 2.2
Bloom's Scale: SYNTHESIS
Multiple Choice

35. Consider figure 2.6. If you measure the voltage of a neuron at rest and add extracellular potassium, you would expect that
a) the neuron would become more depolarized
b) the neuron would become hyperpolarized
c) the neuron voltage would not change
d) the neuron voltage would become approximately 0 mV.

Answer: a

Question 36.
Section 2.2
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

36. Which of the following is true of ion channels?
a) They permit the passage of ions through a cell membrane
b) They are composed of proteins that form pores in the cell membrane
c) They are responsible for passive transport of ions through the cell membrane
d) all of the above

Answer: d

Question 37.
Section 2.2
Bloom's Scale: SYNTHESIS
Matching

37. Consider an action potential. Write the letter (A – E) that corresponds to the best answer.

_____ resting membrane potential
_____ rising phase
_____ peak of action potential
_____ falling phase
_____ lowest point of action potential

A. voltage-gated potassium channels open, allowing potassium to exit the cell
B. voltage-gated sodium channels open, allowing sodium to enter the cell

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C. equilibrium potential of sodium is reached
D. equilibrium potential of potassium is reached
E. voltage-gated channels are closed

Answer:

___E___ resting membrane potential
___B___ rising phase
___C___ peak of action potential
___A___ falling phase
___D___ lowest point of action potential

Question 38.
Section 2.2
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

38. Regarding voltage-gated sodium channels:
a) the probability that they are open depends on the voltage of the cell
b) they contain 4 segments, each of which consists of 6 transmembrane domains
c) after inactivation they must be "reset" by a return to resting voltages
d) all of the above are true

Answer: d

Question 39.
Section 2.2
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

39. What initiates an action potential?
a) A critical depolarization level, usually around -40 mV
b) A critical hyperpolarization level, usually around -80 mV
c) Opening of voltage-sensing calcium channels in the axon terminal
d) negative charges flowing into the cell from the outside
e) none of the above

Answer: a

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Question 40.
Section 2.2
Bloom's Scale: SYNTHESIS
Multiple Choice

40. Examine figure 2.9. Predict how 2.9B might look if potassium was replaced by another positively charged ion that cannot cross the neuronal membrane?
a) no positive current would be observed
b) no negative current would be observed
c) no current at all would be observed
d) more current would be seen in both directions

Answer: a

Question 41.
Section 2.3
Bloom's Scale: SYNTHESIS
Short Answer

41. In a blue whale (*Balaenoptera musculus*), some neurons are between 50-100 feet long. This presents a technical obstacle – for example a USB cable can't be longer than about 20-30 feet long because the electrical signal becomes too diminished to be useful after that distance. How can action potentials travel these great distances (and in certain dinosaurs, even greater distances - up to 150 feet!) and still reliably convey information from one point to another?

Answer: the electrical signal does not diminish, it is regenerated to full strength at each point that is depolarized along an axon.

Question 42.
Section 2.3
Bloom's Scale: APPLICATION/ANALYSIS
Short Answer

42. Diagram how an action potential propagates along an axon. Consider its initiation and the ions and ion channels involved. Label the phases of an action potential and state the ionic basis of each of these phases.

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Question 43.
Section 2.3
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

40. Which of the following is NOT true regarding an action potential?
a) it cannot propogate in both directions because sodium channel remain inactive while the membrane is depolarized
b) it is regenerated to full strength at each point as it moves along an axon
c) it is often initiated by depolarization in the axon hillock
d) it is initiated with an influx of potassium into the neuron

Answer: d

Question 44.
Section 2.3
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

44. In studying an animal you observe that certain axons are quite large in diameter. You would likely predict that
a) these axons have a faster conduction velocities than small axons
b) these axons have less surface area than small axons
c) these axons have shorter length constants than small axons
d) these axons have fewer potassium leak channels than small axons

Answer: a

Question 45.
Section 2.3
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

45. Which of the following is true of myelin?
a) It is an extension of the membrane of adjacent non-neuronal cells
b) It increases the speed of electrical impulse conduction
c) It helps to limit diffusion of ions across the neuronal membrane
d) all of the above

Answer: d

Question 46.
Section 2.3
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

46. Which factors are most associated with the speed of nerve conduction?
a) axon length and axon diameter
b) myelination and axon length
c) myelination and axon diameter
d) axon diameter and resting membrane potential

Answer: c

Question 47.
Section 2.3
Bloom's Scale: APPLICATION/ANALYSIS
Circle one.

