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Chapter 2- Biology and the Brain

Multiple Choice

1. Which of the following is NOT part of a neuron?
   a. Synaptic Cleft
   b. Dendrites
   c. Soma
   d. Axon

Answer: a

A-head: The Neuron

Bloom's: Understand

Difficulty: Easy

2. Soma, or cell bodies….
   a. establish metabolism.
   b. are parts of a neuron that touch other cells.
   c. receive information from other nerve cells.
   d. are all of equivalent shape and size in the brain.

Answer: a

A-head: The Neuron

Bloom's: Understand

Difficulty: Easy

3. Dendrites are tiny fibers that….
   a. establish metabolism.
   b. touch other cells.
   c. receive information from other nerve cells.
   d. are all of equivalent shape and size in the brain.

Answer: c

A-head: The Neuron

Bloom's: Understand

Difficulty: Easy

4. Action potentials are defined as….
   a. stored up electrical energy.
   b. the lapse of time between neural firings.
   c. short bursts of energy.
   d. All of the answers are correct.

Answer: b

A-head: Neural Firing

Bloom's: Understand

Difficulty: Easy

5. When a neuron has discharged an action potential, the brief period of time to restore its resting potential and be ready to fire again is called the _____

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a. action potential, part 2.
b. all-or-none process.
c. chemical energy.
d. refractory period.

Answer: d

A-head: Neural Firing

Bloom's: Understand

Difficulty: Easy

6. Jose is walking alone at night. He hears footsteps behind him. His heart begins to beat faster and he feels more alert. This reaction is related to:

a. excitatory chemicals.
b. inhibitory chemicals.
c. inhibitory protons.
d. problems within the synaptic cleft.

Answer: a

A-head: Neural Firing

Bloom's: Apply

Difficulty: Moderate

7. The central nervous system is composed of:

a. the brain.
b. the spinal cord.
c. the brain and heart.
d. the brain and spinal cord.

Answer: d

A-head: Control Systems

Bloom's: Apply

Difficulty: Easy

8. Shontal is running a race and begins to sweat profusely during the last mile. How might the Nervous System be related to this phenomenon?

a. Axonic fibers run to all parts of your body including your sweat glands. The excitement at the end of a race likely has increased Shontal's parasympathetic nervous system.
b. Axonic fibers run to all parts of your body including your sweat glands. The excitement at the end of a race likely has increased Shontal's sympathetic nervous system.
c. Increased production of hormones prior to a race may be the cause.
d. All of the above are correct.

Answer: b

A-head: Control Systems

Bloom's: Apply

Difficulty: Easy

9. Why would a doctor use a PET Scan rather than an EEG to determine the location of a brain injury?

a. EEGs are inaccurate.

b. EEGs are imprecise.
c. EEGs are linked with cancer.
d. EEGs are not used in the study of the brain.

Answer: b

A-head: The Brain

Bloom's: Applied

Difficulty: Moderate

10. Which of the following methods uses a strong magnetic field to create computer-generated images of a cross-section of the brain?

a. EEG
b. MRI
c. PET Scan
d. CAT Scan

Answer: b

A-head: The Brain

Bloom's: Understand

Difficulty: Easy

11. Which of the following is most associated with "stream of consciousness" thoughts?

a. Hindbrain
b. Midbrain
c. Forebrain
d. "Silent" areas

Answer: c

A-head: Brain Organization

Bloom's: Factual

Difficulty: Moderate

12. Which of the following most impacts your sense of balance?

a. Hindbrain
b. Midbrain
c. Forebrain
d. "Silent" areas

Answer: b

A-head: Brain Organization

Bloom's: Factual

Difficulty: Moderate

13. Which part of the brain is completely responsible for creativity?

a. Right brain
b. Left brain
c. Both hemispheres of the brain
d. Neither hemisphere; creativity is completely a learned behavior

Answer: c

A-head: The Hemispheres of the Brain

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Bloom's: Apply
Difficulty: Difficult

14. Research on split-brain patients shows us that:
    a. there is specialization within brain hemispheres.
    b. humans cannot survive if corpus callosum is cut.
    c. verbal ability is associated with the right hemisphere.
    d. None of the answers are correct.

Answer: a
A-head: The Hemispheres of the Brain
Bloom's: Conceptual
Difficulty: Easy

15. Jacob has an injury to the right side of his brain. What is most likely to be impacted?
    a. Logic
    b. Language
    c. Math
    d. Musical ability

Answer: d
A-head: The Hemispheres of the Brain
Bloom's: Apply
Difficulty: Moderate

16. Avni wants to strengthen the associations in her left brain. What might she focus on?
    a. Music
    b. Imagination
    c. Math
    d. Daydreaming

Answer: c
A-head: The Hemispheres of the Brain
Bloom's: Apply
Difficulty: Moderate

17. How many chromosomes are in each cell of the human body?

    a. 14
    b. 23
    c. 46
    d. 100

Answer: c
A-head: Genetics
Bloom's: Factual
Difficulty: Easy

18. Which of the following is true about the study of behavioral genetics?

a. It is conducted only in hospitals.
b. It is conducted only by geneticists.
c. It is conducted where scientists suspect a connection between inherited characteristics and behavior.
d. None of these are correct.

