Unit A · Diploma-style practice

Name: _____ Date: _____

These questions are in the style of the diploma examination: 24 multiple choice and 6 numerical response. Use only the Biology 30 Data Booklet. Do the practice for each lesson first.

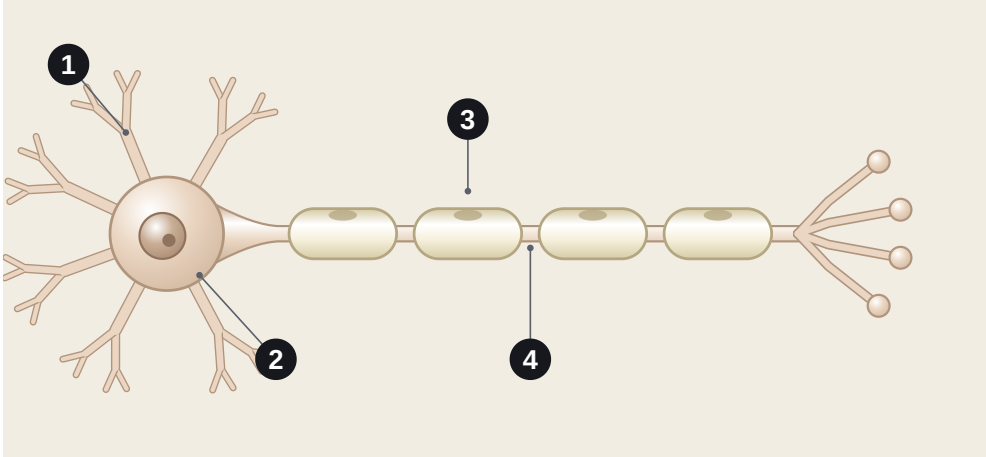
Multiple choice

Choose the one best answer.

1. In a reflex arc, a nerve impulse passes through three kinds of neuron. Which row gives them in the correct order?

A. Motor neuron, interneuron, sensory neuron
B. Sensory neuron, interneuron, motor neuron
C. Sensory neuron, motor neuron, interneuron
D. Interneuron, sensory neuron, motor neuron

Use the following diagram to answer the next question.



2. Which number marks a node of Ranvier?

A. 1
B. 2
C. 3
D. 4

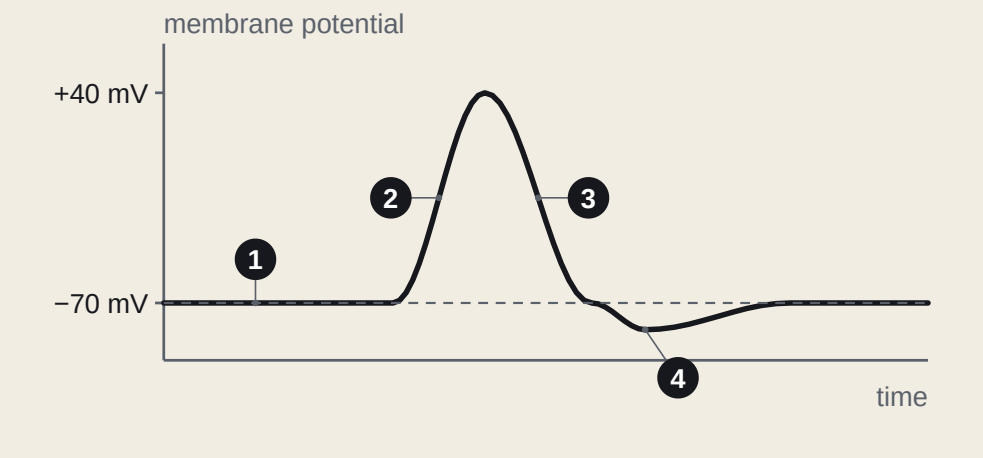
3. Which statement describes the ions around the membrane of a resting neuron?

A. Sodium ions are mostly outside and potassium ions are mostly inside.
B. Sodium ions are mostly inside and potassium ions are mostly outside.
C. Sodium ions and potassium ions are both mostly outside.
D. Sodium ions and potassium ions are both mostly inside.

4. The sodium-potassium pump moves ions by

A. diffusion, with sodium ions moving in and potassium ions moving out
B. diffusion, with sodium ions moving out and potassium ions moving in
C. active transport, with sodium ions moving out and potassium ions moving in
D. active transport, with sodium ions moving in and potassium ions moving out

Use the following diagram to answer the next question.



