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Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0484940158

BIOLOGY **5090/22**

Paper 2 Theory **October/November 2015**

1 hour 45 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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Section A
Answer **all** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section B
Answer **both** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section C
Answer **either** question 8 **or** question 9.
Write your answers in the spaces provided on the Question Paper.

You are advised to spend no longer than one hour on Section A.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

This document consists of **14** printed pages and **2** blank pages.

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Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 Fig. 1.1 shows a carpel of a flower with two pollen grains on top.

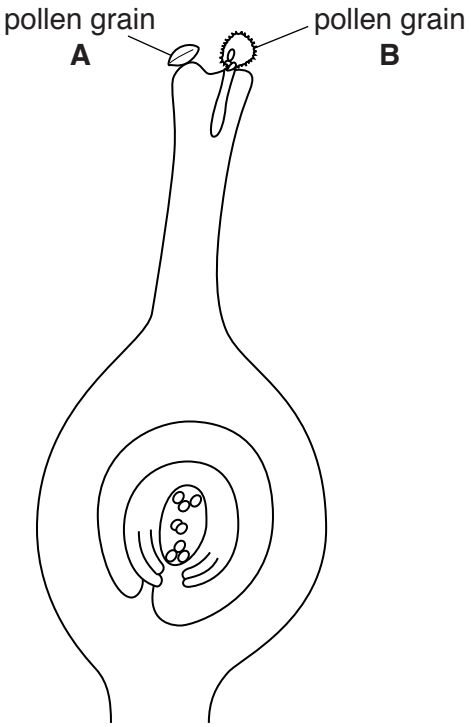

Fig. 1.1

(a) Name each of the following:

(i) the process that has brought the pollen grains to the carpel

.....[1]

(ii) the part of the carpel to which the pollen grains are attached.

.....[1]

(b) On Fig. 1.1, draw a line to show the route taken by the pollen tube up to the point at which male and female gametes fuse. [3]

(c) Name each of the following:

(i) a part of the carpel where the nuclei are all **diploid**

.....[1]

(ii) a part of the carpel that contains **haploid** nuclei.

.....[1]

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(d) Suggest why pollen grain **A** has not developed a pollen tube.

.....

.....[1]

[Total: 8]

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2 Fig. 2.1 shows a sloth. The sloth is a mammal that lives in the trees of the South American rainforests.

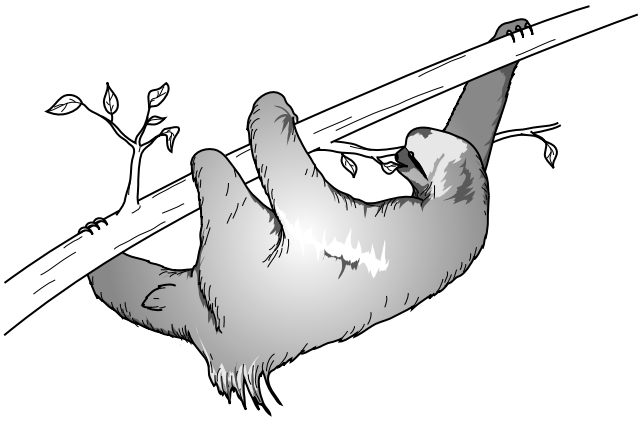

Fig. 2.1

Sloths have the following features:

- They are extremely slow moving.
- Some tear leaves from trees using their lips and the teeth at the back of their mouths.
- They have no front teeth.
- They climb down the tree to deposit their faeces in a hole they dig near the foot of the tree.
- They lose over a quarter of their body weight when they defaecate, which may be once every 6–8 days.
- Their fur is often green since it contains single-celled, plant-like organisms (algae).
- Their fur also contains blood-sucking mosquitoes and many small animals such as adult moths that feed on the algae and on the hair of the sloth.
- Moths lay their eggs in the faeces of the sloth on which the moth larvae feed.
- The major predators of the sloth are jungle cats and the harpy eagle.

(a) The structure and functions of the regions of the sloth's alimentary canal are generally similar to those of a human.

(i) Suggest which type of front teeth are likely to be absent in the mouth of the sloth.

.....[1]

(ii) One region of the sloth's alimentary canal is proportionally much larger than the same part in humans. Suggest which part and give a reason for your answer.

part .....

reason .....

.....

