



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2012

Centre Number

71

Candidate Number

Biology

Assessment Unit AS 2

assessing

Organisms and Biodiversity

[AB121]

FRIDAY 15 JUNE, MORNING



TIME

1 hour 30 minutes.

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 eight** questions.

You are provided with **Photographs 2.5A and B** for use with **Question 5** in this paper. Do not write your answers on these photographs.

INFORMATION FOR CANDIDATES

The total mark for this paper is 75.

Section A carries 60 marks. Section B carries 15 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 **20 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	

Total
Marks

(a) The J-tube is used to analyse the relative amounts of gases in air. Name the gas(es) absorbed by using each of the following reagents when using the J-tube.

-
- [2]

State the colour change that you would expect in each of the following conditions.

-
- [2]

Examiner Only	
Marks	Remark

(a) (i) Identify the kingdom to which organisms like *Marasmius oreades* belong.

[1]

(ii) State **one** cellular feature which is characteristic of the organisms in this kingdom.

[1]

(b) (i) Explain how *M. oreades* obtains nutrients from the dead organic matter.

[3]

(ii) To enable them to make full use of the dead plant material, organisms like *M. oreades* produce enzymes that are not found in animals. Suggest **one** such enzyme.

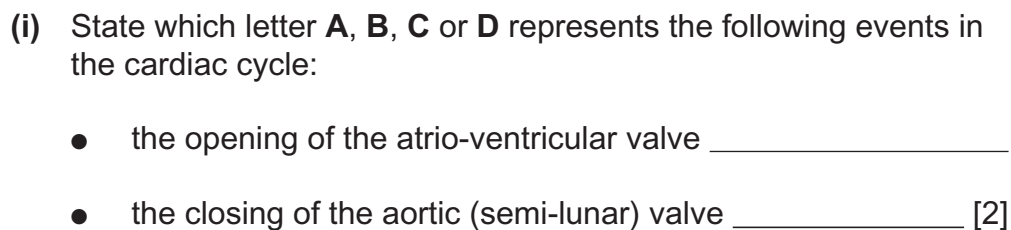
[1]

Examiner Only	
Marks	Remark

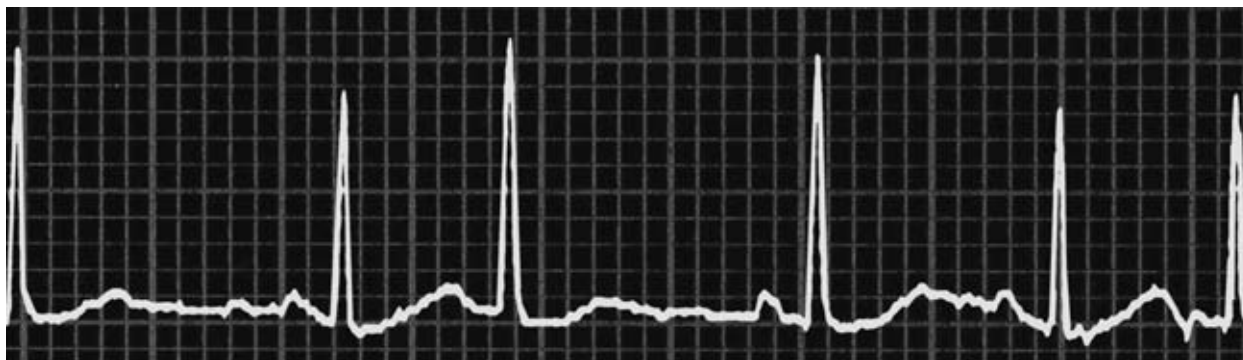
(a) With reference to Fick's Law, suggest **three** features which you would expect the gills of fish to possess, and, for each feature, explain how it maximises exchange.

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark



- (d) The electrical activity of the heart can be monitored and displayed in an electrocardiogram (ECG). An example of an ECG trace is shown below.



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What is the evidence that the individual, for whom the trace was made, had an irregular heartbeat?

[1]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

5 **Photographs 2.5A and 2.5B** show two types of vascular tissue found in a stem – xylem and phloem. Both tissues are involved in transport, xylem carrying water and ions and phloem carrying the products of photosynthesis.

(a) State **two** ways in which the process of transport in the xylem differs from that in the phloem.

1. _____

2. _____

_____ [2]

(b) Identify the tissue shown in **photograph 2.5A** and the structure labelled **Z** in the photograph.

Tissue _____

Structure **Z** _____ [2]

(c) Below is a diagram representing a stem.

Draw a line on the diagram below to indicate the direction in which the stem was cut in order to produce the sections shown in the photographs.



