Cambridge International Examinations
Cambridge International Level 1/Level 2 Certificate

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

4286478726

BIOLOGY **0610/33**

Paper 3 Extended **May/June 2014**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages.

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CAMBRIDGE International Examinations

[Turn over

1 Fungi were often classified as different species according to their visible reproductive structures.

Penicillium dodgei and *Eupenicillium brefeldianum* were classified as different species because they had different types of spores.
However, recently it was recognised that the spores of *P. dodgei* were asexual spores, while those of *E. brefeldianum* were sexual spores. A comparison of the DNA of these two fungi shows that they are the same species.
This fungus is now known as *Penicillium brefeldianum.*

(a) State how DNA analysis can show that *P. dodgei* and *E. brefeldianum* are the same species.

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.....[2]

(b) **(i)** Describe how a fungus, such as *P. brefeldianum*, reproduces asexually.

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.....[3]

(ii) Discuss the advantages of **asexual** reproduction.

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[Total: 8]

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2 Sulfur dioxide (SO_2) can cause acid rain.

(a) Name **one** other pollutant that can cause acid rain.

.....[1]

(b) Describe the effects of acid rain on the environment.

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(c) State **three** methods to reduce atmospheric SO_2 pollution.

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[3]

(d) Scientists in China measured the concentration of sulfur dioxide (SO_2) in the atmosphere and sulfur in plant tissues from 1990 until 2005. They did not record any measurements between 1990 and 1996.
Their results are shown in Fig. 2.1.

