



Rewarding Learning

ADVANCED

General Certificate of Education

2015

Centre Number

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Candidate Number

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# Biology

Assessment Unit A2 1

*assessing*

Physiology and Ecosystems



[AB211]

THURSDAY 21 MAY, AFTERNOON

## TIME

2 hours, plus your additional time allowance.

## INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

There is an extra lined page at the end of the paper if required.

Answer **all nine** questions.

You are provided with **Photograph 1.4** for use with Question 4 in this paper.

Do not write your answers on this photograph.

## INFORMATION FOR CANDIDATES

The total mark for this paper is 90.

Section A carries 72 marks. Section B carries 18 marks.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You are reminded of the need for good English and clear presentation in your answers. Use accurate scientific terminology in all answers.

You should spend approximately **25 minutes** on Section B.

You are expected to answer Section B in continuous prose.

**Quality of written communication** will be assessed in Section B, and awarded a maximum of 2 marks.

For Examiner's use only

| Question Number | Marks |
|-----------------|-------|
| 1               |       |
| 2               |       |
| 3               |       |
| 4               |       |
| 5               |       |
| 6               |       |
| 7               |       |
| 8               |       |
| 9               |       |

Total Marks

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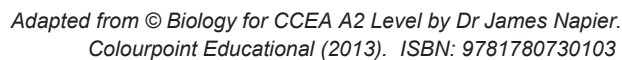
The depletion of the ozone layer has resulted in increased penetration of UV light, causing an increased risk of skin cancer and \_\_\_\_\_. Acid rain also harms the atmosphere. It results from the combustion of fossil fuels as a consequence of \_\_\_\_\_ reacting with water. [2]

- Ozone depletion

- Acid rain

[2]

| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |



- 
- [1]

- GPP = \_\_\_\_\_ [1]

- 
- 
- [1]

9447.09 ML

**(i)** Explain precisely what is meant by the term monoculture.

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[1]

(ii) Explain how monocultures can harm:

- soil quality

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- animal biodiversity

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[2]

| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |
|               |        |

| Length of continuous dark period/hours | Length of continuous light period/hours | Flowering outcome |
|----------------------------------------|-----------------------------------------|-------------------|
| 16                                     | 8                                       | no flowering      |
| 14                                     | 10                                      | no flowering      |
| 12                                     | 12                                      | no flowering      |
| 10                                     | 14                                      | flowering         |
| 8                                      | 16                                      | flowering         |

(i) What is the evidence that this species is a long-day plant?

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[1]

**(ii)** Suggest why the investigation was carried out in a laboratory rather than field (outdoor) conditions.

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[1]

**(iii)** Describe how this investigation could be extended to give a more precise value for the photoperiod required to promote flowering.

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[1]

| Examiner Only |         |
|---------------|---------|
| Marks         | Remarks |
|               |         |



- (c) The human eye is normally able to distinguish different colours. However, in one form of red-green colour blindness, individuals are unable to distinguish between red and green colours.

With regard to the function of the retina, suggest the biological basis of this type of colour blindness.

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 [1]

| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |
|               |        |



The graph illustrates the relationship between Biological Oxygen Demand (BOD) and Time. The vertical axis is labeled 'Biological Oxygen Demand' and the horizontal axis is labeled 'Time'. A curve starts at a baseline level. At a point marked by an upward arrow labeled 'Pollution incident', the curve rises sharply to a peak and then gradually declines, eventually returning to the baseline level.

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[ ]9447.09 ML





Using your knowledge and the information provided:

- (i)** Describe the process of coppicing and its effect on trees.

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 [2]

- (ii) Describe and explain **one** way in which coppicing can promote biodiversity.

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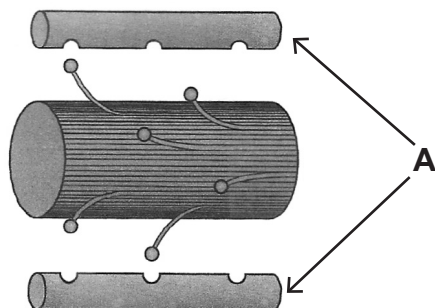
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[2]

| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |
|               |        |



(i) Identify protein **A**.

