AP Psychology
Unit 3: Biological Bases of Behavior
Study Guide

Vocabulary:
1. action potential
2. adrenal glands
3. agonist
4. all-or-none response
5. amygdala
6. antagonist
7. aphasia
8. association areas / cortex
9. autonomic nervous system
10. axon
11. biopsychology
12. brainstem
13. Broca’s area
14. central nervous system (CNS)
15. cerebellum
16. cerebral cortex
17. cerebral dominance
18. cognitive neuroscience
19. computerized tomography (CT scan)
20. corpus callosum
21. dendrite
22. deoxyribonucleic acid (DNA)
23. electroencephalogram (EEG)
24. endocrine system
25. endorphins
26. epigenetics
27. frontal lobes
28. functional magnetic resonance imaging (fMRI)
29. genes / genome
30. genotype
31. glial cells
32. hippocampus
33. hormones
34. hypothalamus
35. interneurons
36. lesion
37. limbic system
38. magnetic resonance imaging (MRI)
39. medulla
40. motor cortex
41. motor neurons
42. myelin sheath
43. natural selection
44. nerves
45. nervous system
46. neural pathway
47. neuron
48. neurogenesis
49. neurotransmitters
50. occipital lobes
51. parasympathetic nervous system
52. parietal lobes
53. peripheral nervous system (PNS)
54. phenotype
55. pituitary gland
56. plasticity
57. pons
58. positron emission tomography (PET)
59. refractory period
60. reflex
61. resting potential
62. reticular formation
63. reuptake
64. sensory neurons
65. soma
66. somatic nervous system
67. somatosensory cortex
68. split brain
69. sympathetic nervous system
70. synapse
71. temporal lobes
72. terminal buttons
73. thalamus
74. threshold
75. Wernike’s area

Discussion questions:

1. If you stub your toe, how does the impulse travel through your nervous system allowing you to pull your toe back and jump up and down in pain? Explain how this process occurs (including the process of neural transmission) using the following terms in context:
   - Sensory neuron
   - Peripheral nervous system
   - Central nervous system
   - Interneuron
   - Motor neuron
   - Action potential
   - Neurotransmitter
   - Synapse

2. A patient who is admitted to the hospital after a stroke suffers from the following symptoms: episodes of intense, unexplainable fear; difficulty speaking; and blindness in his right visual field.

   **Part A:** Using the terms below, explain why you would use these scans to investigate the patient's brain functioning and,
   - PET Scan
   - MRI scan

   **Part B:** Using the terms below, explain which brain structures you predict might have been affected by the stroke, and why you think those brain structures were affected. (Note: Not all the brain structures listed below were necessarily affected by the stroke. Your essay should clearly indicate which brain structures you predict were affected and which were not.)
   - Brainstem
   - Amygdala
   - Hypothalamus
   - Occipital lobe
   - Broca’s area
3. Professor Mendel, a behavior geneticist, is interested in studying the relative contributions of nature and nurture to the personality trait of extraversion in humans.

**Part A:** Use the following terms to explain possible biological components of extraversion.
- Chromosomes
- Genes
- Temperament

**Part B:** Describe how Professor Mendel might complete a study of separated twins to investigate the influence of nature and nurture on extraversion. In your description, explain how the research could employ the case study, survey, and naturalistic observation methods. Be sure to explain how you would operationally define extraversion in the description of your study.

4. Briefly describe how one neuron transmits an impulse to another neuron using the following terms correctly to describe the process of neural transmission: Axon, action potential, terminal branches of axon, neurotransmitter, synapse, receptor site, dendrite.

5. Dr. Taylor discovers a chemical that is a very effective agonist for serotonin. Briefly explain how this chemical might affect human behavior, and identify the condition Dr. Taylor might treat with this chemical.

6. Give examples of the types of messages that travel through the following systems: somatic nervous system, sympathetic nervous system, parasympathetic nervous system, central nervous system, endocrine system (adrenal glands).

7. Briefly describe the kinds of information each of the following scans provides about the brain: EEG, CT, PET, MRI, fMRI.

8. Briefly summarize the functions of the brain structures in the brainstem and limbic system.

9. After a mild stroke, Mr. McGeorge showed some signs of aphasia. What pattern of symptoms would lead you to believe the damage occurred primarily in (a) Broca's area or (b) Wernicke's area?

10. Briefly describe Gazzaniga's research with split-brain patients, including the finding that the left brain is the “interpreter” of our actions.

11. After suffering a head injury in an auto accident, Alyssa says that she remembers what her mother looks like, and she can accurately recall many of her mother's distinctive facial features. However, when she is shown pictures of her mother, Alyssa is unable to recognize who it is, even though she can see clearly. Use your understanding of the functioning brain to account for Alyssa's strange pattern of experience.

12. Briefly describe the genetic differences between identical and fraternal twins, and explain why behavior geneticists are interested in studying twins to investigate nature-nurture issues.

13. Explain how an evolutionary psychologist might explain why humans developed into omnivores, eating both meat and plants.