



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

[AB211]

THURSDAY 21 MAY, AFTERNOON

TIME

2 hours.

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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BLANK PAGE

Section A

- 1 (a) The following account is about the adverse impact of human activity on the environment. Write the most appropriate word(s) in the blank spaces to complete the account.

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]

- (b) State **one** strategy used to reduce ozone depletion and acid rain:

- Ozone depletion

- Acid rain

[2]

Examiner Only	
Marks	Remark



-
- [1]

- GPP = _____ [1]

-
-
- [1]

9447

[1]

[2]

Examiner Only	
Marks	Remarks

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?

[1]

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

[1]

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

[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.

 [1]

Examiner Only	
Marks	Remark

A _____

B

[2]

[]

[2]

[1]

1. _____
2. _____

[2]

Examiner Only	
Marks	Remarks

The graph illustrates the relationship between Biological Oxygen Demand (BOD) and Time. The vertical axis is labeled 'Biological Oxygen Demand' with an upward arrow, and the horizontal axis is labeled 'Time' with a rightward arrow. A curve starts at a low baseline, remains flat until a 'Pollution incident' (indicated by an upward arrow on the x-axis), then rises steeply to a peak. After the peak, the curve gradually declines, returning to the original baseline level.

[9447



Using your knowledge and the information provided:

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

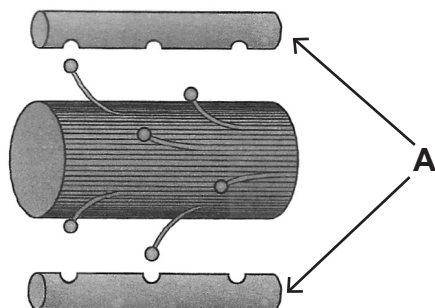
 [2]

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

[2]

Examiner Only	
Marks	Remark

- 6 (a)** The main proteins involved in skeletal muscle contraction are represented in the diagram below.



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

- (i) Identify protein **A**.

[1]

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

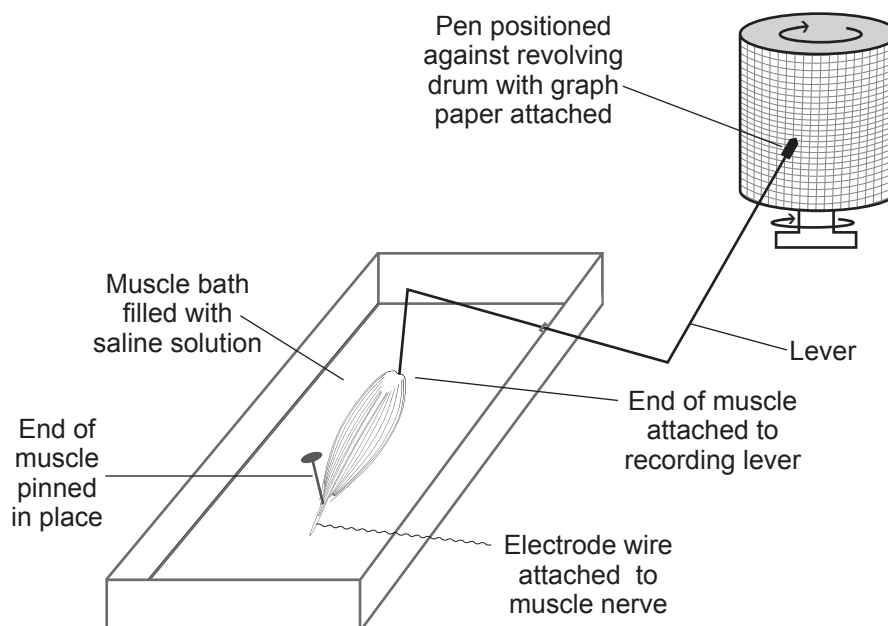
[4]

[4]

Examiner Only	
Marks	Remarks

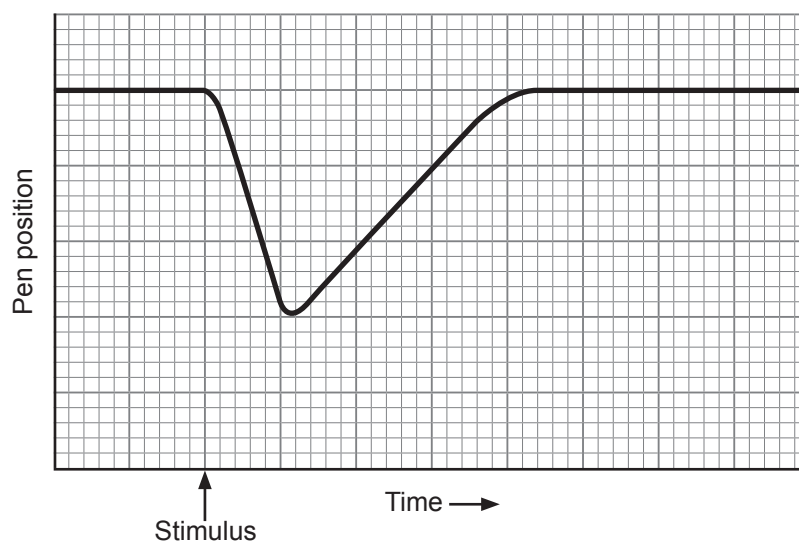
- (b) An experiment was carried out to investigate muscle contraction in skeletal muscle. This type of investigation uses muscles obtained from freshly killed animals. The experimental set-up is shown in diagram A.

