

15.1 Control & Coordination in Mammals

Question Paper

Course	CIEA Level Biology
Section	15. Control & Coordination
Topic	15.1 Control & Coordination in Mammals
Difficulty	Easy

Time allowed: 40
Score: /29
Percentage: /100

Question 1a

Fig. 1 shows a diagram of a motor neurone.

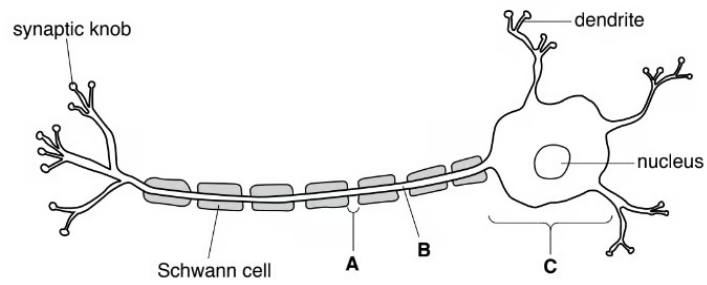


Fig. 1

Name the structures labelled **A**, **B** and **C** on Fig. 1.

[3 marks]

Question 1b

Describe the function of a motor neurone.

[2 marks]

Question 1c

With reference to Fig. 1, explain the fast transmission of impulses along a motor neurone.

[4 marks]

Question 2a

Fig. 1 shows changing membrane potential in an axon within a human leg.

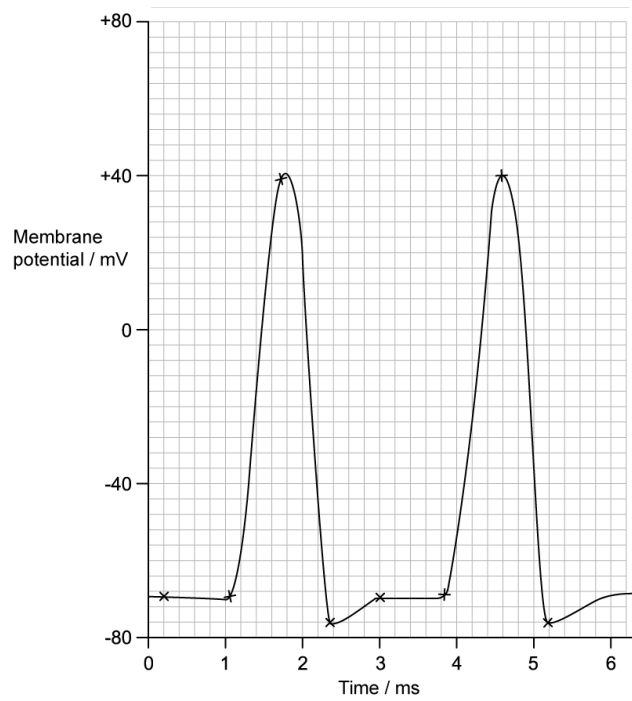


Fig. 1

(i)
Identify the type of membrane potential present in the axon at **0.5 ms** in Fig. 1.

[1]

(ii)
Explain how the membrane potential identified in part (i) has been achieved in the axon.

[2]

[3 marks]

Question 2b

At 1 ms in Fig. 1 the membrane is stimulated.

State what happens **within the membrane** at **1 ms** as a result of this stimulation.

[1 mark]

Question 2c

Explain the shape of the curve between 1 – 1.8 ms in Fig. 1.

[3 marks]

Question 2d

Assuming that the intensity of stimulation remains constant, calculate how many complete action potentials will occur in 1 second in the neurone shown in Fig. 1. Note that there are 1000 ms in a second.

[2 marks]

Question 3a

Fig. 1 shows a representation of a junction between two neurones.

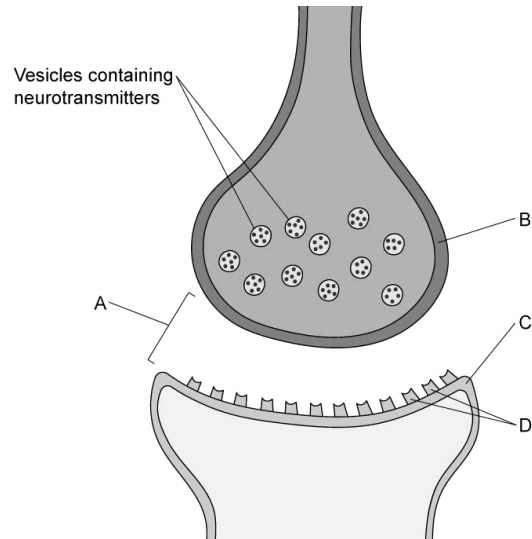


Fig. 1

Identify structures **A-C** in Fig. 1.

[3 marks]

Question 3b

Fig. 1 shows that the junctions between neurones contain molecules known as neurotransmitters.

Outline how neurotransmitters interact with the structures labelled **D** to bring about an action potential in the new neurone.

[2 marks]

Question 3c

The junctions between motor neurones and muscles are specialised versions of the structure illustrated in Fig. 1.

(i)
Name the specialised junctions between motor neurones and muscles.

[1]

(ii)
Give **one** difference between the processes that take place in the structure named in part (i) and those that occur in the structure illustrated in Fig. 1.

[1]

[2 marks]

Question 3d

Fig. 2 shows a representation of a sarcomere from striated muscle. When an impulse arrives at the structure named in part (c) (i), striated muscle can be stimulated to contract.

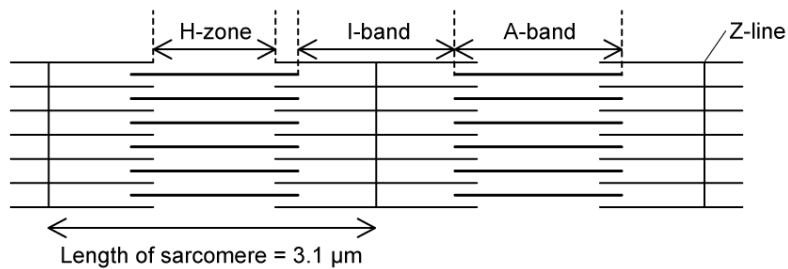


Fig. 2

(i)
When the sarcomere contracts it reduces in length by 9.5 %.

Calculate the length of a contracted sarcomere.

[2]

(ii)
Other than an overall reduction in length, state **two specific** changes that will occur in Fig. 2 as a result of stimulation of the striated muscle.

[2]

[4 marks]