47. Multiple sclerosis is a disease that decreases the amount of myelin present in neurons. You might predict that (decreased/increased) nerve conduction velocity of affected neurons is a symptom of MS.

Answer: decreased

Question 46.
Section 2.3
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

46. Which factors are most associated with the speed of nerve conduction?
a) axon length and axon diameter
b) myelination and axon length
c) myelination and axon diameter
d) axon diameter and resting membrane potential

Question 47.
Section 2.3
Bloom's Scale: KNOWLEDGE/COMPREHENSION

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Multiple Choice

47. In studying an animal you observe that certain axons are myelinated. You would likely predict that
a) these axons have 5-10X as fast conduction velocities than small axons
b) these axons propagate action potentials via salutatory conduction at Nodes of Ranvier
c) these axons have longer length constants than small axons
d) all of the above

Answer: d

Question 48.
Section 2.3
Bloom's Scale: SYNTHESIS
Multiple Choice

48. Create a drawing that compares two neurons, one with fast conduction velocity and one with slow conduction velocity. Indicate how the axon diameter and presence of absence of myelination influence nerve conduction velocity by changing the length constant, altering potassium leak, and altering membrane capacitance.

Question 49.
Section 2.4
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Fill in the blank

49. Most synapses in the central nervous system use _____ as the neurotransmitter.

Answer: glutamate or L-glutamate

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Question 50.
Section 2.4
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

50. Drugs that block voltage-gated calcium channels in the axon terminal may have which of the following side effects?
a) decreased nerve conduction velocity
b) decreased size of the action potential
c) decreased neurotransmitter release into a synapse
d) all of the above

Answer: c

Question 51.
Section 2.4
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

51. A typical ligand-gated neurotransmitter receptor
a) is composed of multiple subunits
b) spans the membrane
c) allows passage of ions through the membrane when bound to its ligand
d) may have different functions or susceptibility to toxins/drugs based on its subunit composition
e) all of the above

Answer: e

Question 52.
Section 2.4
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

52. Select the accurate characterization of neuronal communication.
a) glutamate binds to AMPA receptors and causes an EPSP
b) AMPA receptors present along the length of an axon regenerate the action potential
c) EPSPs and action potentials both involve neuronal depolarization
d) all of the above

Answer: d

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Question 52.
Section 2.4
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

52. How are neurotransmitters removed from a synapse?
a) diffusion
b) degredation by enzymes
c) reuptake into the same or nearby cells
d) all of the above

Answer: d

Question 53.
Section 2.5
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice

53. Neurons may vary in all of the following ways EXCEPT
a) size
b) structure and number of dendrites
c) presence of endoplasmic reticulum
d) neurotransmitter type
e) nerve conduction velocity

Answer: c

Question 54.
Section 2.5
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice

54. You perform a histology experiment and find that a neuron has a relatively small dendritic arbor and seems to project to adjacent cells. You might classify this cells as a
a) recurrent collateral
b) projection neuron
c) interneuron

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d) temperature-sensing neuron

Answer: c

Question 55.
Section 2.5
Bloom's Scale: APPLICATION/ANALYSIS
Fill in the blank.

55. Each of the concepts listed below is most associated with EPSPs or IPSPs. Classify each by writing EPSP or IPSP on the line next to the statement.

