Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **5090/22**

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 **15** printed pages and **1** blank page.

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Section A

Answer **all** questions in this section.

1 Fig. 1.1 shows stages in the development of human twins.

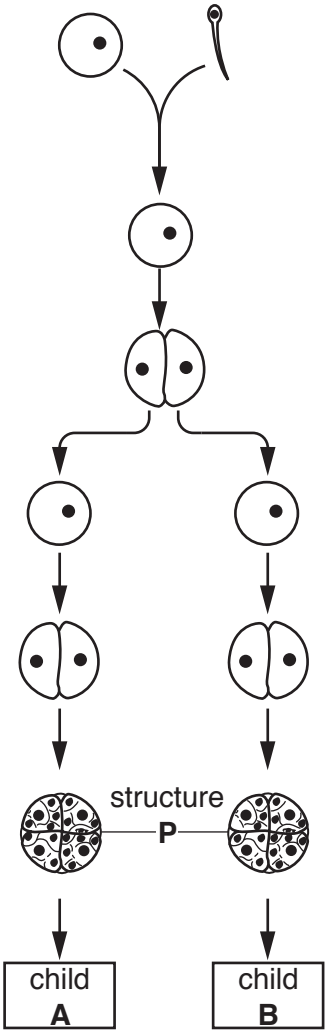

Fig. 1.1

(a) On Fig. 1.1, label and name each of the following:

- a gamete,
- a zygote. [2]

(b) Name the part of the female reproductive system that structure **P** enters.

.....[1]

(c) If the sex chromosome in the sperm is a Y chromosome, and in the ovum (egg) is an X chromosome, state the sex of child **A** and of child **B**. Explain your answer.

child **A** .....

child **B** .....

explanation .....

.....

.....

.....

.....
[4]

(d) Explain how a woman's body prevents further ova (eggs) from being released until the end of her pregnancy.

.....

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.....

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.....[4]

[Total: 11]

2 Fig. 2.1 shows changes in the body temperature of a person.

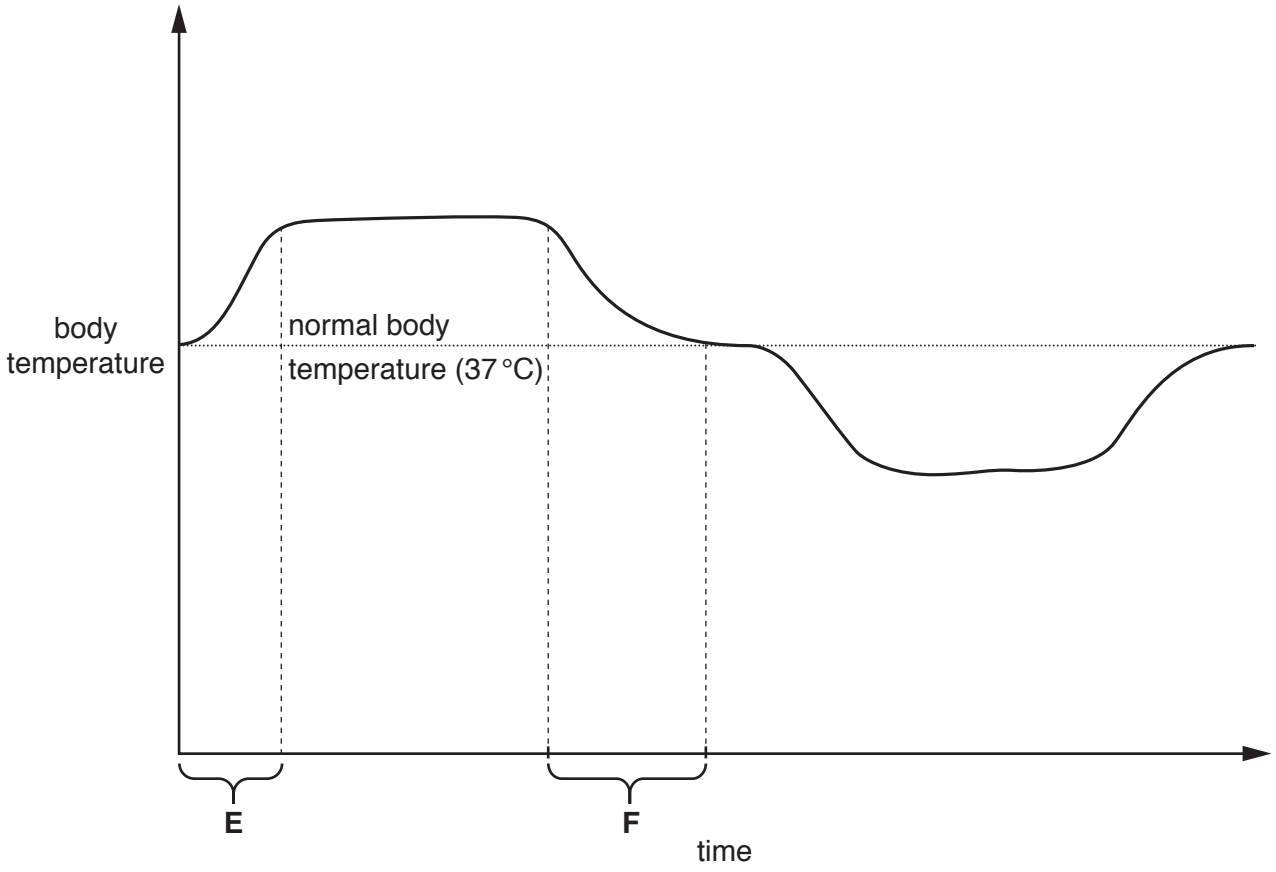


Fig. 2.1

(a) State the term for maintaining constant conditions, such as temperature, in the body.

