

The Human Nervous System

Question Paper

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|-------------------------|--------------------------------------|
| Level | GCSE (9-1) |
| Subject | Combined Science – Trilogy - Biology |
| Exam Board | AQA |
| Topic | 4.5 Homeostasis and Response |
| Sub-Topic | The Human Nervous System |
| Difficulty Level | Gold Level |
| Booklet | Question Paper |

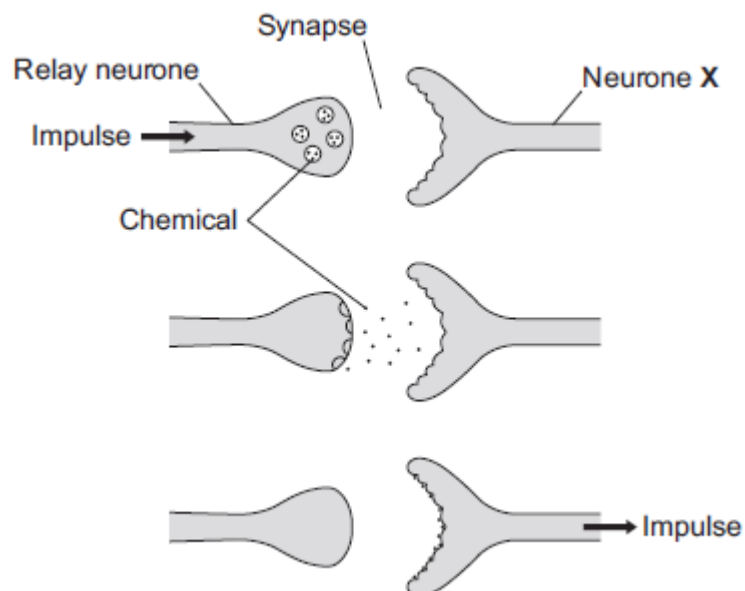
Time Allowed: 40 minutes

Score: / 40

Percentage: /100

Grade Boundaries:

Q1. The diagram below shows how a nerve impulse passing along a relay neurone causes an impulse to be sent along another type of neurone, neurone **X**.



(a) What type of neurone is neurone **X**?

.....

(1)

(b) Describe how information passes from the relay neurone to neurone **X**.
Use the diagram to help you.

.....

(3)

(c) Scientists investigated the effect of two toxins on the way in which information

passes across synapses. The table below shows the results.

| Toxin | Effect at the synapse |
|------------|--|
| Curare | Decreases the effect of the chemical on neurone X |
| Strychnine | Increases the amount of the chemical made in the relay neurone |

Describe the effect of each of the toxins on the response by muscles.

Curare

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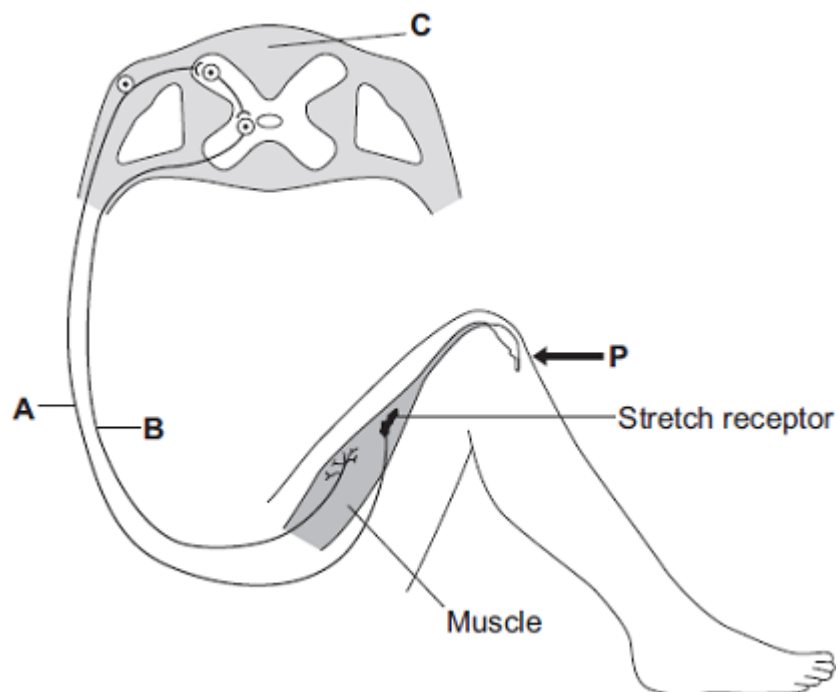
Strychnine

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(2)
(Total 6 marks)

Q2. The diagram shows the structures involved in the knee-jerk reflex. When the person is hit at point **P**, the lower leg is suddenly raised.



- (a) Name the structures labelled **A**, **B** and **C**.

A

B

C

(3)

- (b) How is information passed across a synapse?

.....

.....