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 [1]

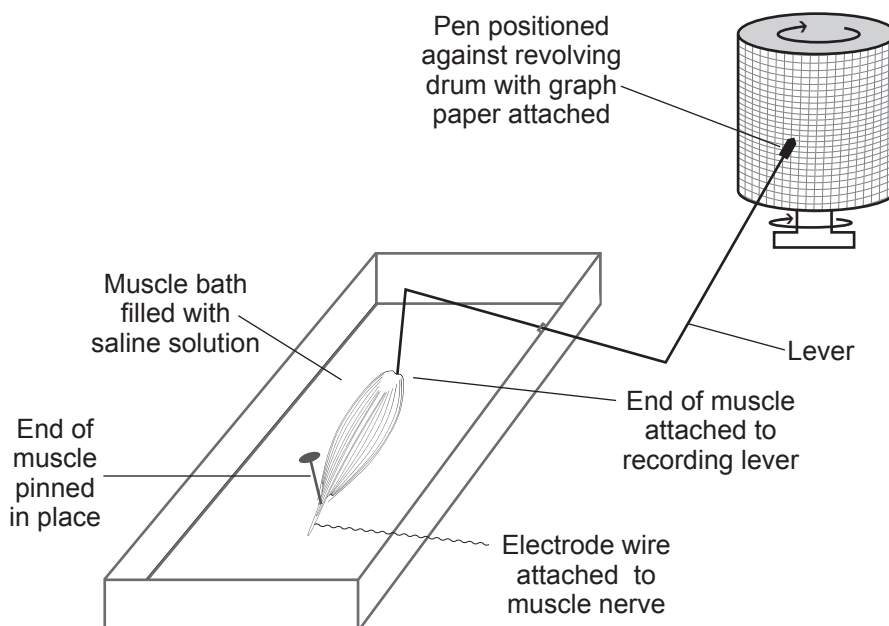
**(ii)** Explain the process of muscle contraction in a myofibril following nervous stimulation.

[illegible]

| Examiner Only |         |
|---------------|---------|
| Marks         | Remarks |
|               |         |

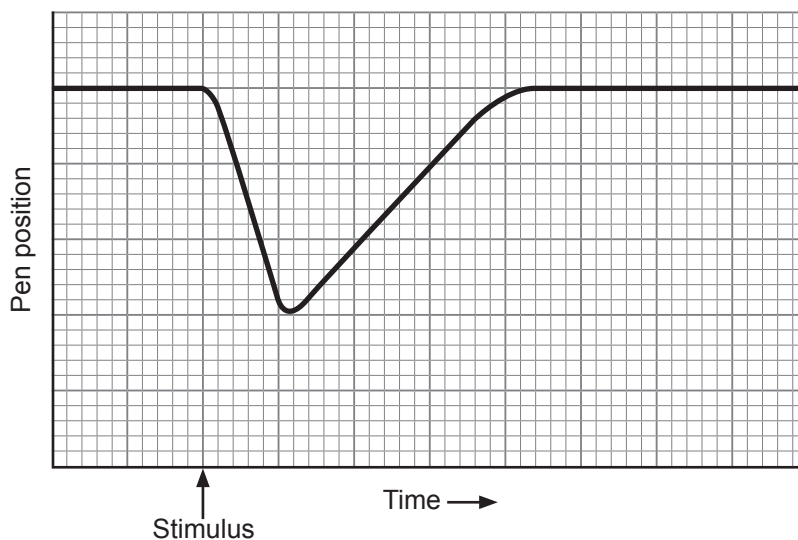
- (b) An experiment was carried out to investigate muscle contraction in skeletal muscle. This type of investigation uses muscles obtained from freshly killed animals. The experimental set-up is shown in diagram A.

**Diagram A**



If a single electrical stimulus is applied to the muscle (by the electrode wire), the following trace (graph line) is produced on the graph paper on the revolving drum.

**Diagram B**



- (i) On diagram B above, mark with an X, a part of the trace that represents muscle contraction.

[1]



In September 2013, people who were 70 years old became eligible for shingles vaccination as part of NHS policy.

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- [1]

