

Brett Robbins Academic Consulting

Biology 30 Practice Test

Unit A: Nervous & Endocrine Systems

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

The part of a neuron that receives incoming signals from other neurons or from sensory receptors is the

- A) axon
- B) dendrite
- C) myelin sheath
- D) node of Ranvier

Question 2

The resting potential of a neuron is maintained primarily by

- A) the sodium – potassium pump, which moves sodium ions out of the neuron and potassium ions into the neuron
- B) sodium channels that remain permanently open in the membrane of the axon
- C) chloride ions that are pumped into the neuron
- D) the myelin sheath, which generates an electrical charge

Question 3

The division of the nervous system that consists of the brain and the spinal cord is the

- A) autonomic nervous system
- B) somatic nervous system
- C) central nervous system
- D) peripheral nervous system

Question 4

Insulin is secreted by

- A) beta cells in the islets of the pancreas
- B) the adrenal cortex
- C) the anterior pituitary gland
- D) the thyroid gland

Question 5

Before they are released into the synaptic cleft, neurotransmitter molecules are stored in

- A) the dendrites of the postsynaptic neuron
- B) the myelin sheath
- C) synaptic vesicles in the axon terminal
- D) the nodes of Ranvier

Question 6

When a stimulus causes the membrane potential of a neuron to reach threshold level, the first event that occurs is

- A) voltage – gated sodium channels open and sodium ions rush into the neuron
- B) voltage – gated potassium channels open and potassium ions rush out of the neuron
- C) synaptic vesicles release neurotransmitter into the cleft
- D) the sodium – potassium pump stops working

Question 7

Which of the following sequences correctly shows the pathway of a nerve impulse through a reflex arc?

- A) receptor, motor neuron, interneuron, sensory neuron, effector
- B) receptor, sensory neuron, motor neuron, interneuron, effector
- C) effector, sensory neuron, interneuron, motor neuron, receptor
- D) receptor, sensory neuron, interneuron, motor neuron, effector

Question 8

The photoreceptors that allow a person to see in dim light, but do not detect colour, are the

- A) cones
- B) rods
- C) ganglion cells
- D) bipolar cells

Question 9

After a meal, a rise in blood glucose stimulates the release of insulin. As blood glucose falls, insulin release decreases. This is an example of negative feedback because the response

- A) amplifies the original rise in blood glucose
- B) permanently stops all hormone release from the pancreas
- C) is carried out by the nervous system instead of hormones
- D) counteracts the original change in blood glucose

Question 10

Sound vibrations are converted into nerve impulses by

- A) the ossicles in the middle ear
- B) the tympanic membrane
- C) hair cells in the cochlea
- D) the auditory nerve

Question 11

Some Events in Synaptic Transmission

- 1 Neurotransmitter molecules bind to receptors on the postsynaptic membrane
- 2 An action potential reaches the axon terminal
- 3 Calcium ions enter the axon terminal through open channels
- 4 Synaptic vesicles fuse with the membrane and release neurotransmitter

The order in which the events above occur during synaptic transmission is

____, ____, ____, and _____. Record your answer as a four – digit code.

Question 12

In multiple sclerosis, the myelin sheaths surrounding some axons are gradually destroyed. Impulses along affected axons slow down or fail because

- A) without insulation, charge leaks across the membrane, so the next section of the axon is depolarized more slowly
- B) the axon can no longer generate any action potentials
- C) the sodium – potassium pumps in the axon stop functioning
- D) neurotransmitter production in the dendrites increases

Question 13

A toxin prevents acetylcholine from binding to receptors on the postsynaptic membrane of a neuromuscular junction. The most likely result of this blockage is that

- A) the muscle will not be stimulated and will remain relaxed
- B) the muscle will remain in a state of continuous contraction
- C) the motor neuron will release more acetylcholine into the cleft
- D) the postsynaptic membrane will repolarize more quickly than normal

Question 14

Some Events in the Regulation of Thyroxine

- 1 The anterior pituitary gland releases TSH
- 2 The thyroid gland releases thyroxine
- 3 The hypothalamus releases TRH
- 4 The metabolic rate of body cells increases

When the level of thyroxine in the blood falls, the events above occur in the order ____, ____, ____, and _____. Record your answer as a four – digit code.