Answer: c

A-head: Genetics

Bloom's: Think Critically

Difficulty: Moderate

19. How many chromosomes do people with Down's Syndrome have?
a. 23
b. 24
c. 46
d. 47

Answer: d

A-head: Genetics

Bloom's: Conceptual

Difficulty: Moderate

True/False

20. Neurons are part of a system of communication that includes the brain.
a. True
b. False

Answer: a
A-head: The Neuron
Bloom's: Understand
Difficulty: Easy

21. Neurons pass information, but only in the brain.
a. True
b. False

Answer: b
A-head: The Neuron
Bloom's: Understand
Difficulty: Easy

22. It is possible for neurons to pass messages without using its dendrites.
a. True
b. False

Answer: b
A-head: The Neuron
Bloom's: Understand
Difficulty: Moderate

23. Dendrites come near, but do not touch, other dendrites.

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a. True
b. False

Answer: a
A-head: The Neuron
Bloom's: Understand
Difficulty: Easy

24. The dendrites are responsible for metabolism.
a. True
b. False

Answer: b
A-head: The Neuron
Bloom's: Understand
Difficulty: Easy

25. Axons release neurotransmitters.
a. True
b. False

Answer: a
A-head: The Neuron
Bloom's: Understand
Difficulty: Moderate

26. The stored-up electrical energy in a neuron is called the resting potential.
a. True
b. False

Answer: a
A-head: The Neuron
Bloom's: Understand
Difficulty: Moderate

27. The somatic nervous system controls involuntary muscles such as your heart.
a. True
b. False

Answer: b
A-head: Control Systems
Bloom's: Understand
Difficulty: Moderate

28. The autonomic nervous system controls voluntary muscles such as your legs.

a. True
b. False

Answer: b
Difficulty: Moderate
A-head: Control Systems
Bloom's: Understand

29. The Sympathetic Nervous System provides the “fight or flight” response.

a. True
b. False
Answer: a
A-head: Control Systems
Bloom's: Understand
Difficulty: Easy

30. The Parasympathetic Nervous System calms you down after a scary event.
a. True
b. False
Answer: a
A-head: Control Systems
Bloom's: Understand
Difficulty: Easy

31. CAT Scans produce more specific locational information than EEGs.
a. True
b. False
Answer: a
A-head: The Brain
Bloom's: Apply
Difficulty: Moderate

32. MRIs use radioactive dyes in sugar to study the brain.
a. True
b. False
Answer: b
A-head: The Brain
Bloom's: Understand
Difficulty: Moderate

33. In the brain, the medulla controls blood pressure.
a. True
b. False
Answer: a
A-head: Brain Organization
Bloom's: Understand
Difficulty: Easy

34. People with Parkinson’s Disease have damage in the midbrain.
a. True
b. False
Answer: a
A-head: Brain Organization
Bloom's: Understand
Difficulty: Easy

35. The parietal lobe of the brain is directly connected to the spinal cord.
a. True

b. False
Answer: b
A-head: Brain Organization
Bloom's: Understand
Difficulty: Easy

36. There are 6 lobes in the right hemisphere and 4 lobes in the left hemisphere of your brain.
a. True
b. False
Answer: b
A-head: Brain Organization
Bloom's: Understand
Difficulty: Moderate

37. People diagnosed at birth with PKU lack DNA.
a. True
b. False
Answer: False
Difficulty: Moderate
A-head: Genetics
Bloom's: Conceptual
Difficulty: Moderate

38. Due to their exact chromosomal copy, geneticists only study behavioral genetics in identical twins.
a. True
b. False
Answer: b
A-head: Genetics
Bloom's: Conceptual
Difficulty: Moderate

Short Answer

39. Most people who "die of fright" by a heart attack following an intense period of stress/excitement, typically do so at least ten minutes after the initial fear has passed. Using what you learned in this chapter, describe why this might be the case.

Answer: Your autonomic nervous system has two major parts or divisions: (1) the sympathetic nervous system and (2) the parasympathetic nervous system. In general, activity in your sympathetic nervous system tends to excite or *arouse* you. Activity in your parasympathetic system tends to *depress* many of your bodily functions. The reactions between the sympathetic and parasympathetic nervous systems are equal. Periods of intense stress or excitement create a matching parasympathetic response, which slows heart rate and other bodily functions to the same degree. This is likely what happens to the heart rate after the critical period of excitement has ended, causing a heart attack.

40. There is an emerging industry of "brain games" that aim to keep people, especially older adults, mentally acute. If you were designing such a brain game, what would it include and why?

Answer: Answers will vary but the most successful brain games will engage multiple areas of the brain including the right brain (creativity, imagination, and the arts) as well as the left brain (logic, math, and language). Successful games will also engage both thinking and moving. For

example, puzzles are a common “brain teaser,” but they mostly use spatial abilities in the abstract rather than the spatial acuity needed to navigate around a busy shopping mall, for example. A variety of activities are needed to maintain good connections within the human brain.

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