

# Nervous System

## Question Paper 1

<b>Level</b>	International A Level
<b>Subject</b>	Biology
<b>Exam Board</b>	Edexcel
<b>Topic</b>	Coordination, Response, Gene Technology
<b>Sub-Topic</b>	Nervous system
<b>Booklet</b>	Question paper 1

**Time Allowed:** 23 minutes

**Score:** /19

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 Organisms need to coordinate responses to changes in their environment.  
The mechanism of coordination in animals can be nervous or hormonal.

(a) Place a cross ☒ in the box next to the answer that correctly compares nervous coordination with hormonal coordination.

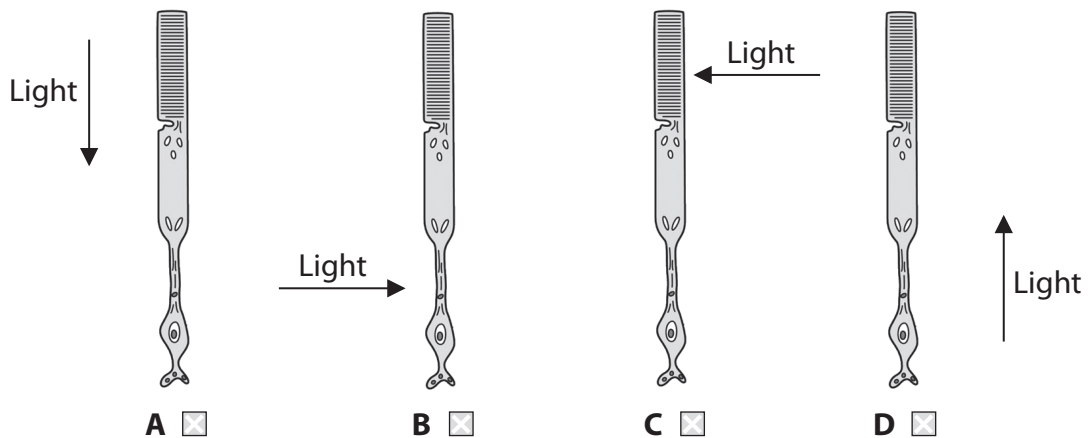
(1)

- A** nervous coordination is faster and lasts for a longer time
- B** nervous coordination is faster and lasts for a shorter time
- C** nervous coordination is slower and lasts for a longer time
- D** nervous coordination is slower and lasts for a shorter time

(b) The response to light in humans involves rod cells as receptors.

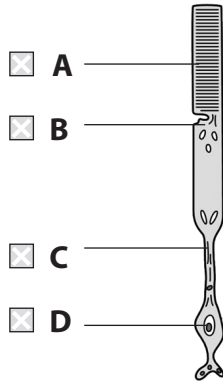
(i) Place a cross ☒ in the box below the diagram that shows the direction light takes when it stimulates a rod cell.

(1)



- (ii) Place a cross  in the box next to the part of the rod cell that contains rhodopsin.

(1)



- (iii) Place a cross  in the box next to the description of what happens when a molecule of rhodopsin is bleached by light.

(1)

- A opsin changes to retinal
- B retinal changes to opsin
- C trans-retinal changes to cis-retinal
- D cis-retinal changes to trans-retinal

- (iv) Bleaching of rhodopsin leads to hyperpolarisation of the rod cell membrane. Place a cross  in the box next to the description of what happens during hyperpolarisation.

(1)

- A sodium ion channels close while the sodium ion pump stops working
- B sodium ion channels close while the sodium ion pump continues to work
- C sodium ion channels open while the sodium ion pump continues to work
- D sodium ion channels open while the sodium ion pump stops working

(c) Coordination in plants involves IAA (auxin).

In an experiment, 25 mm lengths of stem were cut and placed in five dishes. A different concentration of IAA was added to each dish. The dishes were left for 24 hours and the mean increase in stem length was recorded.

The results are shown in the table below.

