Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

5761711984

BIOLOGY **5090/22**

Paper 2 Theory **May/June 2017**

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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CAMBRIDGE International Examinations

[Turn over

Section A

Answer **all** questions in this section.

1 **(a)** Fig. 1.1 shows the front view of a person's chest and abdomen.

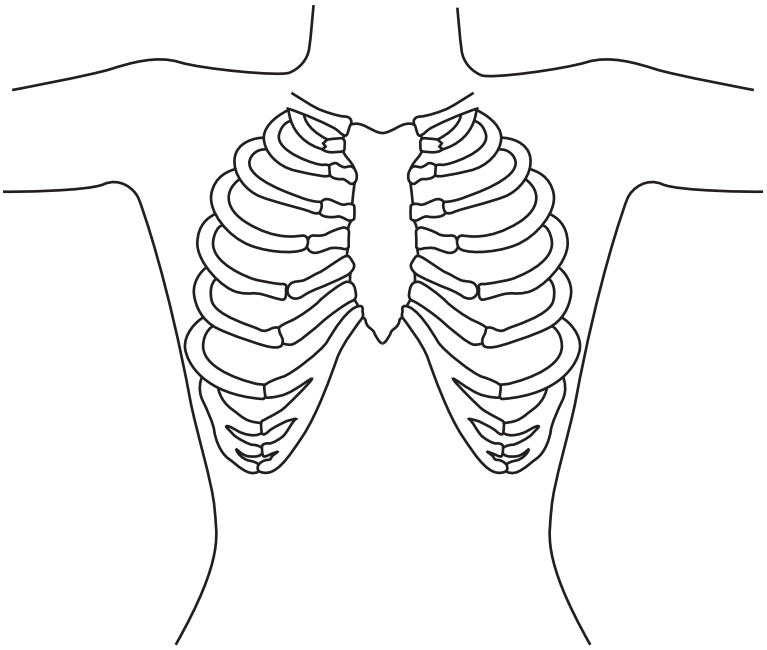

Fig. 1.1

On Fig. 1.1 draw:

- the diaphragm as it would appear immediately after breathing in,
- a circle (**O**) to show the position of the heart,
- a cross (**X**) to show the position of the liver. [3]

(b) Fig. 1.2 shows a person about to lift the handle of a bucket from position **A** to position **B**.

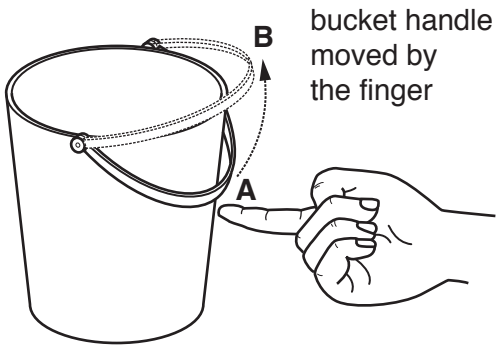

Fig. 1.2

The movement of the bucket handle, as shown, illustrates some features of the movement of a person's chest while breathing in.

(i) State **two similarities** between the movement of a person's chest while breathing in and the movement of the handle.

1 .....

2 .....
[2]

(ii) Explain the **differences** between the movement of a person's chest and the movement of the handle.

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.....[5]

[Total: 10]

2 Four of the stages associated with human nutrition are:

absorption **digestion** **egestion** **ingestion**

(a) **(i)** State the stage in nutrition that has **not** been included in the list above.

.....[1]

Fig. 2.1 shows the human alimentary canal.

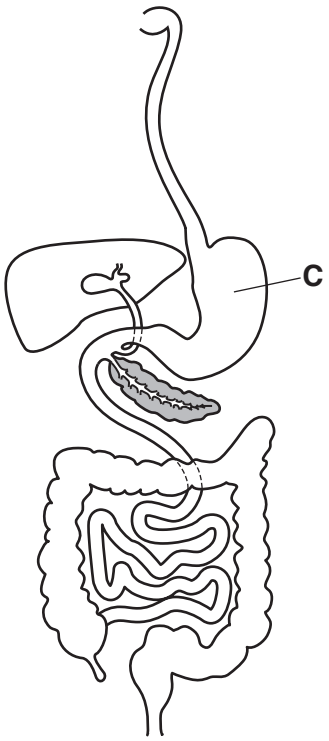

Fig. 2.1

(ii) On Fig. 2.1, use lines labelled **A** and **B** to indicate where egestion (**A**) and ingestion (**B**) occur. [2]

(b) State a component of the diet that is digested in region **C** in Fig. 2.1, and where the products are then absorbed into the blood.

component .....

where products absorbed .....
[2]

(c) Suggest the likely effect on digestion of removing a person's gall bladder.