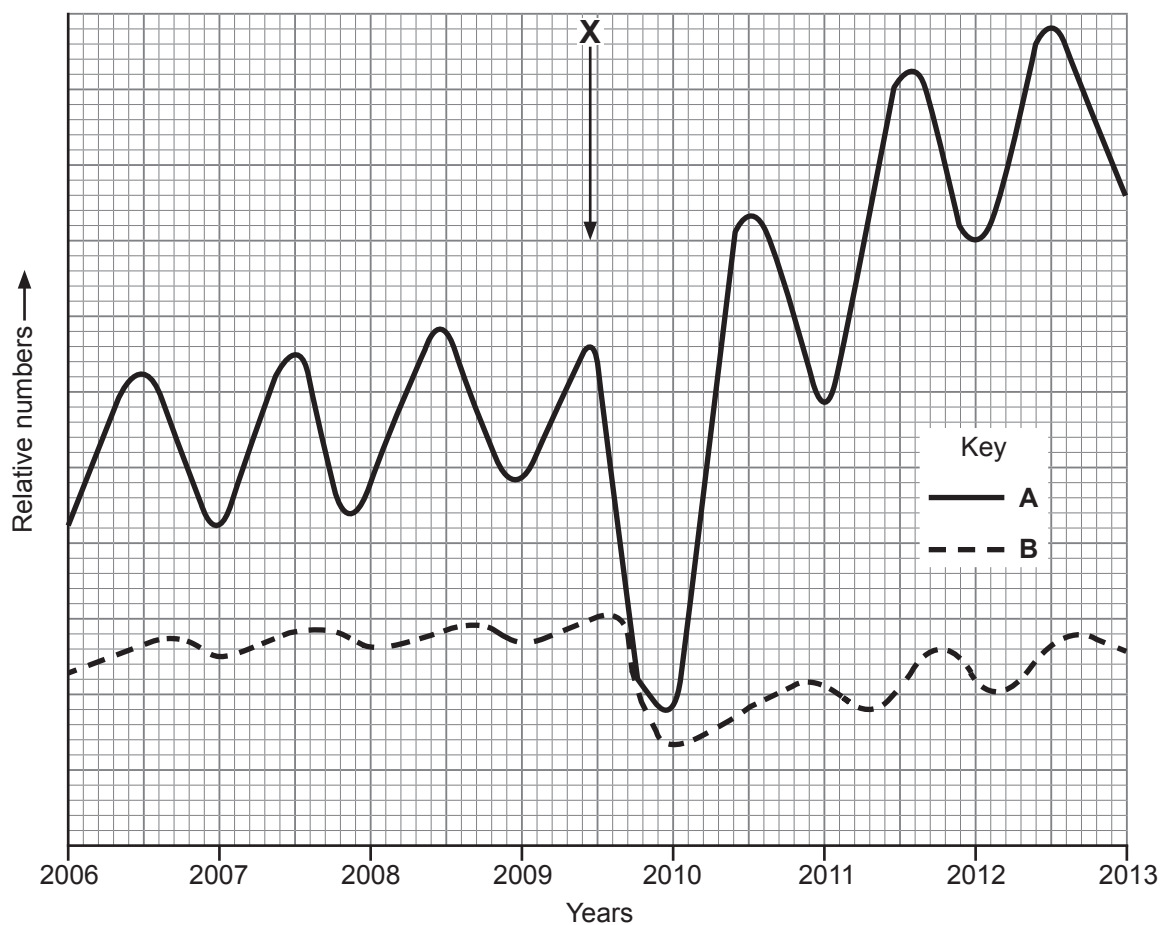
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- [1]

9447.09 ML

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- [illegible]

| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |



- (i) Give **one** piece of evidence from the graph that indicates that **A** is the pest (prey) and **B** is the predator.

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[1]

| Examiner Only |         |
|---------------|---------|
| Marks         | Remarks |
|               |         |





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[1]

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[2]

1. \_\_\_\_\_
2. \_\_\_\_\_

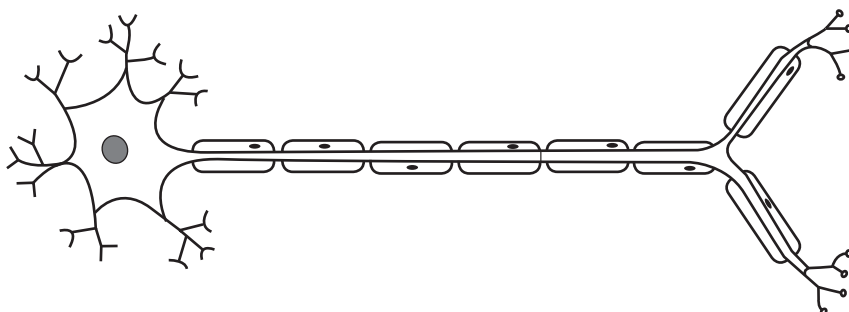
[2]

| Examiner Only |         |
|---------------|---------|
| Marks         | Remarks |
|               |         |

## Section B

Quality of written communication is awarded a maximum of 2 marks in this section.

- 9 Neurones are specialised cells, highly adapted for rapid nervous communication throughout the body. The diagram below represents a motor neurone.



*Adapted from © Biology for CCEA A2 Level by Dr James Napier.  
Colourpoint Educational (2013). ISBN: 9781780730103*

- (a) Using the diagram and your knowledge, describe and explain how neurones are adapted for their function. Your answer should refer to how nerve impulses are initiated, propagated and passed on. [12]
- (b) Nervous communication involves synaptic transmission. While they may limit the speed of nervous transmission, synapses have a necessary role in coordination and control. Outline why synapses are important. [4]

Quality of written communication [2]

- (a) Using the diagram and your knowledge, describe and explain how neurones are adapted for their function. Your answer should refer to how nerve impulses are initiated, propagated and passed on.