Question 15

A teenager is diagnosed with a condition in which blood glucose remains high and little or no insulin is produced. Tests show that the immune system has destroyed cells in the pancreas. The underlying cause of this condition is the destruction of

- A) insulin receptors on the surface of liver cells B) the insulin – producing beta cells of the pancreas
- C) the cells of the thyroid gland that produce thyroxine D) receptors for ADH in the kidneys

Question 16

When the level of calcium in the blood falls, a hormone is released that stimulates the release of calcium from bone. The hormone and the gland that secretes it are

- A) Hormone : calcitonin

Gland : thyroid gland

- B) Hormone : calcitonin

Gland : parathyroid glands

- C) Hormone : parathyroid hormone

Gland : thyroid gland

- D) Hormone : parathyroid hormone

Gland : parathyroid glands

Question 17

Some Components of a Reflex Arc

- 1 A motor neuron carries an impulse to a muscle
- 2 A sensory neuron carries an impulse toward the spinal cord
- 3 The muscle contracts
- 4 An interneuron in the spinal cord relays the impulse

After a receptor detects a stimulus, the components above function in the order ____, ____, ____, and _____. Record your answer as a four – digit code.

Question 18

A gymnast suffers damage to one region of the brain. Afterwards, she has difficulty maintaining balance and her movements are uncoordinated, although her muscles are not weak. The damaged region of the brain is most likely the

- | | |
|----------------------|-----------------|
| A) cerebrum | B) cerebellum |
| C) medulla oblongata | D) hypothalamus |

Question 19

During a sudden frightening event, the hormone that is responsible for the immediate increase in heart rate and blood glucose level is

- | | |
|----------------|----------------|
| A) epinephrine | B) cortisol |
| C) insulin | D) aldosterone |

Question 20

Some Events That Occur When Light Enters the Eye

- 1 The optic nerve carries impulses to the brain
- 2 Light is focused onto the retina
- 3 Rods and cones generate nerve impulses
- 4 Light entering the eye is refracted by the cornea

The order in which the events above occur is ____, ____, ____,
and _____. Record your answer as a four – digit code.

Question 21

A patient complains of weight gain, fatigue, and feeling cold. Blood tests show a low level of thyroxine and a higher – than – normal level of TSH. The problem most likely originates in the

- | | |
|------------------|-----------------------------|
| A) hypothalamus | B) anterior pituitary gland |
| C) thyroid gland | D) adrenal gland |

Question 22

After running a long distance without drinking water, a person's blood level of ADH rises. The effect of this increase in ADH is

- A) an increase in the volume of urine produced
- B) a decrease in blood pressure
- C) an increase in the reabsorption of glucose by the kidneys
- D) an increase in the reabsorption of water by the kidneys

Question 23

Some Events in Blood Glucose Regulation

- 1 Insulin is released by the pancreas
- 2 The liver converts glycogen into glucose
- 3 Blood glucose concentration rises
- 4 Body cells take up glucose, and the liver stores glucose as glycogen

Beginning immediately after a carbohydrate – rich meal, the events above occur in the order ____, ____, ____, and _____. Record your answer as a four – digit code.

Question 24

Which of the following statements about synaptic transmission is correct?

- A) The nerve impulse jumps across the synaptic cleft as an electrical signal
- B) Synaptic vesicles travel across the cleft to the postsynaptic neuron
- C) Neurotransmitter molecules diffuse across the cleft and bind to receptors on the postsynaptic membrane
- D) Neurotransmitters are produced by the postsynaptic neuron

Question 25

At rest, the membrane potential of a neuron is -70 mV.

At the peak of an action potential, the membrane potential reaches $+40$ mV. The total change in membrane potential, in millivolts, during depolarization to the peak is _____. Record your answer as a number.

Answer Key

- | | | |
|------|----------|----------|
| 1. B | 10. C | 19. A |
| 2. A | 11. 2341 | 20. 4231 |
| 3. C | 12. A | 21. C |
| 4. A | 13. A | 22. D |
| 5. C | 14. 3124 | 23. 3142 |
| 6. A | 15. B | 24. C |
| 7. D | 16. D | 25. 110 |
| 8. B | 17. 2413 | |
| 9. D | 18. B | |

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