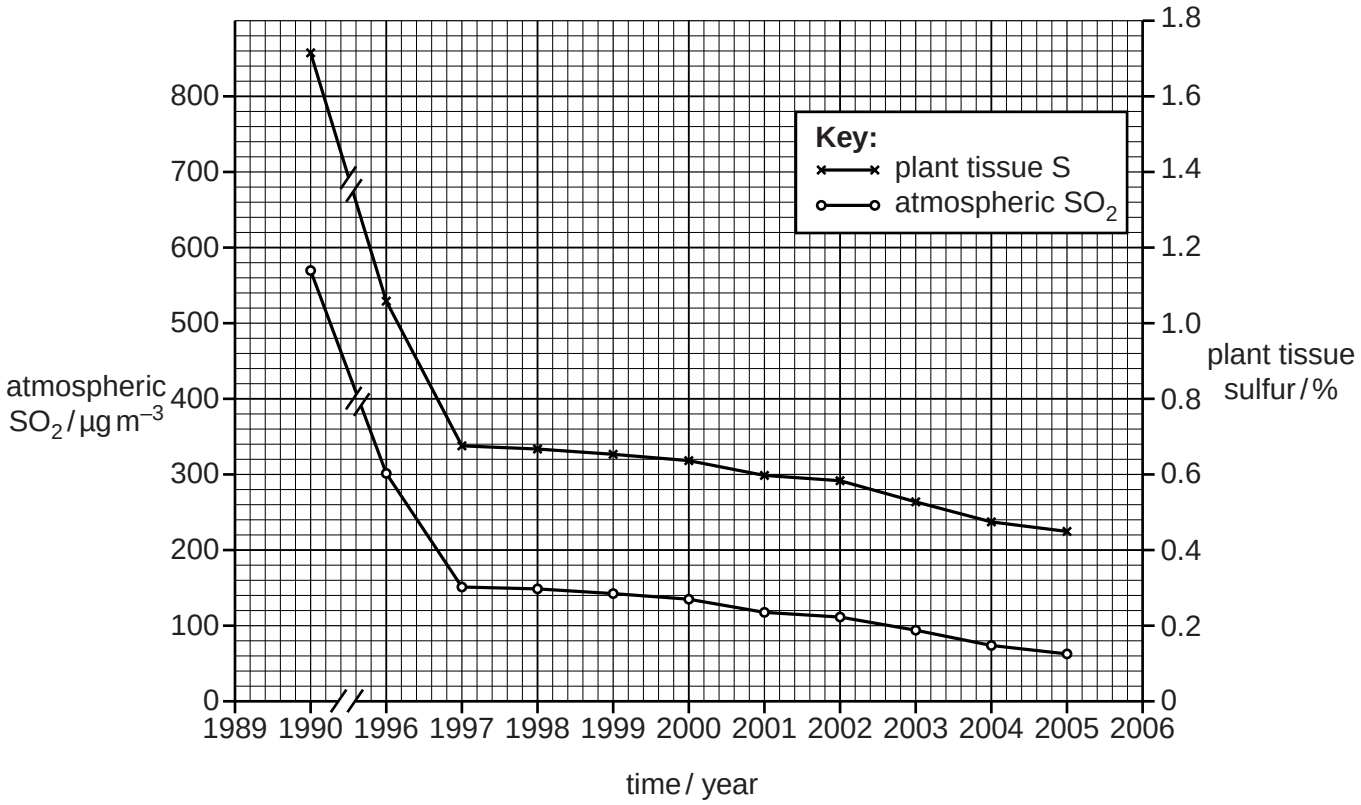


Fig. 2.1

(i) Describe the trends in the concentrations of sulfur found in the atmosphere and in the plant tissues as shown in Fig. 2.1. You will gain credit for using the data in the graph to support your answer.

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(ii) Suggest why the concentration of sulfur in the plant tissues was calculated as a **percentage** of the **dry mass** of the plant tissue.

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[Total: 12]

3 **(a)** Define the term *sensitivity.*

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(b) Describe how voluntary actions differ from involuntary actions.

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.....[2]

(c) Name the neurone that transmits impulses from a receptor.

.....[1]

(d) Reaction time is defined as the time taken to respond to a stimulus.

During a swimming relay race, the reaction times of four swimmers in two teams, **A** and **B**, were recorded.

In each team, swimmer 1 responded to the sound of the start gun; swimmers 2, 3 and 4 responded to seeing the previous swimmer touch the swimming pool wall.

Table 3.1 shows the reaction times for the swimming relay teams.

Table 3.1

swimmer	reaction time / s	
	team **A**	team **B**
1	0.81	0.75
2	0.48	0.40
3	0.58	0.06
4	0.31	0.35

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Compare the reaction time of swimmer 1 in each team with the reaction times of the other swimmers in each team. Use the information in Table 3.1 to support your answer.

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.....[3]

(e) Adrenaline is often secreted during sporting competitions.

Outline how adrenaline affects the performance of a swimmer.

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[Total: 11]

4 **(a)** Fig. 4.1 shows a section through the anther of a lily flower. The cells in the centre are dividing by meiosis.

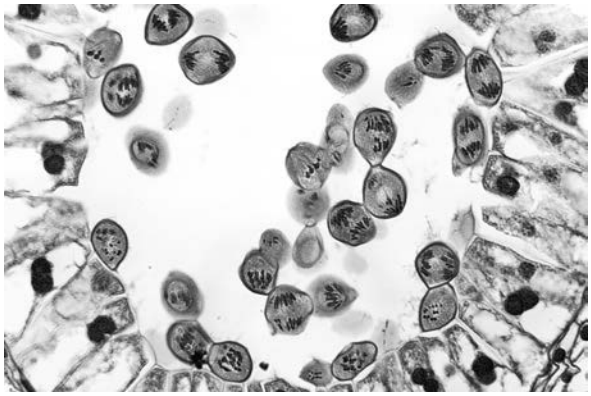


Fig. 4.1

(i) Name the product of meiosis that is formed in anthers.

.....[1]

(ii) Explain the importance of meiosis in sexual reproduction.

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.....[2]

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(b) Fig. 4.2 shows a flower of *Lilium polyphyllum*, a lily that grows in the Himalayan mountains. This species is cross-pollinated by insects.



Fig. 4.2

(i) Explain what is meant by *cross-pollination*.

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.....[2]

(ii) Name **one** feature **visible** in Fig. 4.2 that helps to attract insects.

.....[1]

(c) Plants of this species that grow at low altitudes produce flowers 60 days before the plants of the same species that grow at high altitudes.

(i) Suggest **one** environmental reason why lilies that grow at lower altitudes flower earlier than the lilies at higher altitudes.

.....[1]

(ii) Explain why flowering time is an example of continuous variation.

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.....[2]

(d) Scientists think that plants of *L. polyphyllum* growing at high altitudes may evolve into a new species.

Explain how natural selection could lead to the evolution of a new species of lily.

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[Total: 14]

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5 Fig. 5.1 shows a cross-section of a kidney.