.....[2]

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(b) Complete the food web in Fig. 2.2 to show the feeding relationships of the organisms mentioned on page 4.

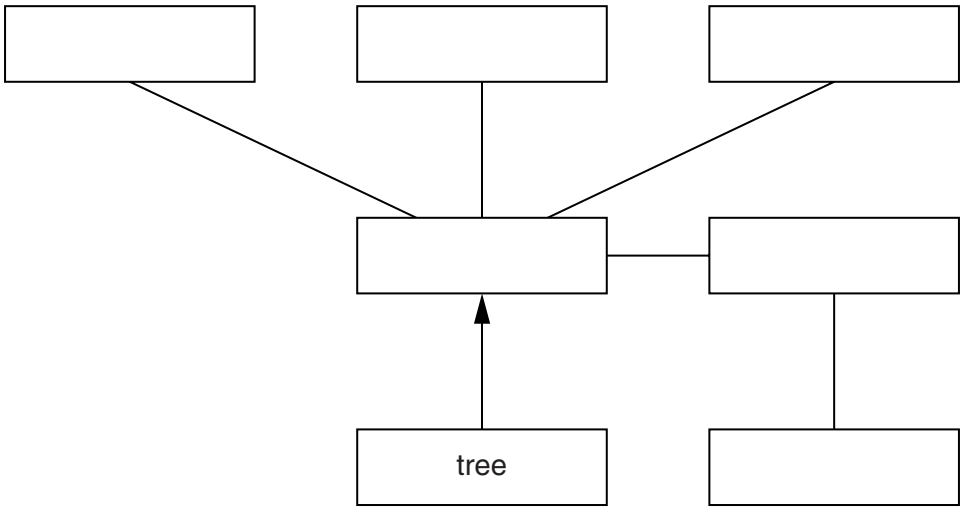

Fig. 2.2

[4]

(c) Suggest and explain an advantage to the sloths of each of the following:

(i) the algae that live in their fur

.....

.....

.....

.....[2]

(ii) burying their faeces at the foot of the trees in which they live.

.....

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.....

.....

.....

.....

.....[3]

[Total: 12]

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3 Fig. 3.1 shows blood pressure changes as blood flows through part of the circulatory system, beginning at the right atrium, travelling to the lungs, and ending in the pulmonary vein.

