



ADVANCED
General Certificate of Education
January 2014

Centre Number

71

Candidate Number

Biology

Assessment Unit A2 1

assessing

Physiology and Ecosystems

[AB211]



FRIDAY 10 JANUARY, 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 answer 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

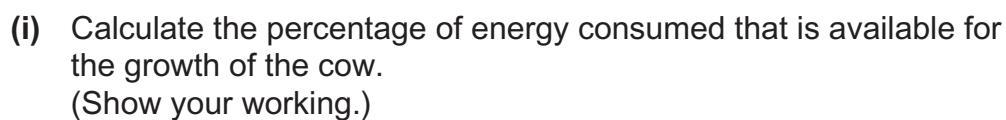
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

Total Marks

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- [4]

Examiner Only	
Marks	Remark



_____ % [2]

- (ii)** In terms of energy loss, explain the reason for the high values shown for respiration and faeces in the cow.

Respiration _____

Faeces _____

[2]

8644

Atmospheric carbon dioxide levels varied within each year and highest and lowest monthly averages are also shown.

	Atmospheric CO ₂ /parts per million		
Year	Annual average	Highest monthly average	Lowest monthly average
1975	329	332	326
1980	336	340	331
1985	345	347	341
1990	354	357	350
1995	359	363	355
2000	366	371	362
2005	378	381	374

- (a)** Suggest reasons for the high and low levels of carbon dioxide within each year.

[2]

Examiner Only	
Marks	Remark

4 (a) Photograph 1.4 is a photomicrograph of muscle tissue.

(i) Identify the features labelled **A** and **B**.

A _____

B _____

[2]

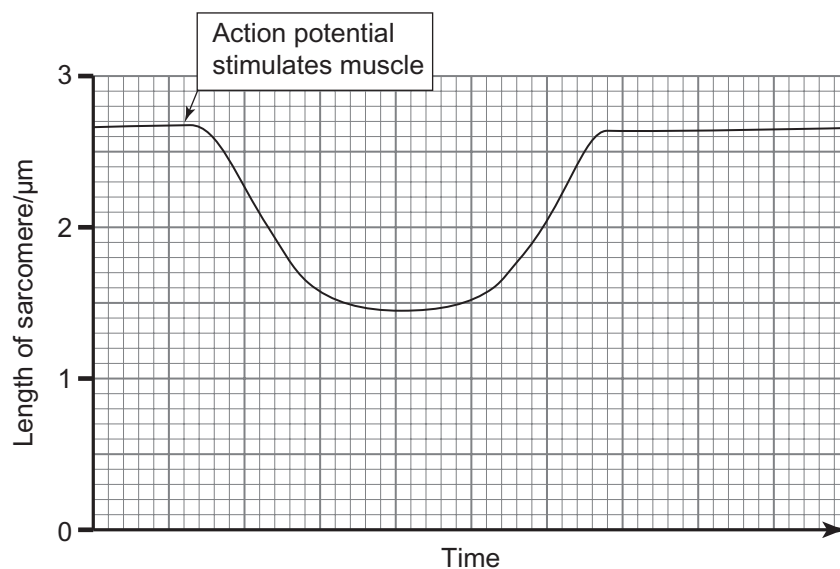
(ii) Identify the evidence from the photomicrograph which indicates that this section is:

- skeletal muscle and not cardiac muscle

- skeletal muscle and not smooth muscle

[2]

(b) The graph below shows the length of a sarcomere during muscle contraction.