5. On the graph, which number marks repolarization?

A. 1
B. 2
C. 3
D. 4

Use the following information to answer the next question.

Stimulus X just reaches the threshold level of a sensory neuron. Stimulus Y is three times as strong as stimulus X.

6. Compared with the action potentials caused by stimulus X, the action potentials caused by stimulus Y are

A. the same size and more frequent
B. larger and more frequent
C. larger and equally frequent
D. the same size and equally frequent

7. During repolarization, the membrane potential returns toward the resting potential because

A. sodium ions diffuse into the neuron
B. sodium ions diffuse out of the neuron
C. potassium ions diffuse into the neuron
D. potassium ions diffuse out of the neuron

Use the following information to answer the next question.

An insecticide blocks the enzyme cholinesterase.

8. What is the most likely effect of the insecticide at a synapse between a motor neuron and a skeletal muscle?

A. No acetylcholine is released, so the muscle cannot contract.
B. Acetylcholine stays in the synaptic cleft, so the muscle keeps contracting.
C. Acetylcholine cannot bind to its receptors, so the muscle cannot contract.
D. Acetylcholine is broken down faster, so the muscle relaxes sooner.

9. An inhibitory neurotransmitter binds to receptors on a postsynaptic neuron. The inside of this neuron becomes

A. more negative, so it is less likely to reach the threshold level
B. more negative, so it is more likely to reach the threshold level
C. less negative, so it is less likely to reach the threshold level
D. less negative, so it is more likely to reach the threshold level

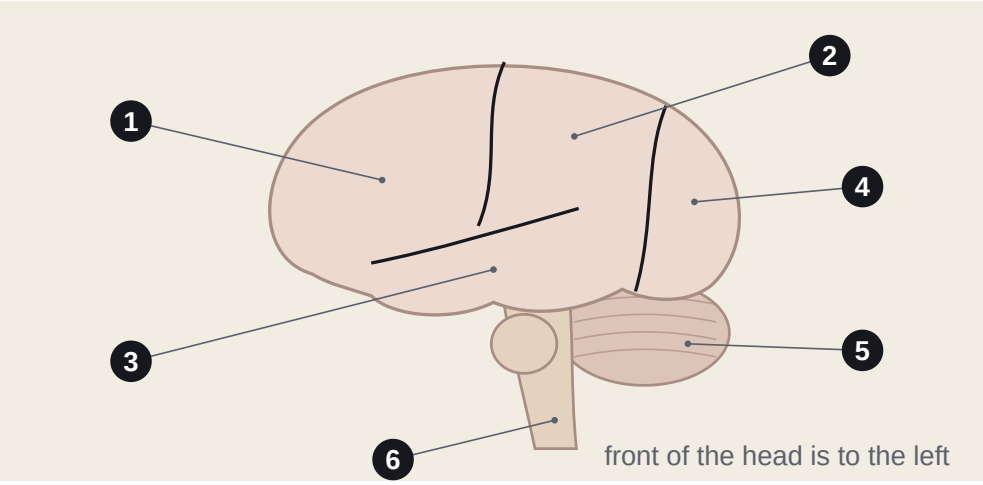
10. Which row gives two effects of the sympathetic nervous system?

A. Heart rate falls and peristalsis slows.
B. Heart rate rises and peristalsis slows.
C. Heart rate rises and the pupils constrict.
D. Heart rate falls and the pupils dilate.

11. A student chooses to raise a hand in class. The motor neurons to the arm muscles are part of the

A. central nervous system
B. sympathetic nervous system
C. parasympathetic nervous system
D. sensory-somatic nervous system

Use the following diagram to answer the next question.



12. Which number marks the lobe that receives and interprets information from the ears?

A. 1
B. 2
C. 3
D. 4

13. Which part of the brain controls breathing rate and heart rate?

A. Cerebellum
B. Cerebrum
C. Pons
D. Medulla oblongata

Use the following information to answer the next question.

A patient with a brain tumour staggers and cannot make smooth movements. The patient sees, hears and thinks normally.

14. The tumour is most likely pressing on the

A. cerebellum
B. occipital lobe
C. temporal lobe
D. hypothalamus

15. Which observation is an example of sensory adaptation?

A. A person pulls a hand away from a hot stove.
B. A person cannot see colours in dim light.
C. A person stops noticing the feel of a watch on the wrist.
D. A person feels dizzy after spinning on a chair.