(1)

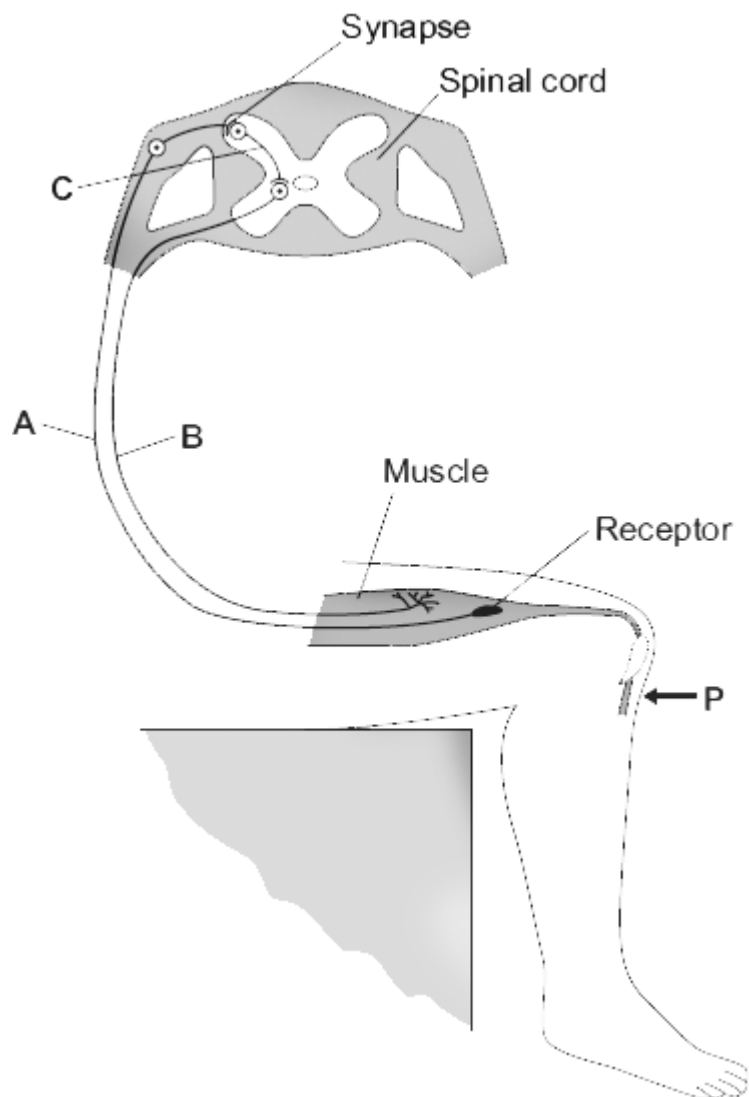
- (c) What is the effector in this response?

.....

(1)

(Total 5 marks)

Q3. The diagram shows the nervous pathway used to coordinate the knee-jerk reflex. When the person is hit at point **P**, the lower leg is suddenly raised.



- (a) Name neurones **A**, **B** and **C**.

A

B

C

(3)

- (b) The receptor in the muscle in the leg is sensitive to a stimulus.

Suggest the stimulus.

.....

(1)

- (c) Describe what happens at the synapse during this reflex.

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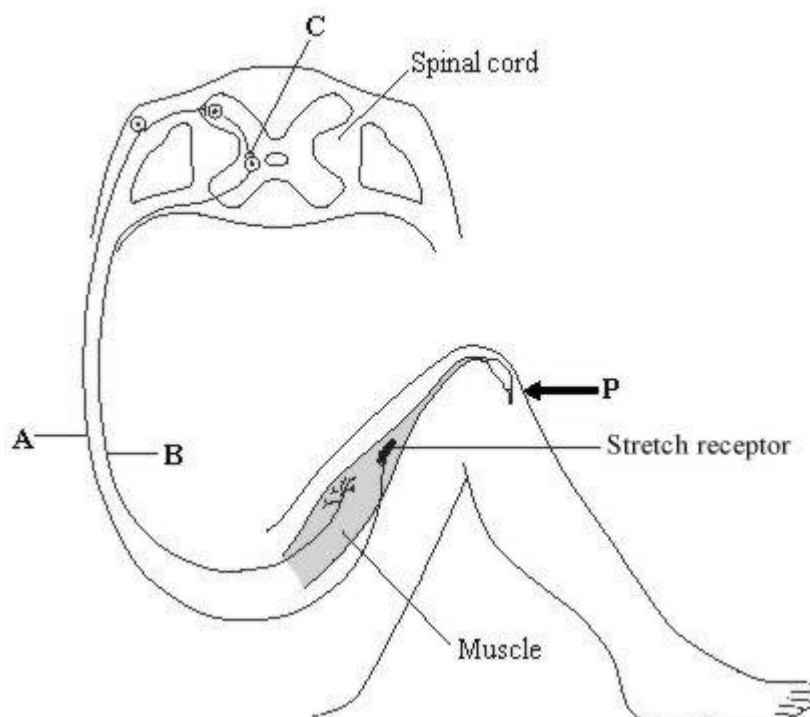
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(3)
(Total 7 marks)

- Q4.** The diagram shows the nervous pathway which is used to coordinate the knee-jerk reflex. When the person is hit at point **P**, the lower leg is suddenly raised.