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.

-
-
-
- [1]

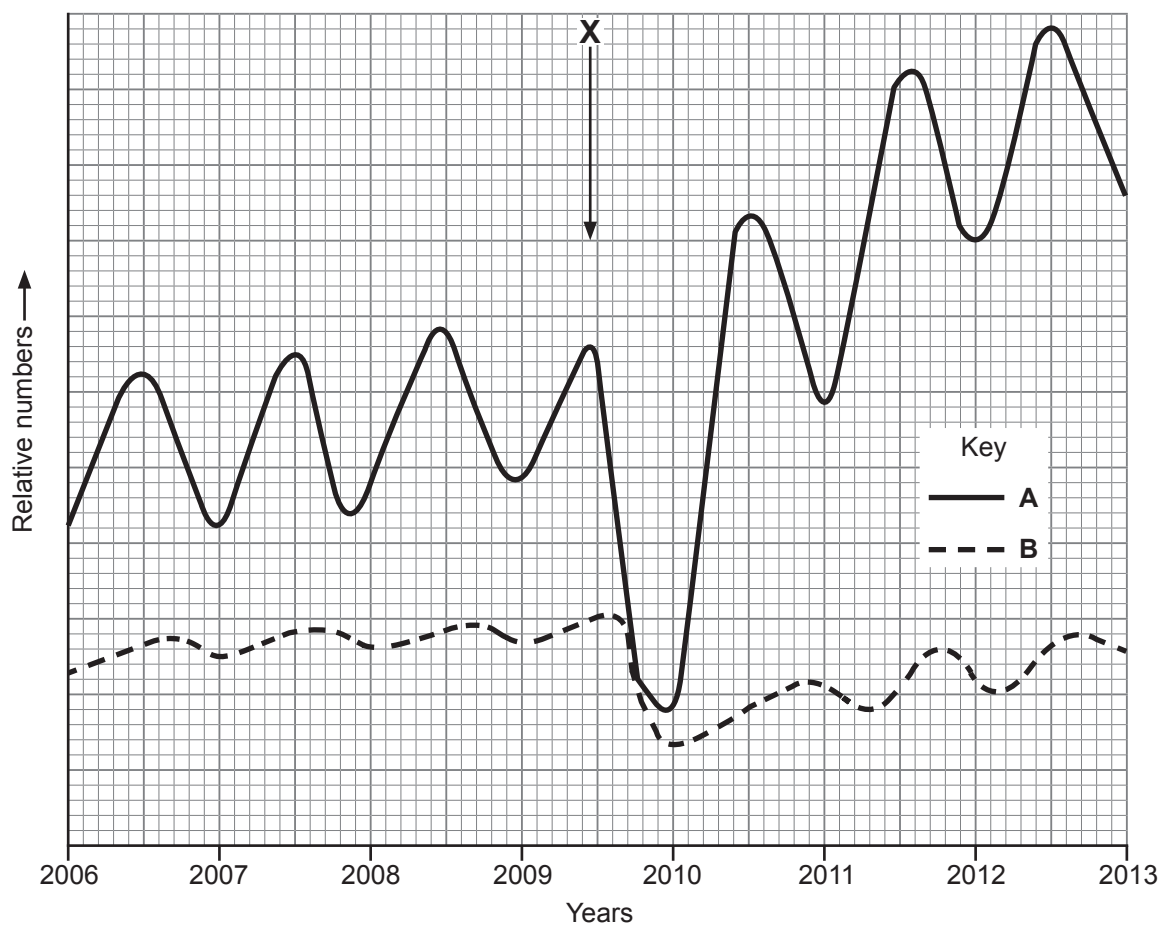
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-
-
- [1]

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- [illegible]