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.....[5]

[Total: 10]

3 Fig. 3.1 shows flowers from the same species of plant at different stages, **D** and **E**, in their development.

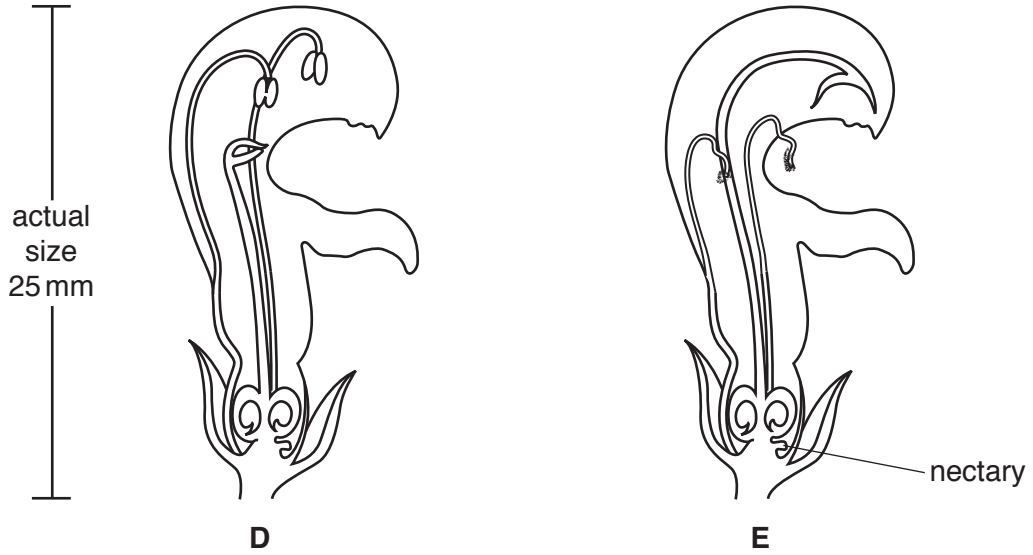

Fig. 3.1

(a) On Fig. 3.1, use lines labelled **S** and **C** to label a sepal (**S**) and a carpel (**C**). [2]

(b) The flowers are cross-pollinated by an insect. Explain why the insect must visit flower **D** before visiting flower **E**.

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.....

.....[3]

(c) Suggest how flowers of this species are adapted to be pollinated by an insect such as a bee.

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.....[4]

[Total: 9]

4 Table 4.1 shows the loss of water vapour by two similarly-sized potted plants, **F** and **G**, grown in the same environment over a period of 14 hours.

Table 4.1

	water vapour loss/arbitrary units	
time of day/hours	**plant F**	**plant G**
06.00 – 08.00	1.0	5.2
08.00 – 10.00	2.0	13.8
10.00 – 12.00	5.8	14.8
12.00 – 14.00	4.8	9.2
14.00 – 16.00	3.6	6.8
16.00 – 18.00	3.0	4.4
18.00 – 20.00	2.0	1.0

(a) State the time of day at which the **combined** loss of water vapour from the two plants is at its greatest.

.....[1]

(b) Suggest reasons for each of the following:

(i) the difference between the total amount of water vapour lost by plants **F** and **G** during the 14-hour period,

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.....[3]

(ii) the change in rate of water vapour loss by plant **F** from 06.00 hours to 12.00 hours.

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.....[3]

(c) The leaves of plant **G** have their lowest temperature at 12.00 hours. Suggest reasons for this.

