Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

3945832350

BIOLOGY **5090/21**

Paper 2 Theory **October/November 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.

CAMBRIDGE International Examinations

Section A

Answer **all** questions in this section.

1 Fig. 1.1 shows four types of human teeth **A**, **B**, **C** and **D**.

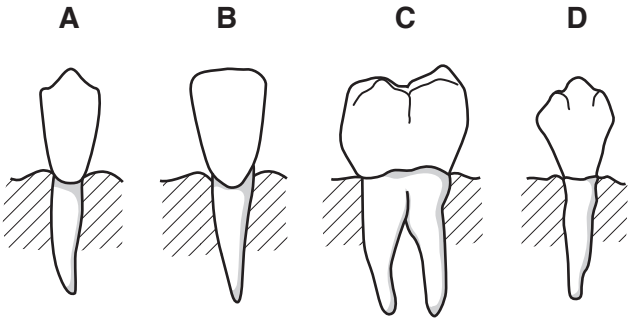

Fig. 1.1

Fig. 1.2 below shows the arrangement of teeth in the lower jaw of a human.

(a) Complete Fig. 1.2 to show the following for each of the two types of teeth indicated:

- the identity of each type of tooth by writing the correct letter **A**, **B**, **C** or **D** from Fig. 1.1
- the name of each type of tooth
- **one** function of each type of tooth. [6]

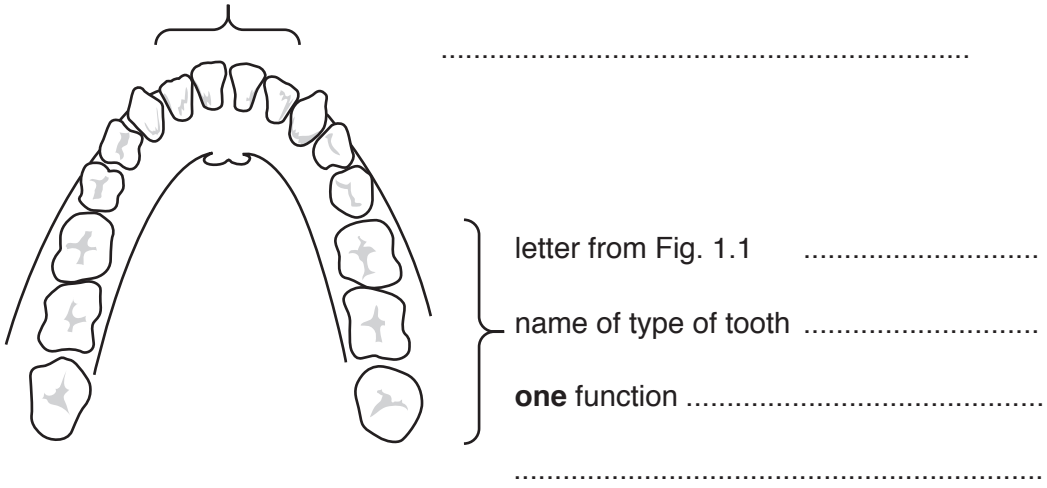

Fig. 1.2

(b) (i) State the causes of dental decay.

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.....[2]

(ii) Describe the proper care of teeth.

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.....[2]

[Total: 10]

[Turn over

2 Fig. 2.1 shows a section through a human kidney and its associated structures.

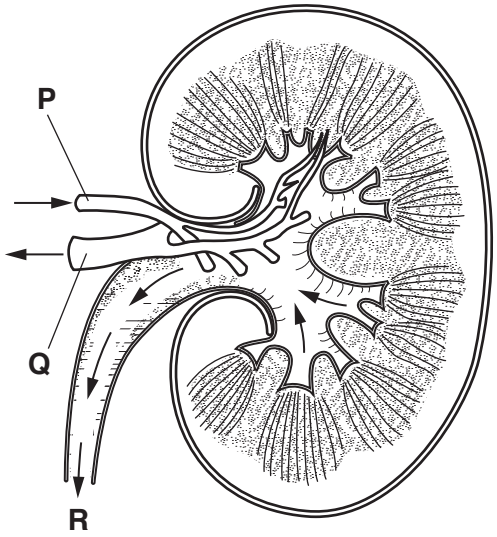

Fig. 2.1

(a) (i) Name the blood vessels **P** and **Q** in Fig. 2.1.