- (a) (i) Name the type of neurone labelled **A**.

(1)

- (ii) **On the diagram**, draw arrows next to the neurones labelled **A** and **B** to show the direction in which an impulse moves in each neurone.

(1)

- (b) How is information passed across the synapse at **C**?

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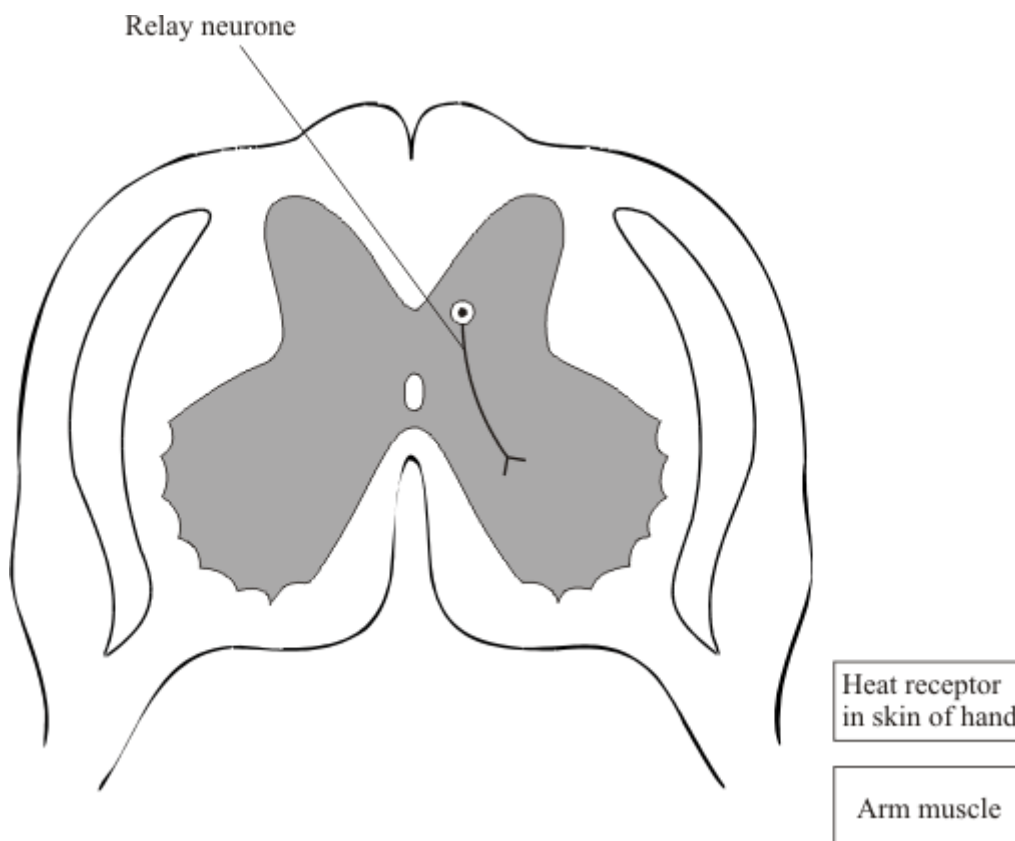
(1)

- (c) **On the diagram**, label the effector with the letter **X**.

(1)

(Total 4 marks)

Q5. The diagram shows a section through the spinal cord.



- (a) Coordination of a reflex movement of the arm, in response to the hand touching a hot object, involves three neurones. One of these, the relay neurone, is shown in the diagram. Complete the nerve pathway between the receptor and the muscle on the diagram by drawing and labelling:

- (i) the sensory neurone;
- (ii) the motor neurone.

(2)

- (b) The nerve pathway linking the heat receptor in the hand with the arm muscle is about 1.5 metres in length. It would take the nervous impulse 0.02 seconds to travel this distance along a neurone. However, it takes about 0.5 seconds for the arm to start moving during the reflex response to the heat stimulus.

Explain the difference.

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(2)
(Total 4 marks)

Q6. The doctor is testing the child's nervous system by tapping the tendon just below the knee.

This pulls cells which are sensitive to stretching.



(a) What are cells which are sensitive to stimuli called?

.....
(1)

(b) These cells send information to the spinal cord.

In what form is this information sent?

.....
.....
(2)

(c) The healthy response to the stimulus is the straightening of the leg.

What is the effector in this response?

(1)

- (d) This response is one example of a reflex action.

Describe **one other** example of a reflex action in terms of:

stimulus → receptor → coordinator → effector → response

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(5)

(Total 9 marks)

Q7. A dog runs across the road in front of a car. The driver slams her foot on the brakes.

- (i) Explain how the nervous system brings about this response.

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(4)

- (ii) Explain why alcohol consumption would affect the driver's response.

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(1)
(Total 5 marks)