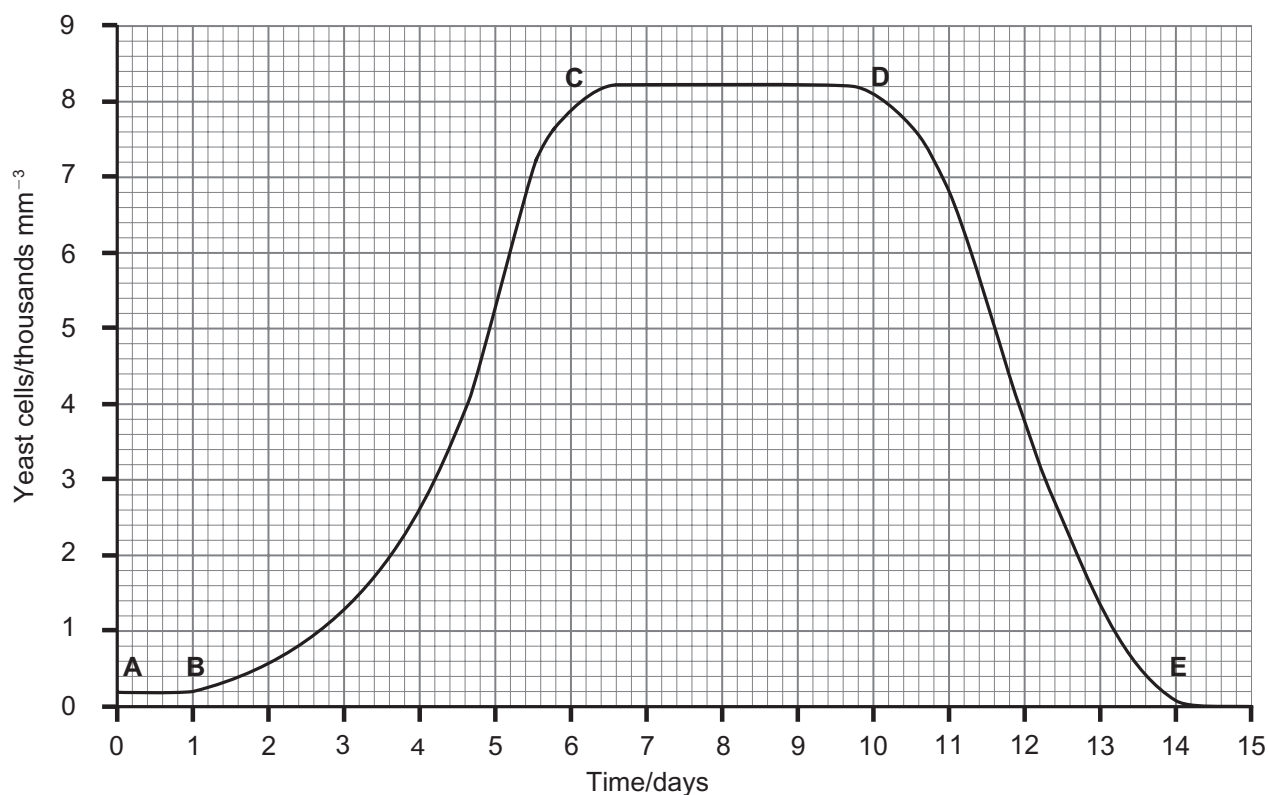
[3]

-
-
-
-
-
- [2]

Examiner Only	
Marks	Remark

- 5 Yeast, cultured in a conical flask containing glucose solution, will produce the population growth pattern shown in the graph below. Increase in population size is due to the yeast cells growing and producing daughter cells as outgrowths (buds) that break off as they reach an appropriate size. The graph shows how the number of living yeast cells changes over time.

Examiner Only	
Marks	Remark



- (a) Explain the population growth pattern between positions:

A–B _____

D–E _____

[4]

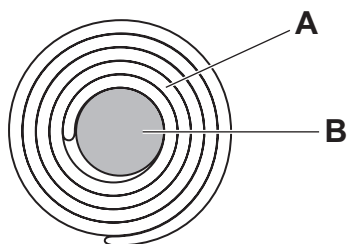
Examiner Only	
Marks	Remark

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- 6 (a)** Diagram **X** below represents a myelinated neurone in transverse section (T.S.).

Two important features of the neurone are labelled **A** and **B**.

Diagram X



- (i) Identify the features labelled **A** and **B**.

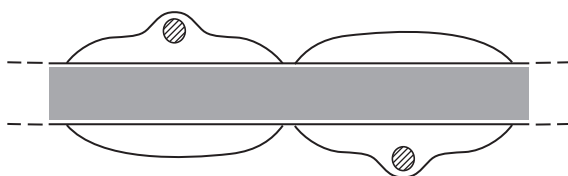
A _____

B _____

[2]

Diagram Y below represents part of the myelinated neurone in longitudinal section (L.S.).

Diagram Y



- (ii)** Draw a line on diagram **Y** to show where the section represented in diagram **X** could have been taken. [1]

Examiner Only	
Marks	Remark

[3]

This method of providing passive immunity was used for many years but it had its limitations. It was difficult to produce enough antibodies to meet medical demand. Additionally, the horse serum contained many different types of antibodies rather than just the specific type required.

1. _____

2. _____

16

Further inland, as the dunes become older and more stable, the marram grass is gradually replaced by small shrubs (mainly heather) and even further inland by the larger bracken and gorse. In these older dunes the ground layer is dominated by moss species.

- (a) (i)** Although sand dunes typically receive high levels of rainfall, marram grass is a xerophyte. Suggest why marram grass requires xerophytic adaptations in this environment.

[1]

- (ii) Name **one** xerophytic adaptation that marram grass would be expected to possess.

[1]

18

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Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

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THIS IS THE END OF THE QUESTION PAPER

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will be happy to rectify any omissions of acknowledgement in future if notified.

Photograph 1.4
(for use with Question 4)



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Magnification $\times 320$