P .....

Q ..... [2]

(ii) Name the fluid **R** in Fig. 2.1 and describe the route taken by this fluid from leaving the kidney to being removed from the body.

name of fluid .....

route taken by fluid .....

.....

.....

.....

[4]

(b) A person with kidney damage requires the process of dialysis to take place several times each week.

Before dialysis begins, a surgical procedure is used to create a connection, called an AV fistula, between two blood vessels in the arm.

Fig. 2.2 shows the AV fistula and the connections between the blood vessels and a kidney machine.

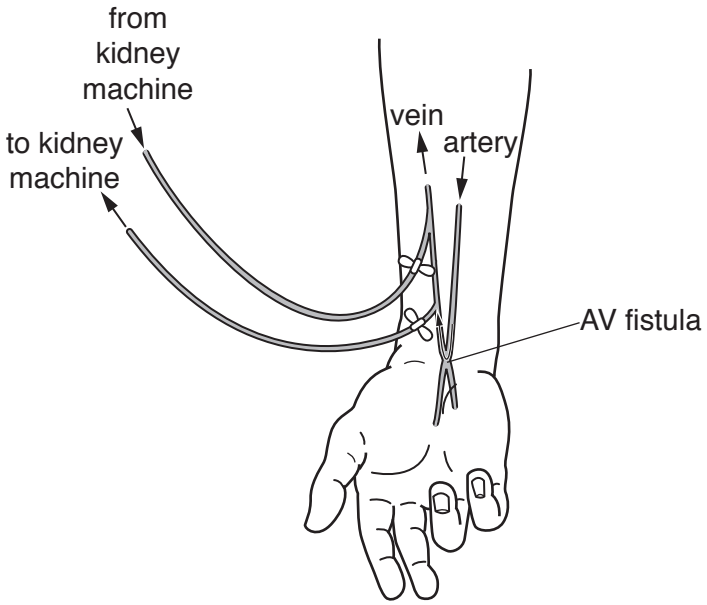

Fig. 2.2

(i) Suggest why the connection made between blood vessels is called an **AV** fistula.

.....[1]

(ii) State **one** way in which blood returning from the kidney machine will differ from blood leaving the body to enter the kidney machine.

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.....[1]

(c) Describe the role in dialysis of each of these components of a kidney machine:

artificial membrane

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dialysis fluid

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.....

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[5]

[Total: 13]