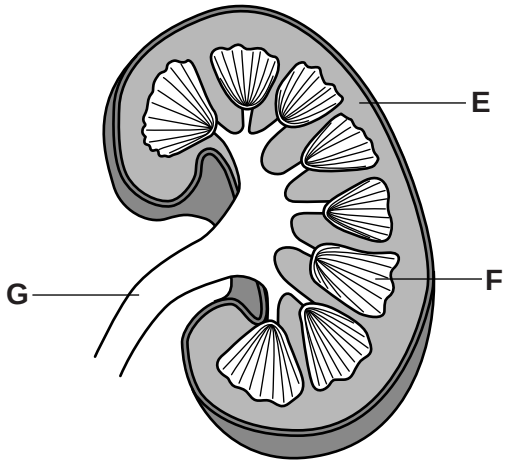


Fig. 5.1

(a) Name the structures labelled, **E**, **F** and **G** as shown in Fig. 5.1.

E .....

F .....

G .....

[3]

(b) Explain the function of the renal capsule in the kidney.

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.....[3]

(c) Glucose is reabsorbed, back into the blood, by active transport.

Define *active transport.*

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(d) Give **one** example, other than glucose, of a substance that is reabsorbed into the blood from the renal tubule.

.....[1]

(e) Dialysis is a treatment for kidney disease.

Fig. 5.2 shows a dialysis machine.

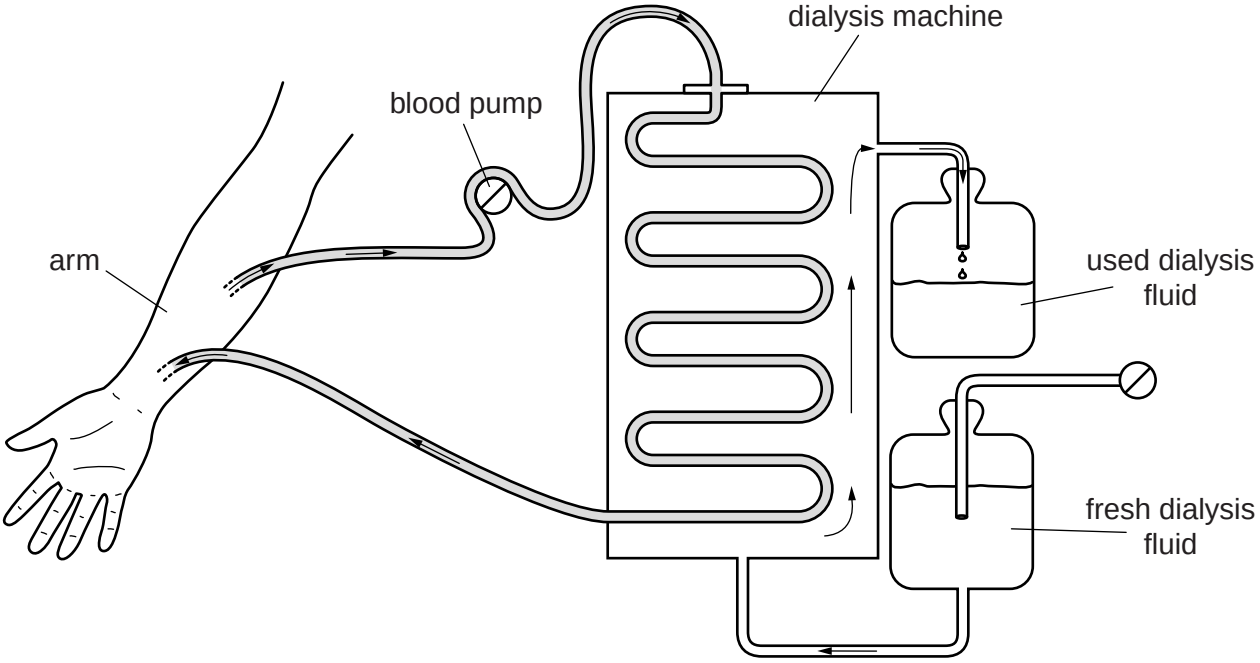


Fig. 5.2

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(i) The composition of the dialysis fluid changes as it passes through the dialysis machine.

Complete Table 5.1 using the words 'low', 'high', 'same' or 'none' to show how the concentration of each substance changes in the dialysis fluid.

The last one has been done for you.

Table 5.1

	concentration of substance in:		
substance	blood before dialysis	**used** dialysis fluid	**fresh** dialysis fluid
glucose	normal		
salts	high		
urea	high		
toxins	high	high	low

[3]

(ii) Explain how a dialysis machine filters blood.

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.....[4]

(f) Kidney transplants are the most common organ transplants.

Describe the **advantages** of a kidney transplant compared with dialysis.

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(g) Before a kidney is transplanted, it is important to match the tissue type of the donor with the tissue type of the recipient.

State why this is necessary.