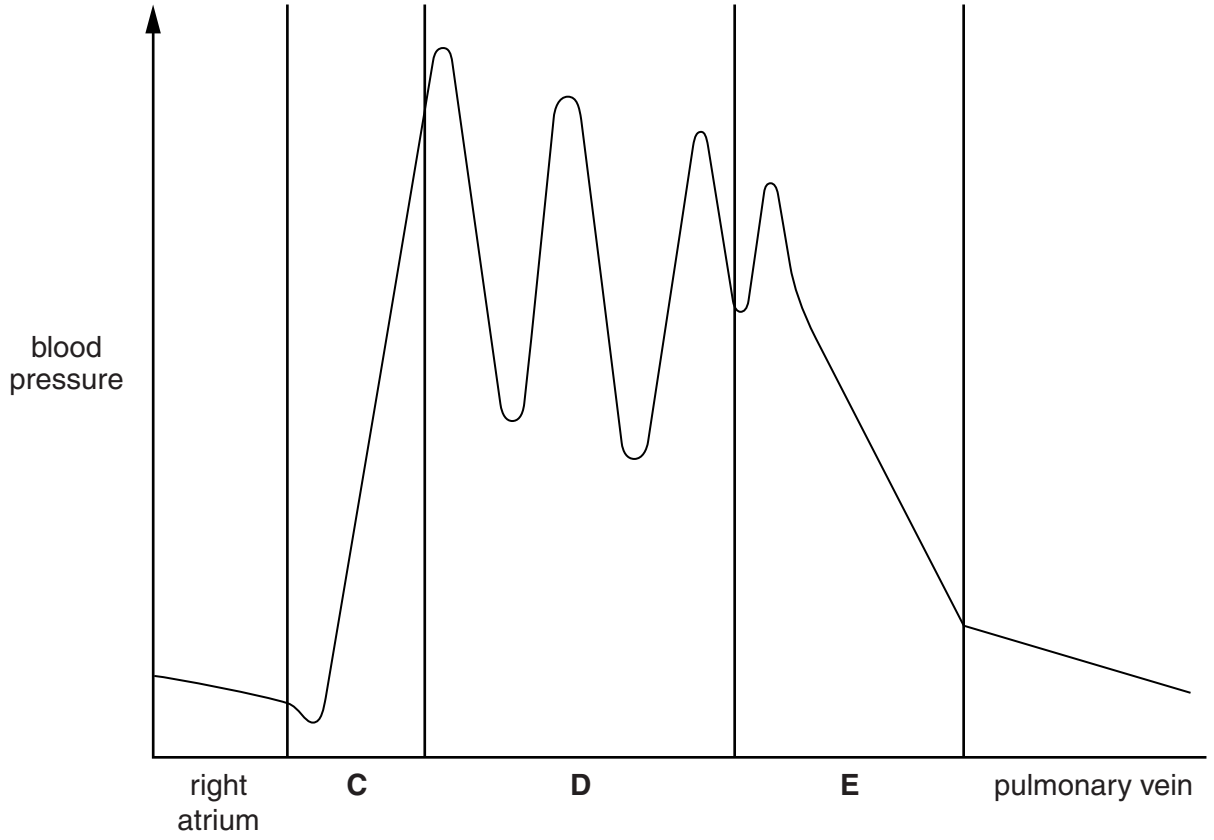

Fig. 3.1

(a) State which chamber of the heart is represented by **C**. Explain your answer.

chamber **C** .....

explanation .....

.....[2]

(b) Explain the reasons for the regular changes in blood pressure in region **D**.

.....

.....

.....

.....[2]

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(c) Important chemical changes occur in the blood as it passes through region **E**.

(i) Identify region **E**.

.....[1]

(ii) Describe and explain the chemical changes that occur.

.....

.....

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.....[3]

(d) Describe and explain how the shape of a graph drawn to show blood pressure changes as blood flows from the heart to the rest of the body and back again would differ from Fig. 3.1.

.....

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.....

.....

.....[3]

[Total: 11]

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4 Fig. 4.1 shows a section through the leaf of a plant.

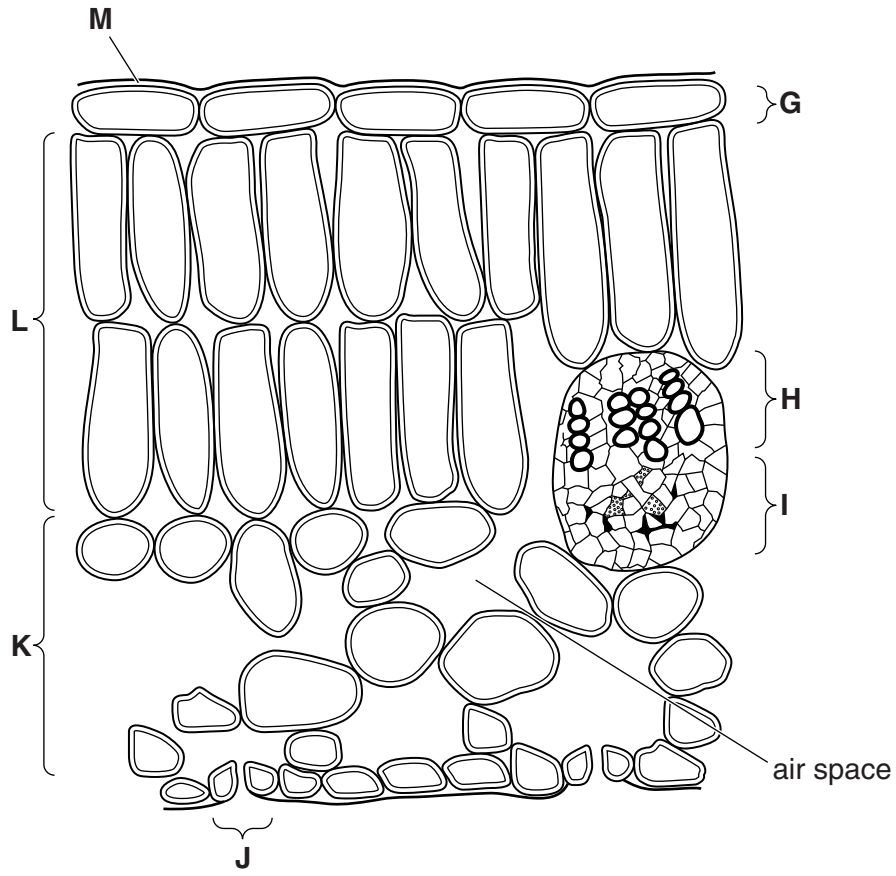

Fig. 4.1

(a) State the letters that identify each of the following:

(i) the region containing cells with the greatest number of chloroplasts

.....[1]

(ii) two regions that contain cells with **no** chloroplasts.