[1]

Examiner Only	
Marks	Remark

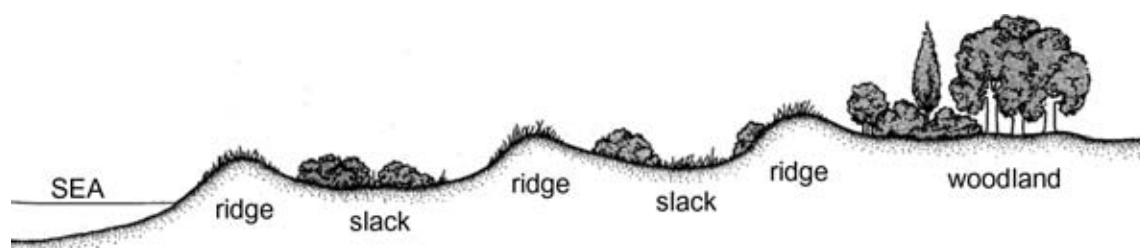
- (d) The tissue shown in **photograph 2.5B** is relatively young. Identify the evidence for this and explain the benefit of this feature being found in young tissue.

 [2]

- (e) Calculate the actual length, in micrometres (μm), of the structure labelled **Z** in **photograph 2.5A**. The magnification is shown in the photograph. (Show your working.)

_____ μm [3]

Examiner Only	
Marks	Remark



A group of students compared the distribution of plants on a dune ridge with that in a dune slack. They used a random sampling method to investigate the plants found on a dune ridge and in the dune slack behind it.

- (a)** Describe a random sampling method which the students could use to investigate the relative abundance of the different plant species present.

[4]

[4]

Examiner Only	
Marks	Remark

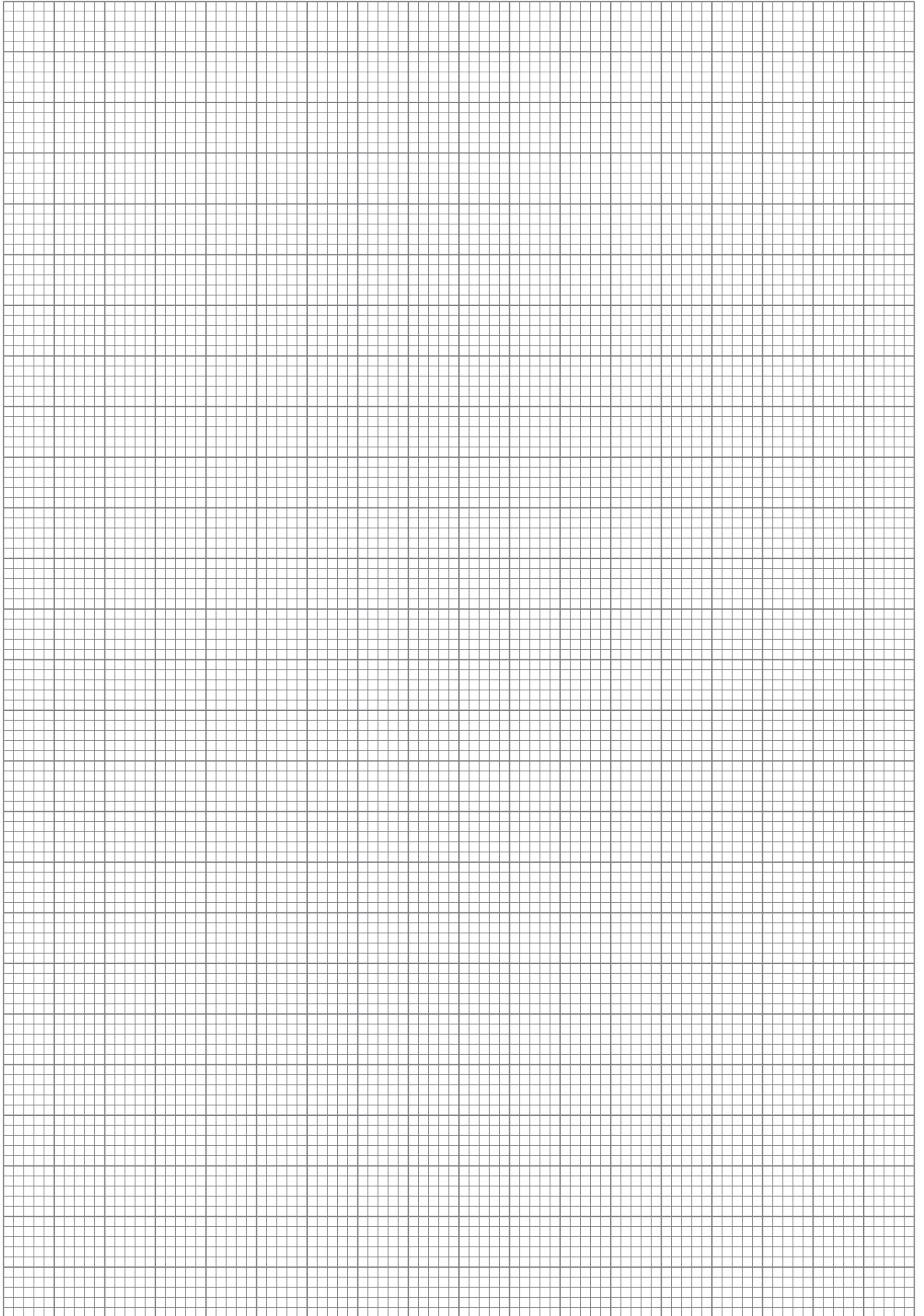
Species	Abundance	
	Dune ridge	Dune slack
Marram grass	112	4
Fescue grass	36	25
Portland spurge	20	0
Catsear	13	27
Thyme	0	34
Mosses	0	164