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.....[2]

[Total: 9]

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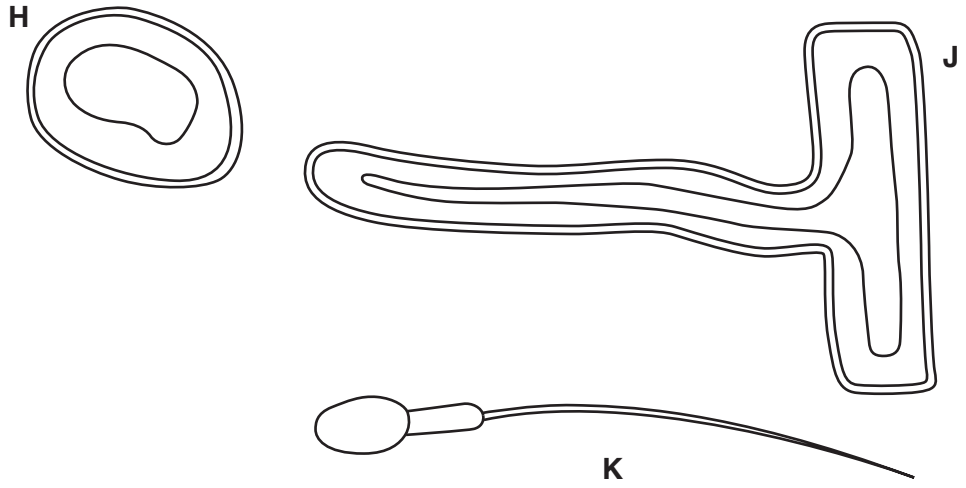
5 Fig. 5.1 shows cells with some of their structures missing.



not to scale

Fig. 5.1

(a) On the cells in Fig. 5.1, draw **and** label nuclei and chloroplasts in their appropriate positions. [4]

(b) State which cell has been produced by meiosis and name the organ in which it has been produced.

cell .....

organ ..... [2]

(c) Explain how energy plays an important part in the function of each of these cells.

cell **H**

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.....

.....

cell **J**

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.....

cell **K**

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.....

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[6]

[Total: 12]

Section B

Answer **both** questions in this section.

6 **(a)** Describe the journey made by a molecule of carbon dioxide after its production by respiration in a body cell, to the moment it enters the air in the lungs.

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.....[7]

(b) Explain how blood is kept flowing from the foot to the heart.

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.....[3]

[Total: 10]

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7 **(a)** Fig. 7.1 shows a section through a fruit.

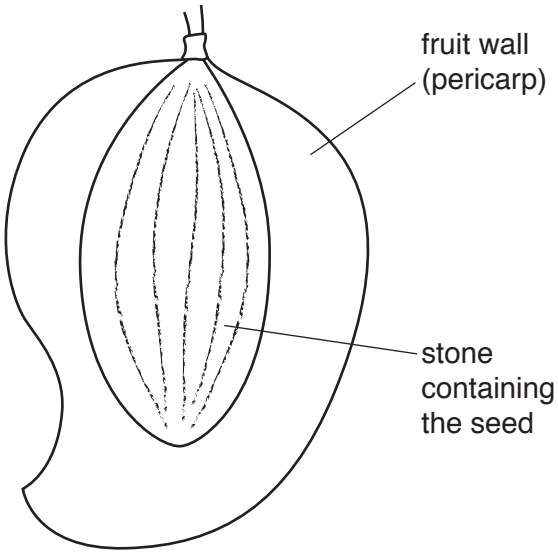

Fig. 7.1

The seed and the fruit wall are genetically different. Explain how this difference is produced.

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.....[4]

(b) Describe and explain the differences between wind-dispersed and animal-dispersed fruits.

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.....[6]

[Total: 10]

Section C

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

8 This is a simple food chain:

tree → insect → bird → fox

(a) Draw and label a pyramid of biomass for this food chain.

[2]

(b) Explain why only a small proportion of the energy in the insects passes to the birds.

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.....[4]

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(c) The foxes are infested with fleas (small, blood-sucking insects).

Draw and label a pyramid of numbers for the complete food chain **including** the fleas.

[4]

[Total: 10]

9 **(a)** Explain the measures taken, **excluding** the use of drugs, to reduce the spread of malaria.

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.....[6]

(b) Quinine was the only drug that was successfully used to protect against malaria until the 1920s.

Suggest why quinine has largely been replaced by more recently-discovered drugs.

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.....[4]

[Total: 10]

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