..... and .....[1]

(b) Explain why Fig. 4.1 shows the leaf during daylight hours.

.....

.....[1]

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(c) (i) Identify the tissues labelled **H** and **I**.

H .....

I .....[2]

(ii) Describe the functions of these two tissues.

.....

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.....

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.....

.....[4]

(d) Name a gas that gradually increases in concentration in the air space during the hours of darkness. Give an explanation for your answer.

gas .....

explanation .....

.....

.....

.....[3]

[Total: 12]

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5 Fig. 5.1 shows some human activities that have an effect on the environment.

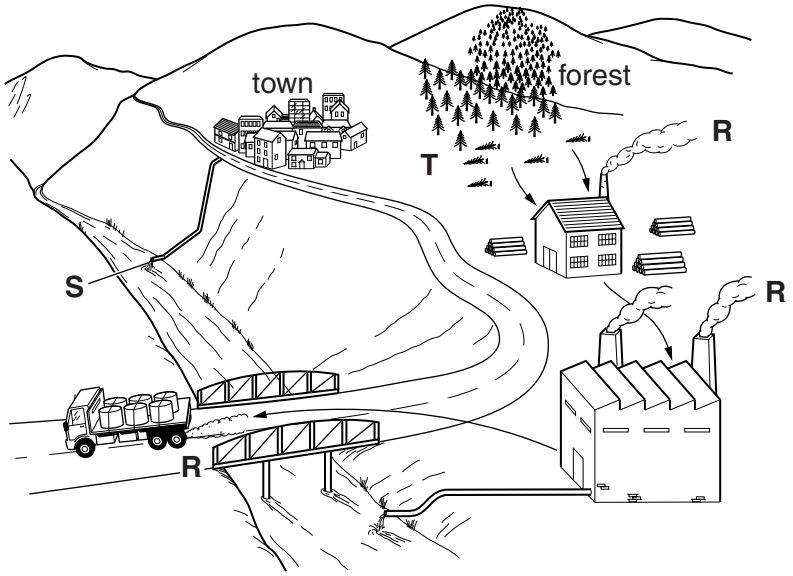

Fig. 5.1

(a) Name **two** gases, other than carbon dioxide, released at **R** that are harmful to the environment. For each gas, state the harm that it causes.

gas 1 .....

harm caused .....

.....

gas 2 .....

harm caused .....

.....[4]

(b) Explain how recycling could prevent the damage caused to the environment at **S** and **T**.

at **S** .....

.....

.....

at **T** .....

.....

.....[3]

[Total: 7]

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Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

6 **(a)** Describe the digestive processes that take place in the mouth (buccal) cavity of a human.

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.....[6]

(b) Explain how food moves from the mouth (buccal) cavity to the stomach.

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.....[4]

[Total: 10]

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7 **(a)** **(i)** Explain how wilting occurs in a plant.

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.....[4]

(ii) Explain why mature plants do not wilt as much as newly-transplanted seedlings, even when both are exposed to similar conditions.

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.....[3]

(b) Suggest an explanation for what would happen to a plant if it is accidentally 'watered' with a concentrated salt solution.

.....

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.....[3]

[Total: 10]

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Section C

Answer **either** question 8 **or** question 9.

Write your answers in the spaces provided.

8 **(a)** Describe how a bacterial cell differs from a typical animal cell.

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.....[3]

(b) Describe the role of bacteria in nitrogen fixation.

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.....[3]

(c) Describe the part played by bacteria after a river has been polluted by sewage.

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.....[4]

[Total: 10]

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9 **(a)** Outline the processes of *mitosis* and *meiosis*, including references to where they occur.

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.....[7]

(b) Describe the advantages of asexual reproduction in plants with reference to a **named** commercially important application.

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.....[3]

[Total: 10]

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