- (c)** Plot the above results, using an appropriate graphical technique. (Use the graph paper opposite.) [4]
- (d)** The area around the dune slack supported a population of rabbits which fed upon the plants growing there. As a result, individual plants were very small and most students required the use of a magnifying lens to examine them.

Explain how this may have affected the accuracy of the results for the dune slack.

[1]

Examiner Only	
Marks	Remark



- 7 (a) The red squirrel (*Sciurus vulgaris*), which is native to Ireland, is related to chipmunks, marmots and prairie dogs and is included in a taxonomic group called the Sciuridae. All Sciuridae belong to a group of mammals called the Rodentia.

Using this information, complete the following table concerning the taxonomy of the red squirrel.

Kingdom	Animalia
	Chordata
Class	
Order	
Family	
Genus	
Species	

[3]

- (b) There are an estimated 40 000 red squirrels throughout Ireland. However the range of this indigenous species is rapidly contracting as grey squirrels (*Sciurus carolinensis*), which were introduced from North America, continue to spread and outcompete reds. Some information about both red and grey squirrels is given in the table below.

Feature	Red squirrel	Grey squirrel
Body length	20–22 cm	25–27 cm
Body mass	275–305 g	540–660 g
Body shape	Slender	Stocky
Habitat	Mainly coniferous forest	Broadleaf forest
Diet	Seeds, nuts, buds and berries	Same as red, plus acorns (particularly big seeds); can eat seeds that are not fully ripe
Feeding area	Mainly in the tree canopy	Mainly on the ground
Breeding	2–3 litters per year with 3–4 kittens per litter	3–4 litters per year with 5–6 kittens per litter

- (i) Using the information in the table, suggest explanations as to how the grey squirrels are able to outcompete the red squirrels.

[4]

- (ii) Throughout Ireland there are many conservation projects aimed at increasing the population of red squirrels. One way is to provide supplementary feeding for the red squirrels and suitable food hoppers are currently in use at some of Ireland's forest parks.

Using information from the table, suggest and explain how food hoppers could be designed and placed in such a way as to favour the red squirrels.

Design

Placement

[2]

- (iii) Suggest **one** other way in which forestry management could encourage the spread of red squirrels.

[1]

Examiner Only	
Marks	Remark

[illegible]

Examiner Only	
Marks	Remark

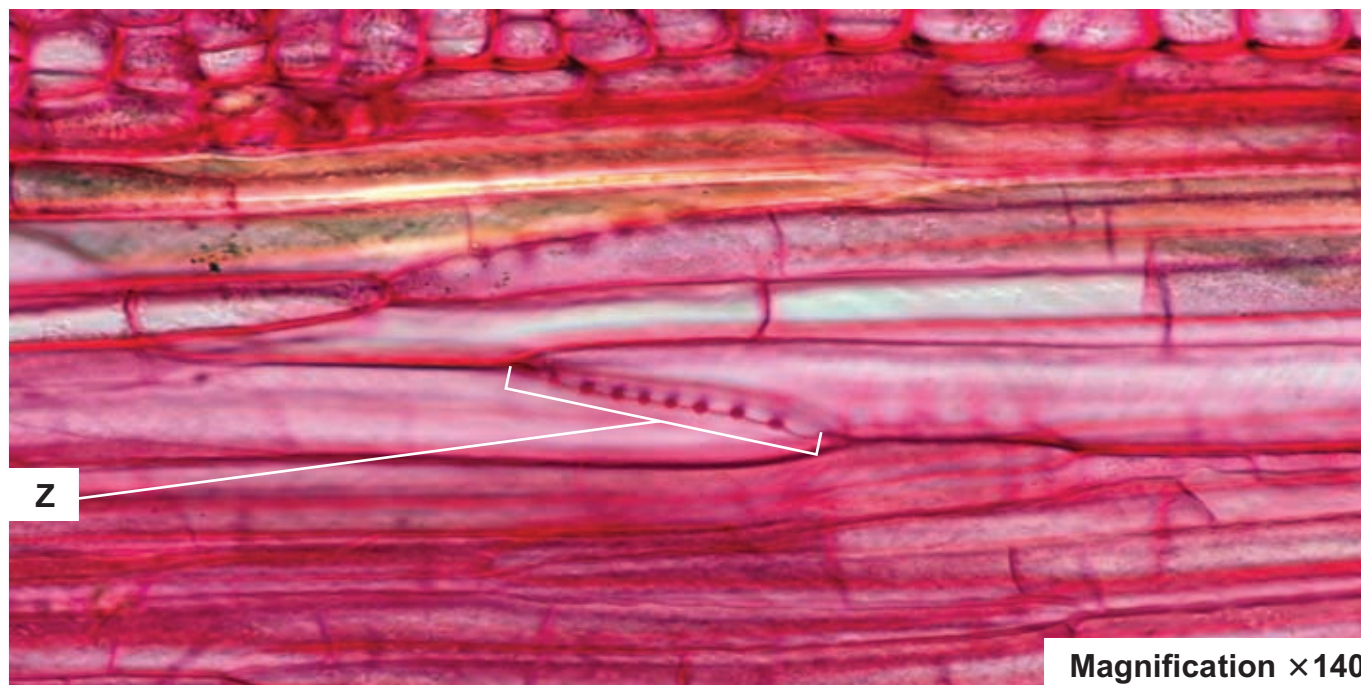
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THIS IS THE END OF THE QUESTION PAPER