3 Fig. 3.1 shows the flow of energy within a biological system.

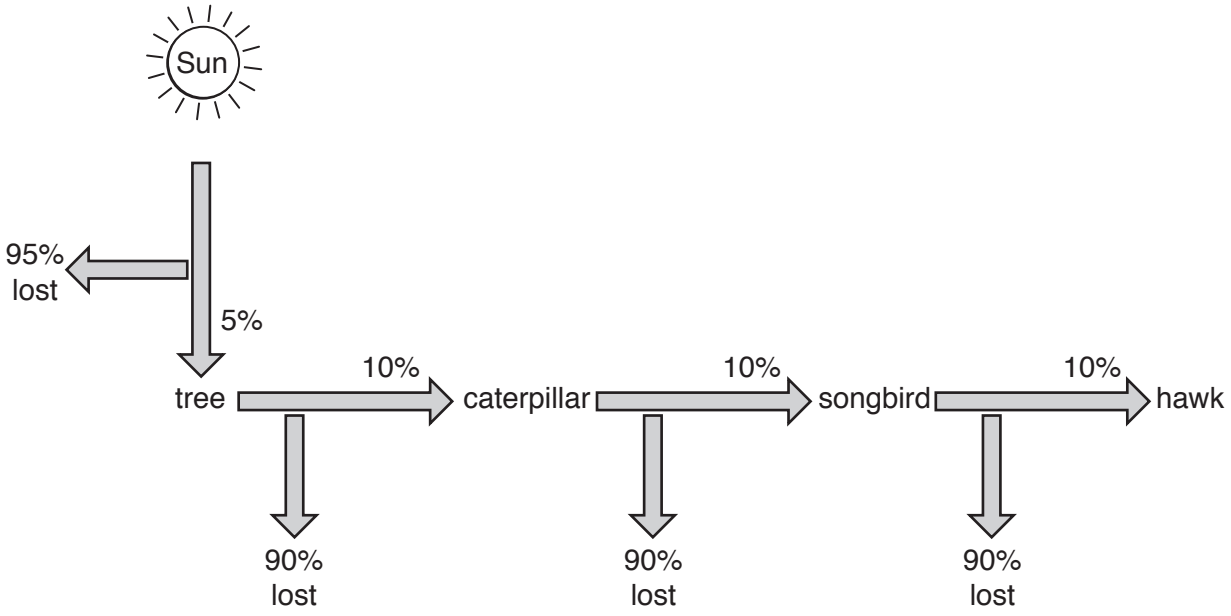

Fig. 3.1

(a) (i) Name the type of chart shown in Fig. 3.1.

..... [1]

(ii) Name **one** example, shown in Fig. 3.1, of each of the following types of organism.

producer .....

carnivore .....
[2]

(b) (i) Suggest why only 5% of the energy from the Sun passes to the tree.

.....

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.....

.....[2]

(ii) Describe how energy is lost between the songbird and the hawk.

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.....[3]

(c) Fig. 3.2 shows two possible uses of the same area of land to produce food.

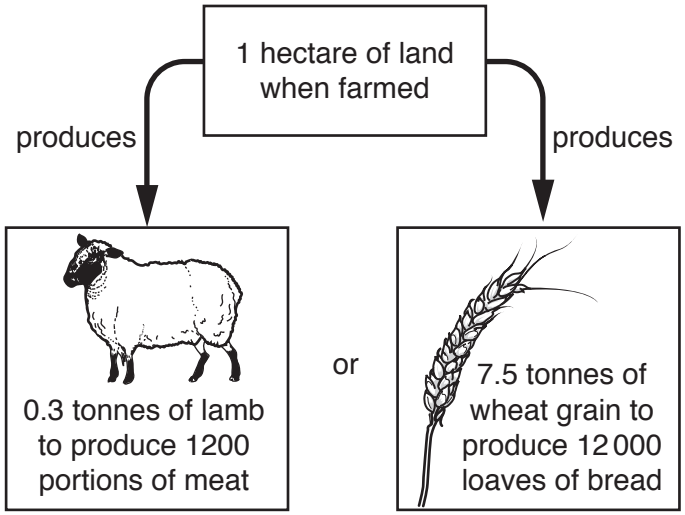

Fig. 3.2

Use the information in Fig. 3.1 and Fig. 3.2, and your own knowledge, to explain why it is possible to feed a greater number of people if the area of land is used to farm crops rather than to farm animals.

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.....[5]

[Total: 13]

4 Fig. 4.1 shows a human cell.

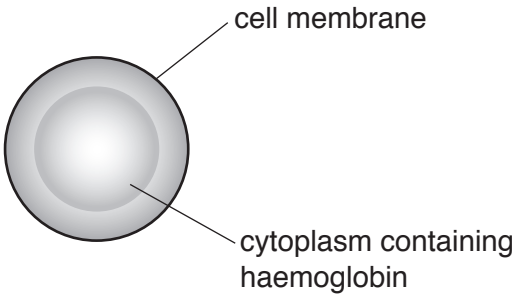

Fig. 4.1

(a) Name and state the main function of the type of cell shown in Fig. 4.1.

name .....

function .....

.....

[2]

(b) Suggest and explain what symptoms might be experienced by a person with an unusually low number of this type of cell.

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.....[4]

(c) Explain what would happen to the cell shown in Fig. 4.1 if placed in pure water.

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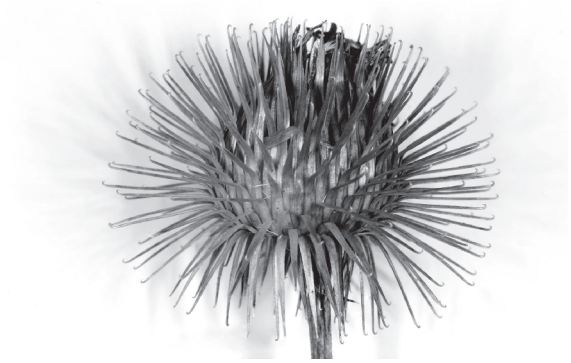
.....[3]

[Total: 9]

5 Fig. 5.1 shows the fruits of two plants, **A** and **B**. Both fruits are animal-dispersed.



fruit **A**

fruit **B**

Fig. 5.1

With reference to the features shown in Fig. 5.1, describe how these fruits are dispersed.