Examiner Only	
Marks	Remark

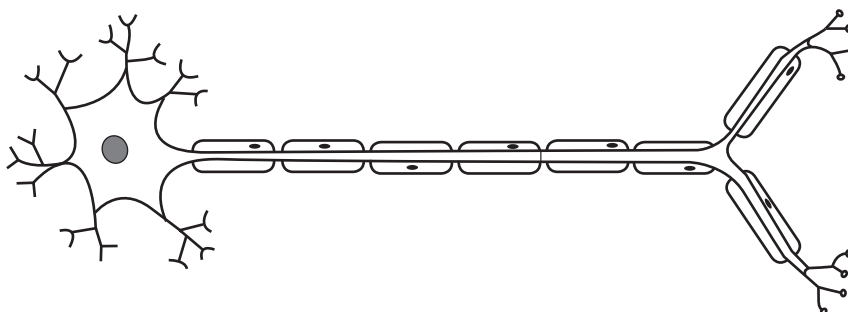


- (i) Give **one** piece of evidence from the graph which indicates that **A** is the pest (prey) and **B** is the predator.

[1]

Examiner Only	
Marks	Remarks

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



(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.

[illegible]9447

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

[illegible]

[Turn over

Extra lined page

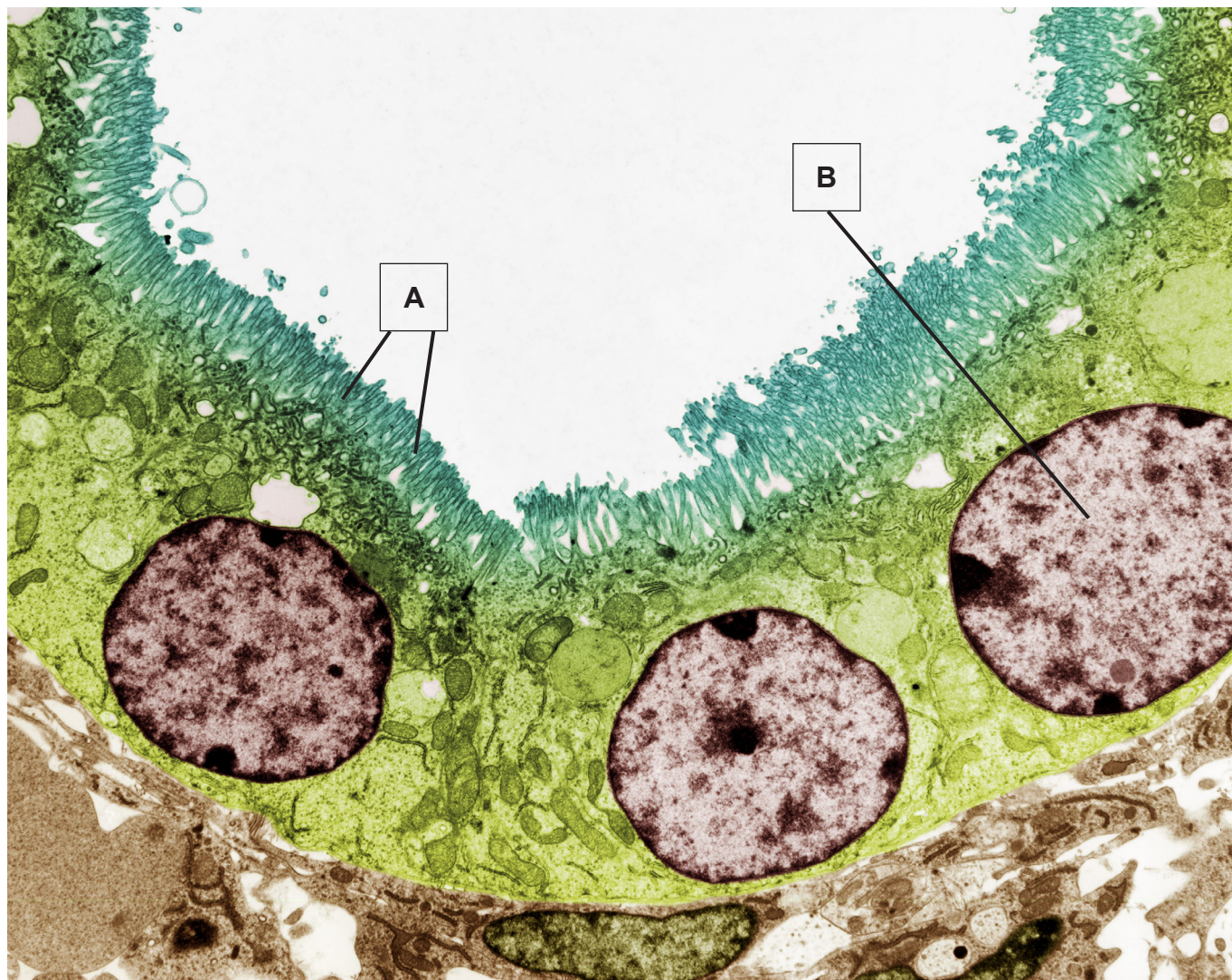
Examiner Only	
Marks	Remark

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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