Dish	IAA concentration / $\text{mg dm}^{-3}$	Mean increase in stem length / mm
1	0.00	$2.5 \pm 1.0$
2	0.01	$2.1 \pm 1.5$
3	0.10	$5.0 \pm 1.1$
4	1.00	$6.8 \pm 4.0$
5	10.00	$7.8 \pm 3.2$

(i) Use the information in the table to describe the effect of IAA concentration on the mean increase in stem length.

(2)

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(ii) Suggest **one** other variable that needs to be controlled in this experiment.

(1)

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(iii) It is important that the calculated means are reliable.

Using the information in the table, state the mean result that is the **least** reliable. Give a reason for your answer.

(1)

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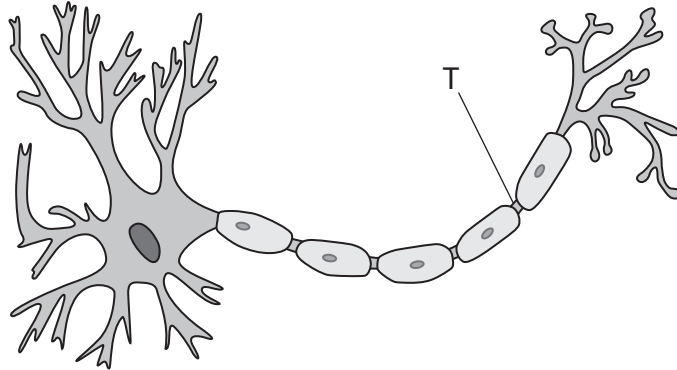
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**(Total for Question 2 = 9 marks)**

2 Nerve impulses are transmitted along the axon of a neurone.

(a) The diagram below shows the structure of a motor neurone.

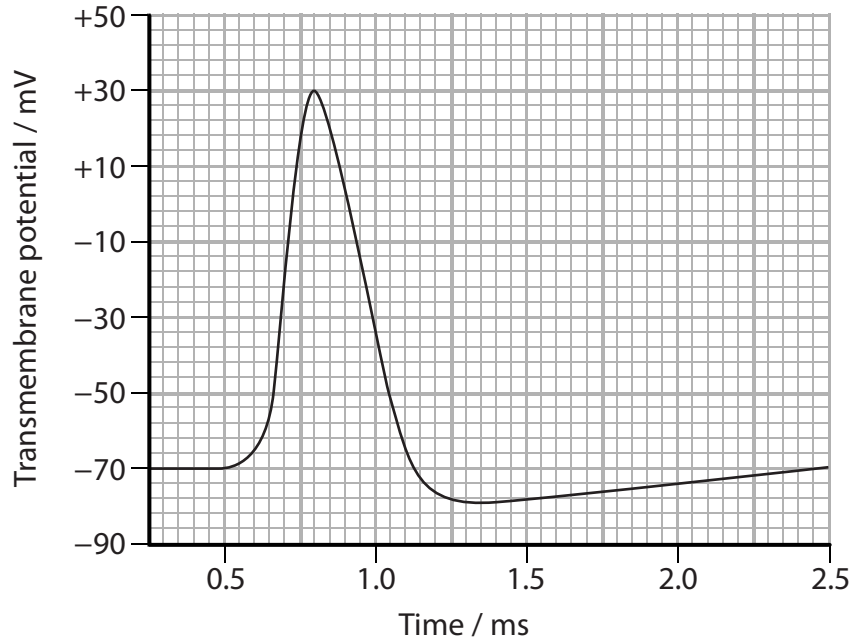


(i) Place a cross ☒ in the box next to the part of the neurone labelled T.

(1)

- A** dendrite
- B** node of Ranvier
- C** Schwann cell
- D** synapse

(ii) The graph below shows changes in the membrane potential during the transmission of an impulse along the axon of a motor neurone.



Place a cross  in the box next to the description of the membrane potential at 0.75 ms on the graph.

(1)

- A** depolarised
- B** hyperpolarised
- C** polarised
- D** repolarised

(iii) Explain how the structure of this motor neurone affects the speed of the impulse along the axon.

(2)

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(ii) Suggest why the neurones of the golden poison frog are not affected if they come into contact with the poison.

(2)

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**(Total for Question 3 = 10 marks)**