_____ post synaptic cell is hyperpolarized
_____ initiates an action potential when critical threshold is reached
_____ involves passive transport of chloride ions
_____ involves passive transport of sodium ions
_____ is generally observed when GABA is the neurotransmitter
_____ is generally observed when glutamate is the neurotransmitter

Answer:

__IPSP_____ post synaptic cell is hyperpolarized
__EPSP_____ initiates an action potential when critical threshold is reached
__IPSP_____ involves passive transport of chloride ions
__EPSP_____ involves passive transport of sodium ions
__IPSP_____ is generally observed when GABA is the neurotransmitter
__EPSP_____ is generally observed when glutamate is the neurotransmitter

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Question 56.
Section 2.5
Bloom's Scale: SYNTHESIS
Short Answer.

56. Construct a diagram of a hypothetical neural network involving 4 neurons. In the diagram, two neurons (A and B) are capable of releasing glutamate onto a post-synaptic cell (C). A fourth neuron (X) synapses onto the axon terminal of a presynaptic neuron and is capable of causing an IPSP and preventing glutamate release. There should be a total of 3 synapses. Label each synapse with a + to indicate whether it is excitatory or a – to indicate if it is inhibitory.

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Question 57.
Section 2.5
Bloom's Scale: APPLICATION/ANALYSIS
Circle one.

57. Organophosphates are chemicals inhibit an enzyme that degrades acetylcholine in the certain synapses. Therefore you might predict that muscle contraction would (increase/decrease) as a result of organophosphate exposure.

Answer: increase

Question 58.
Section 2.5
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice.

58. A toxin produces paralysis in muscles. Nerve conduction appears to be normal. It is most likely that the toxin is
a) TTX
b) latrotoxin
c) botulinum
d) none of the above

Answer: c

Question 59.
Section 2.5
Bloom's Scale: APPLICATION/ANALYSIS
Multiple Choice.

59. Change the underlined words so that the sentence in italics is consistent with Dale's principle. Select the best words below to replace the underlined section. *Neurons may contain several types of neurotransmitters. Each synapse uses* different combinations *of neurotransmitters at each synapse to communicate with post-synaptic cells.*
a) nitric oxide and one other neurotransmitter
b) the same combination of neurotransmitters
c) both excitatory and inhibitory

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d) monoamine

Answer: c

Question 60.
Section 2.5
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice.

60. What is NOT the result of a metabotropic receptor being activated?
a) Intracellular signaling pathways may lead to the opening and/or closing of ion channels
b) Responses that persist for a long period of time
c) The metabotropic receptor opens, allowing an influx of ions into the cell
d) second messenger molecules convey signals within the cell

Answer: c

Question 61.
Section 2.5
Bloom's Scale: APPLICATION/ANALYSIS
Short Answer.

60. The action of a neurotransmitter depends on its receptor. Compare and contrast the AMPA and NMDA receptors, considering both their structure and function.

Question 62.
Section 2.6
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice.

62. Which of the following might cause a neuron to fire?
a) EPSPs triggered by activity at two synapses at the same time
b) EPSPs triggered by activity at two nearby synapses
c) Multiple EPSPs at the same synapse triggered in rapid succession
d) all of the above

Answer: d

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Question 63.
Section 2.6
Bloom's Scale: APPLICATION/ANALYSIS
Short Answer.

63. Give the difference between spike rate coding and spike timing.

Question 64.
Section 2.6
Bloom's Scale: KNOWLEDGE/COMPREHENSION
Multiple Choice.

64. A receptive field of a sensory neuron that responds to peripheral stimuli would best be described as
a) The area of the body that is in contact with the neuron
b) a specific type of sensation that is detected by the neuron
c) the area of the body that when stimulated evoke a response in the neuron
d) all of the above

Answer: c

Question 65.
Section 2.6
Bloom's Scale: APPLICATION/ANALYSIS
Short Answer.

65. Paraphrase the idea of neuronal tuning in your own words. Give examples that describe what tuning would be for a sensory neuron that innervates the skin and a sensory neuron that innervates the tongue.

Question 66.
Section 2.6
Bloom's Scale: APPLICATION/ANALYSIS
Short Answer.

Compare and contrast the computational abilities of brains and computers using ideas presented in section 2.6.

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