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.....[5]

[Total: 5]

Section B

Answer **both** questions in this section.

6 Fig. 6.1a shows the right eye of a person **before** moving into an area of bright light.

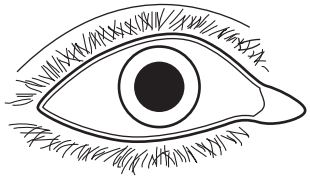

Fig. 6.1a

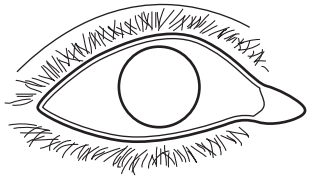

Fig. 6.1b

(a) (i) Complete Fig. 6.1b to show the appearance of the right eye of the person shortly **after** moving into an area of bright light. [1]

(ii) With reference to **named** structures within the eye, describe the changes that take place when a person moves into an area of bright light.

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.....[5]

(b) Name the type of action that occurs to make the changes that you have described and suggest why it is important that these changes take place.

type of action .....

why the changes take place .....

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[4]

[Total: 10]

7 Fig. 7.1 shows a fermenter used for the production of an antibiotic.

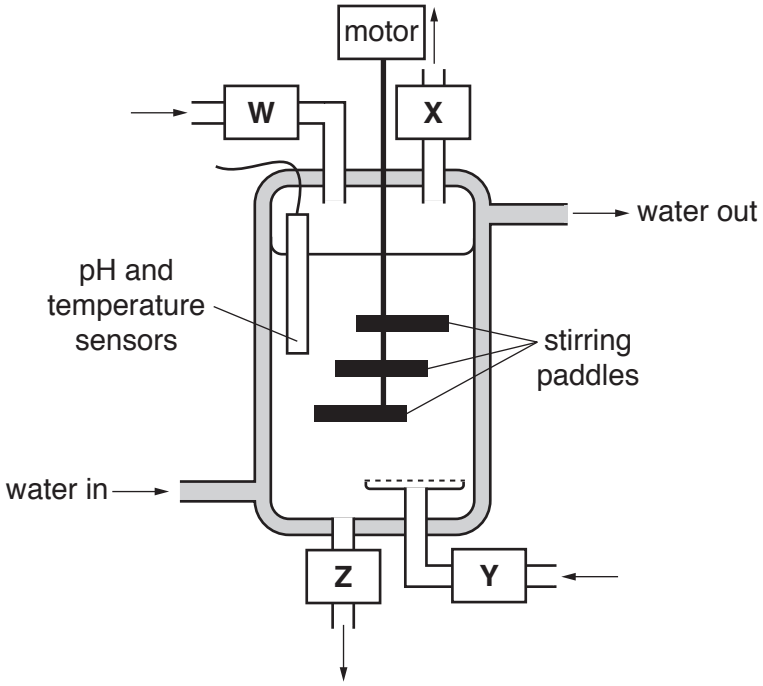

Fig. 7.1

(a) (i) Identify what enters or leaves through each of **W**, **X**, **Y** and **Z** in Fig. 7.1.

W .....

X .....

Y .....

Z ..... [4]

(ii) Explain the importance of the substance entering through **Y** in the production of the antibiotic.

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.....[2]

(b) Explain why it is important to detect and to control the pH and temperature of the contents of the fermenter.

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.....[3]

(c) Suggest **one** advantage of the motor being located outside, rather than inside, the reaction vessel of the fermenter.

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.....[1]

[Total: 10]

Section C

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

8 **(a)** With reference to specific examples, explain how and why diet should be related to the age and activity of an individual.

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.....[4]

(b) Describe digestion in the human stomach.

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.....[6]

[Total: 10]

9 **(a)** Describe how the nervous system is involved in the maintenance of a constant body temperature.

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.....[6]

(b) Describe the role of the hormone adrenaline and give **one** example of a situation in which adrenaline may be released.

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.....[4]

[Total: 10]

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