

## Extended Response – Nervous system

### 1. Explain how a nerve impulse is generated and propagated along a neuron.

- A \_\_\_\_\_ will cause sodium \_\_\_\_\_ - \_\_\_\_\_ channels on the dendrite to open up and \_\_\_\_\_ to rush in.
- $\text{Na}^+$  travels through the soma to axon \_\_\_\_\_. If the sodium ion concentration is \_\_\_\_\_, then \_\_\_\_\_ sodium channels open up and a great amount of  $\text{Na}^+$  rushes in.
- A great influx of sodium ions results in the \_\_\_\_\_ potential to rise to \_\_\_\_\_. This is the \_\_\_\_\_ potential.
- Once the threshold is reached more  $\text{Na}^+$  channels open and more  $\text{Na}^+$  diffuse to the inside of the membrane. This is known as \_\_\_\_\_.
- During depolarisation, the \_\_\_\_\_ becomes more positive in relation to the \_\_\_\_\_ as more  $\text{Na}^+$  move in and the voltage rises quickly to \_\_\_\_\_.
- As soon as the voltage reaches +30mV, \_\_\_\_\_ channels close and \_\_\_\_\_ voltage-gated channels open up. Potassium ions ( $\text{K}^+$ ) diffuse out of the neuron, from inside the membrane to the outside.
- This is known as \_\_\_\_\_. During repolarisation, the inside becomes \_\_\_\_\_ once again and the outside \_\_\_\_\_.
- This depolarisation-repolarisation is known as \_\_\_\_\_. An action potential stimulates the sodium channels in the adjacent section of the neuron to open up, permitting \_\_\_\_\_ to take place in that section.
- Once a section has undergone an action potential, it cannot be \_\_\_\_\_ again and it is known to be in a \_\_\_\_\_ period.
- During repolarisation, the potassium channels close \_\_\_\_\_, allowing more \_\_\_\_\_ to diffuse out of the membrane. This brings the potential below \_\_\_\_\_ potential or \_\_\_\_\_. This dip in voltage is known as \_\_\_\_\_.
- During hyperpolarisation, no depolarisation can take place unless the stimulus is much \_\_\_\_\_ than the previous one.
- A refractory period ensures that an action potential does not \_\_\_\_\_, but instead keep going in \_\_\_\_\_ direction- from \_\_\_\_\_ to \_\_\_\_\_ terminal.
- If the axon is \_\_\_\_\_, then action potentials take place between Schwann cells- at the \_\_\_\_\_ at a much \_\_\_\_\_ pace.

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### 2. Explain how a nerve impulse is transmitted across a synapse.

- An \_\_\_\_\_ reaches the \_\_\_\_\_.
- \_\_\_\_\_ ion channels are stimulated to open up.
- \_\_\_\_\_ ions rush in.
- This results in the migration of the \_\_\_\_\_ containing \_\_\_\_\_ acetylcholine towards the membrane of the \_\_\_\_\_ neuron.
- Vesicles then undergo \_\_\_\_\_ with the membrane.
- Vesicles release their neurotransmitters using the process of \_\_\_\_\_ - an \_\_\_\_\_ mechanism.
- Neurotransmitters \_\_\_\_\_ across the synapse and \_\_\_\_\_ to \_\_\_\_\_ on the \_\_\_\_\_ membrane.
- The binding of neurotransmitters to receptors open up voltage-gated \_\_\_\_\_ channels on the \_\_\_\_\_ neuron.
- sodium ion \_\_\_\_\_ takes place, which may result in an \_\_\_\_\_ given the potential difference reaches the \_\_\_\_\_.
- \_\_\_\_\_ in the synaptic cleft are either \_\_\_\_\_ by the \_\_\_\_\_ or pushed back into the \_\_\_\_\_ neuron.