

1. The medulla oblongata is a region of the brainstem. It regulates the activity of several organs within the human body.

Which of the following would result from the action of the medulla oblongata via the sympathetic nervous system?

- A sweat is produced
- B heart rate decreases
- C heart rate increases
- D ventilation rate decreases

Your answer

[1]

2. Neurotransmitters such as gamma-aminobutyric acid (GABA) are found at synapses within the human brain and are known as inhibitory neurotransmitters.

GABA binds to receptors in the post-synaptic membrane and causes potassium ion channels to open. This prevents an action potential in the post-synaptic neurone.

An action potential is prevented because potassium ions diffuse:

- A out of the post-synaptic neurone causing depolarisation
- B out of the post-synaptic neurone causing hyperpolarisation
- C into the post-synaptic neurone causing depolarisation
- D into the post-synaptic neurone causing hyperpolarisation

Your answer

[1]

3. The Na^+/K^+ pump helps to maintain the resting potential across the membrane of a neurone.

Which of the statements about the pump's activity, **A** to **D**, is correct?

A for every three Na^+ ions that enter the cell, two Ca^{2+} ions leave

B for every three Na^+ ions that leave the cell, two Ca^{2+} ions enter

C for every three Na^{2+} ions that enter the cell, two K^+ ions leave

D for every three Na^{2+} ions that leave the cell, two K^+ ions enter

Your answer

[1]

4. A study was conducted to determine the effect of alcohol on reaction time.

Twenty participants were asked to respond as fast as possible to visual cues, before and after drinking a fixed quantity of alcohol. Two data sets were produced.

Which of the options, **A** to **D**, would be the appropriate statistical method for analysing the data from this study?

- A chi squared test
- B paired Student's t-test
- C unpaired Student's t-test
- D Spearman's rank correlation coefficient

Your answer

[1]

5. Cannabis contains a chemical that affects synaptic transmission.

Which of the options, **A** to **D**, correctly describes how synaptic transmission is affected by this chemical?

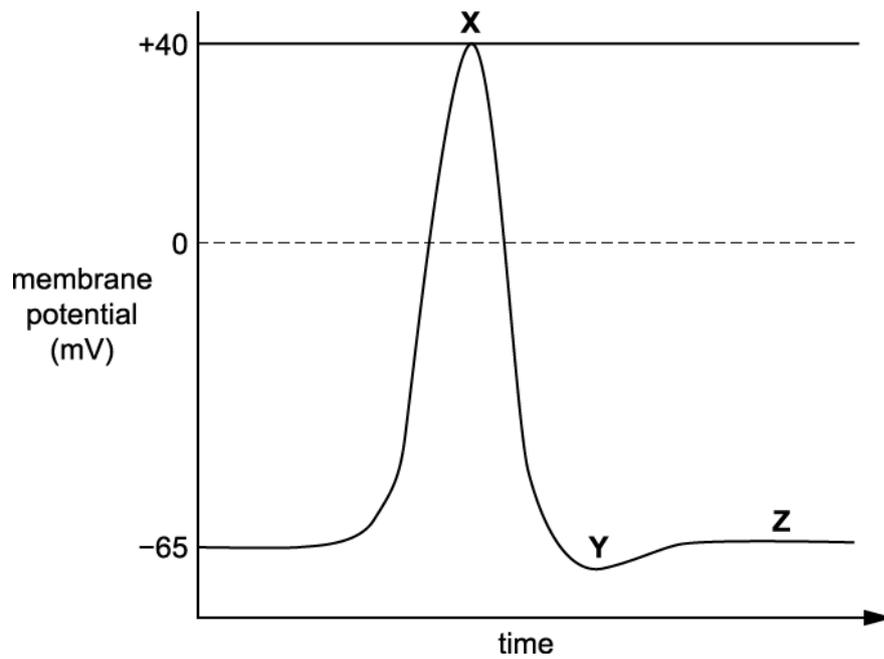
- A dopamine receptors are bound
- B degradation of dopamine is blocked
- C release of an inhibitory neurotransmitter is prevented
- D release of an inhibitory neurotransmitter is promoted

Your answer

[1]

6. The graph below shows changes in the membrane potential of an axon during a nerve impulse.

Three points on the graph are labelled X, Y and Z.



Which of the following statements is/are correct?

- 1 At point X, Na^+ ion channels close.
- 2 Point Y ensures the action potential can only travel in one direction.
- 3 Active pumping of K^+ ions out of the axon contributes to the membrane potential at point Z.

- A 1, 2 and 3 are correct
- B Only 1 and 2 are correct
- C Only 2 and 3 are correct
- D Only 1 is correct

Your answer

[1]

7. The statements below relate to the autonomic nervous system (ANS).

Which of the following statements is/are correct?

- 1 The ANS is a division of the peripheral nervous system.
 - 2 Autonomic neurones between the CNS and the ganglia are myelinated.
 - 3 Sympathetic neurones use acetylcholine and noradrenaline as neurotransmitters.
- A 1, 2 and 3 are correct
 - B Only 1 and 2 are correct
 - C Only 2 and 3 are correct
 - D Only 1 is correct

Your answer

[1]

8. Excitatory and inhibitory postsynaptic potentials have similarities and differences.

Which of the options, A to D, is a feature of an excitatory, but not inhibitory, postsynaptic potential?

- A all-or-nothing response
- B depolarising
- C graded in response
- D hyperpolarising

Your answer

[1]

END OF QUESTION PAPER

Mark Scheme

| Question | | | Answer/Indicative content | Marks | Guidance |
|----------|--|--|---------------------------|-------|---|
| 1 | | | C | 1 | |
| | | | Total | 1 | |
| 2 | | | B | 1 | |
| | | | Total | 1 | |
| 3 | | | D | 1 | |
| | | | Total | 1 | |
| 4 | | | B | 1 | |
| | | | Total | 1 | |
| 5 | | | C ✓ | 1 | |
| | | | Total | 1 | |
| 6 | | | B ✓ | 1 | |
| | | | Total | 1 | |
| 7 | | | A ✓ | 1 | <p>Examiner's Comments This question brought together various pieces of information about the autonomic nervous system. Incorrect response B was most common which indicated that some candidates had overlooked the fact that the pre-ganglionic neurotransmitter in the sympathetic nervous system is acetylcholine.</p> |
| | | | Total | 1 | |
| 8 | | | B | 1 | |
| | | | Total | 1 | |