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| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |
|               |        |



[illegible]

**[Turn over**

***Extra lined page***

| Examiner Only |        |
|---------------|--------|
| Marks         | Remark |
|               |        |

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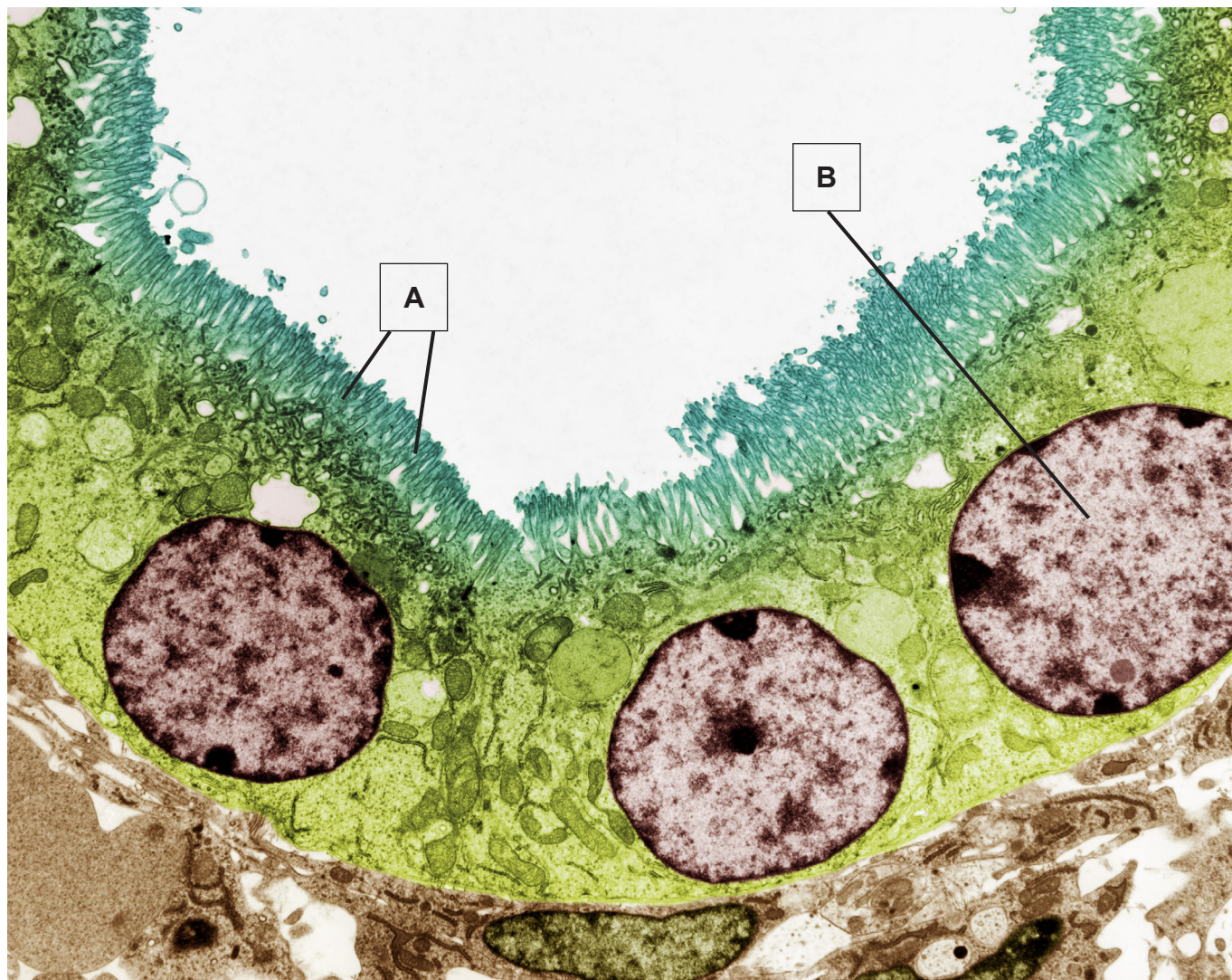
**THIS IS THE END OF THE QUESTION PAPER**

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GCE Biology Advanced (A2)  
Assessment Unit A2 1  
Physiology and Ecosystems  
2015

Photograph 1.4  
(for use with Question 4)



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