16. To focus on a near object, the _____ changes the shape of the _____.

A. iris; pupil
B. ciliary muscle; lens
C. ciliary muscle; cornea
D. iris; lens

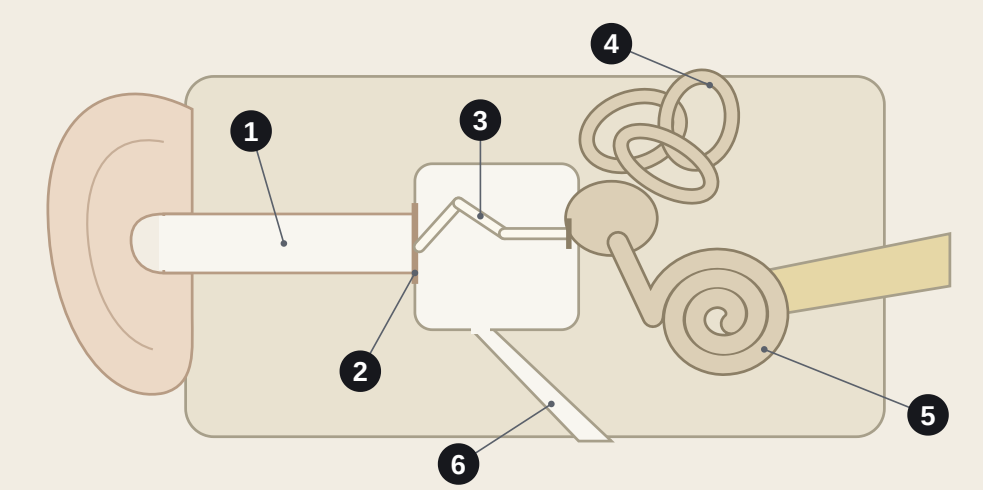
17. Which row describes myopia and the lens that corrects it?

A. The eyeball is too short; a convex lens
B. The eyeball is too short; a concave lens
C. The eyeball is too long; a concave lens
D. The eyeball is too long; a convex lens

18. Compared with the cones of the retina, the rods

A. need bright light and detect colour
B. need bright light and do not detect colour
C. work in dim light and detect colour
D. work in dim light and do not detect colour

Use the following diagram to answer the next question.



19. Which number marks the part that vibrates when sound waves reach the end of the auditory canal?

A. 1
B. 2
C. 3
D. 5

20. Which structure detects a turning movement of the head?

A. Semicircular canals
B. Cochlea
C. Ossicles
D. Auditory canal

Use the following information to answer the next question.

A person has eaten almost no iodine for many months. The thyroid gland of this person makes very little thyroxine.

21. Compared with normal, the level of TSH in this person's blood is

A. low, because TSH is made from iodine
B. high, because little thyroxine is present to inhibit the pituitary gland
C. low, because the thyroid gland is not working
D. high, because thyroxine stimulates the pituitary gland

22. When blood calcium falls below normal, the body releases

A. calcitonin, and the bones take in calcium
B. calcitonin, and the bones release calcium
C. PTH, and the bones release calcium
D. PTH, and the bones take in calcium

23. ACTH acts on the _____, which then releases _____.

A. adrenal cortex; cortisol
B. adrenal cortex; epinephrine
C. adrenal medulla; cortisol
D. adrenal medulla; epinephrine

24. One hour after a large meal, the pancreas of a healthy person releases

A. glucagon from the alpha cells, and the liver stores glucose as glycogen
B. glucagon from the beta cells, and the liver changes glycogen into glucose
C. insulin from the alpha cells, and the liver changes glycogen into glucose
D. insulin from the beta cells, and the liver stores glucose as glycogen

Numerical response

Record your answer as digits. Start in the left-hand box.

1. Four events of an action potential are numbered below. Record the numbers in the order in which the events happen.

1 Potassium channels open
2 The threshold level is reached
3 Sodium ions rush into the neuron
4 The sodium-potassium pump restores the resting potential

Record all four digits of your answer.

Answer: ___ ___ ___ ___

Use the following information to answer the next question.