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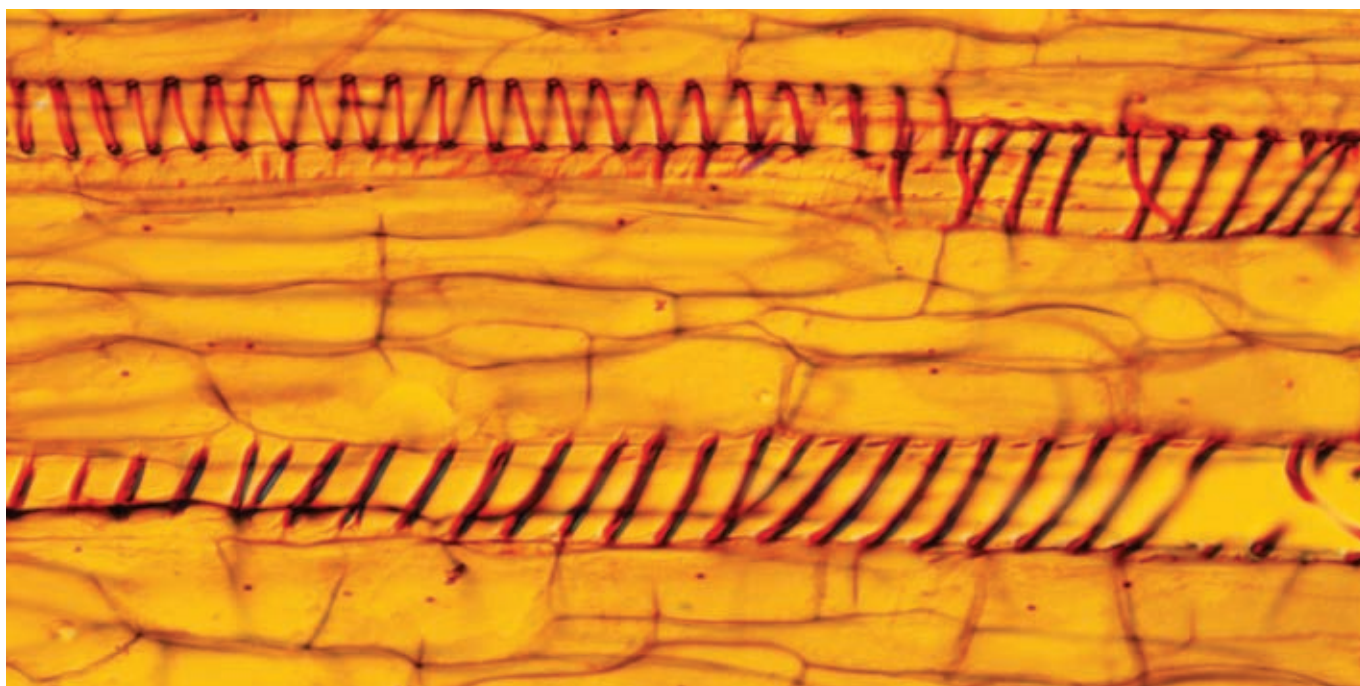
GCE Biology Advanced Subsidiary (AS)
Assessment Unit AS 2: Organisms and Biodiversity
June 2012

Photograph 2.5A



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Photograph 2.5B



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