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.....[1]

[Total: 20]

6 Fig. 6.1 shows the carbon cycle. **P**, **Q**, **R**, **S** and **T** each represent a part of the carbon cycle.

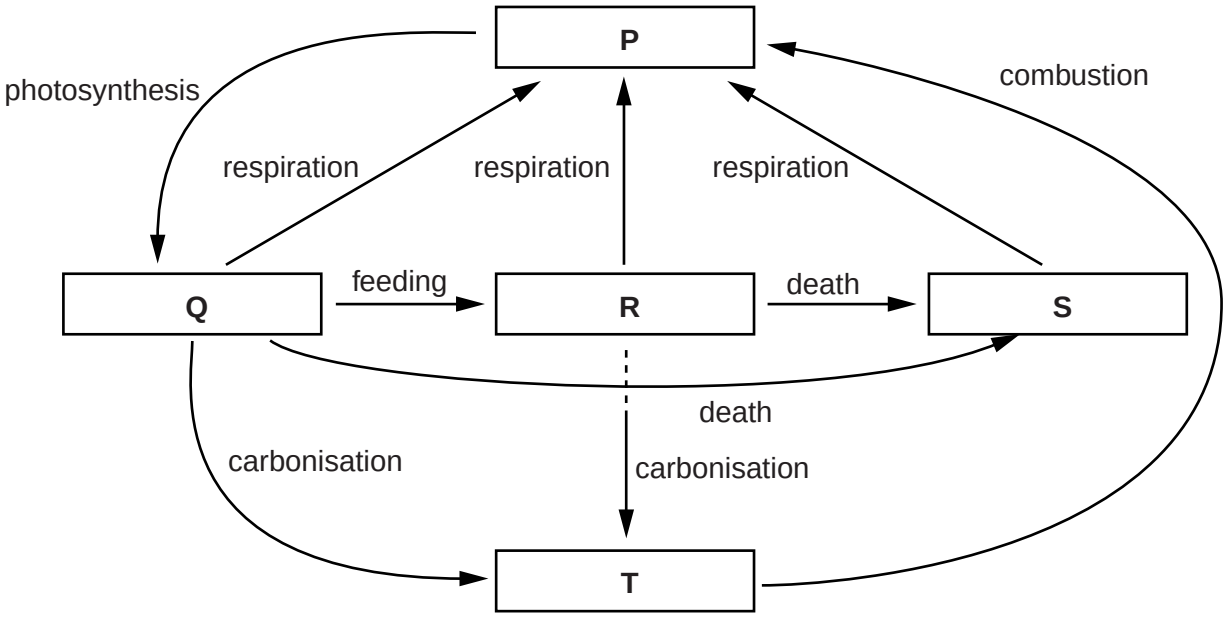


Fig. 6.1

(a) Complete Table 6.1 by identifying **P**, **Q**, **R** and **S** and the name of **one** example of a carbon compound found in each. **T** has been completed for you.

Table 6.1

letter	part of cycle	carbon compound found in each part
P		
Q		
R		
S		
T	fossil fuels, e.g. natural gas	methane

[4]

(b) Photosynthesis is a very important process in the carbon cycle.

Explain how the process of photosynthesis converts carbon compounds from **P** to carbon compounds in **Q**.

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(c) The rate of photosynthesis varies as a result of changes in environmental factors.

State **one** environmental factor and explain how it can affect the rate of photosynthesis.

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.....[3]

(d) Environmental factors can be controlled in glasshouses.

Describe how **three** environmental factors are controlled in a glasshouse to improve crop yield.

factor 1: .....

how is it controlled: .....

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factor 2: .....

how is it controlled: .....

.....

factor 3: .....

how is it controlled: .....

.....

[3]

[Total: 15]

Copyright Acknowledgements:

Question 2 Figure 2.1 © Xue-Yan Liu, Hua-Yun Xiao, Cong-Qiang Liu, Hong-Wei Xiao, Yan-Li Wang; Assessment of atmospheric sulphur with the epilithic moss Haplocladium microphyllum: Evidences from tissue sulphur and d34S analysis. Environmental Pollution; Elsevier; 2009.
Question 4 Figure 4.1 © Biodisc; Cross-section of a Lily anther showing the second meiotic division (Lilium), a monocot. LM X65; Visuals Unlimited; 2011.
Question 4 Figure 4.2 © Anurag Dhyani; LILIES and Related Plants, 2011-2012. Phenology of Lilium polyphyllum in Garhwal Himalaya, India; RHS Lily Group; 2011.

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