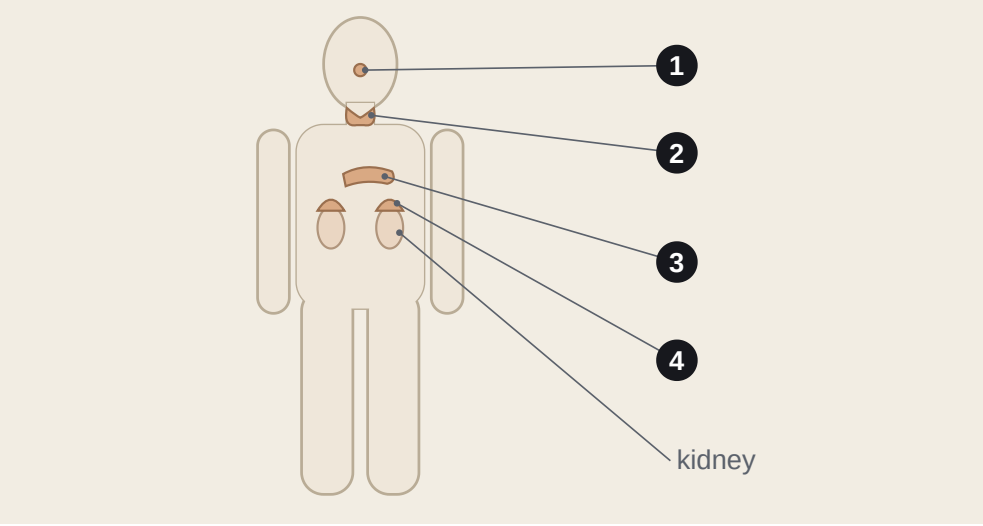
The blood sugar of a healthy person is 5.0 mmol/L before a meal. It reaches 9.5 mmol/L forty minutes after the meal.

2. Calculate the rise in blood sugar, in mmol/L.

Record your answer to one decimal place.

Answer: ___ ___ ___ ___

Use the following diagram to answer the next question.



3. Record the number of the gland that releases ADH, then the gland that releases insulin, then thyroxine, then cortisol.

Record all four digits of your answer.

Answer: ___ ___ ___ ___

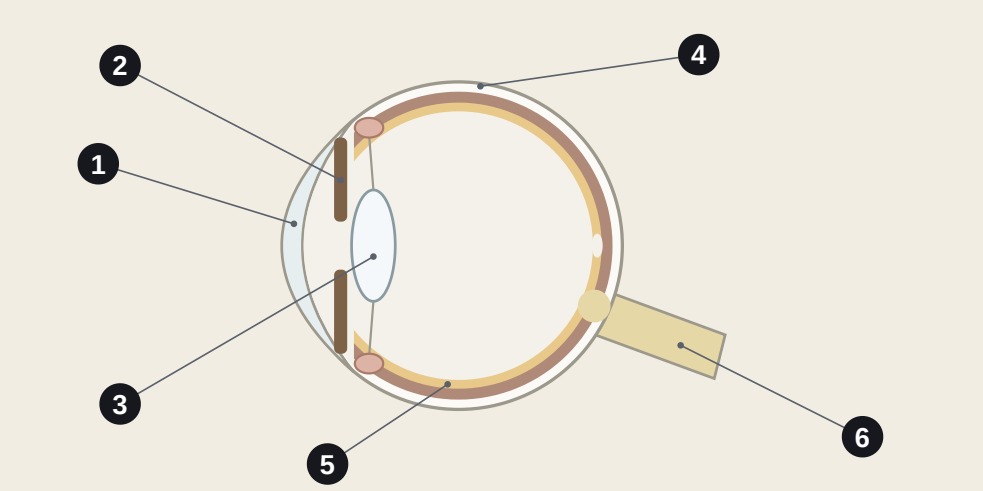
4. A runner loses a lot of water as sweat. Record the numbers of the events below in the order in which they happen.

1 The posterior lobe of the pituitary gland releases ADH
2 The kidneys return more water to the blood
3 Osmoreceptors in the hypothalamus detect concentrated blood
4 The osmotic pressure of the blood returns to normal

Record all four digits of your answer.

Answer: ___ ___ ___ ___

Use the following diagram to answer the next question.



5. Record the number of the part that bends light as it enters the eye, then the part that controls the size of the pupil, then the part that holds the rods and cones, then the part that carries action potentials to the brain.

Record all four digits of your answer.

Answer: ___ ___ ___ ___

6. Record the numbers of the structures below in the order in which sound passes through them.

1 Cochlea
2 Ossicles
3 Auditory canal
4 Tympanum

Record all four digits of your answer.

Answer: ___ ___ ___ ___