.....[1]

(b) Suggest **three** things that could happen to account for the shape of the curve during time **E**.

1 .....

2 .....

3 .....
[3]

(c) Explain what is happening in the body to cause the change in body temperature at time **F**.

.....

.....

.....

.....

.....[3]

(d) Name each of the following:

(i) the process by which the return to a set point, as illustrated by Fig. 2.1, is achieved,

.....[1]

(ii) the part of the brain that controls this process.

.....[1]

[Total: 9]

3 An experiment was carried out to investigate the inheritance of flower colour.

In cross 1, a plant with blue flowers (plant **G**) was pollinated by another plant with blue flowers (plant **H**). The resulting seeds were collected and labelled 'batch 1'.

In cross 2, plant **G** was pollinated by a plant with white flowers (plant **J**). The resulting seeds were collected and labelled 'batch 2'.

All the plants were of the same species.

Fifty seeds from each of batch 1 and batch 2 were grown and the number of plants with white flowers was counted.

The results are shown in Table 3.1.

Table 3.1

batch	number of plants with white flowers
1 (from cross 1)	12
2 (from cross 2)	27

(a) Name the dominant phenotype in this experiment .....[1]

The alleles controlling flower colour in this plant are **B** (dominant) and **b** (recessive).

(b) **(i)** State the genotypes of

plant **G** .....

plant **H** .....

plant **J** ..... [3]

(ii) State which of these plants is heterozygous .....[1]

Question 3 continues on page 7.

(c) In the box below, draw a genetic diagram for cross 1 (between plants **G** and **H**).

[5]

[Total: 10]

4 Fig. 4.1 shows the relationships between a number of organisms living together in a South American rainforest.

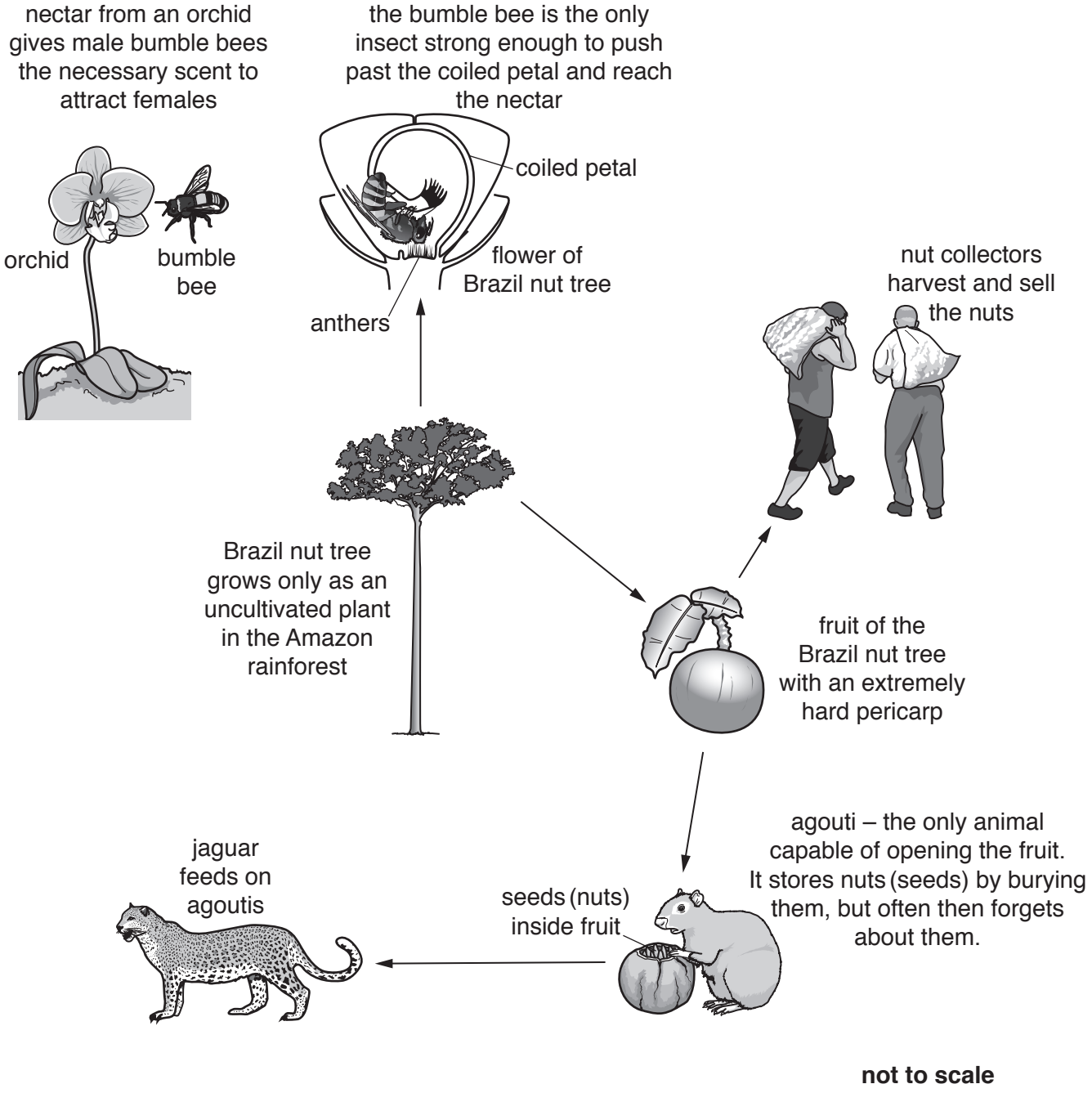
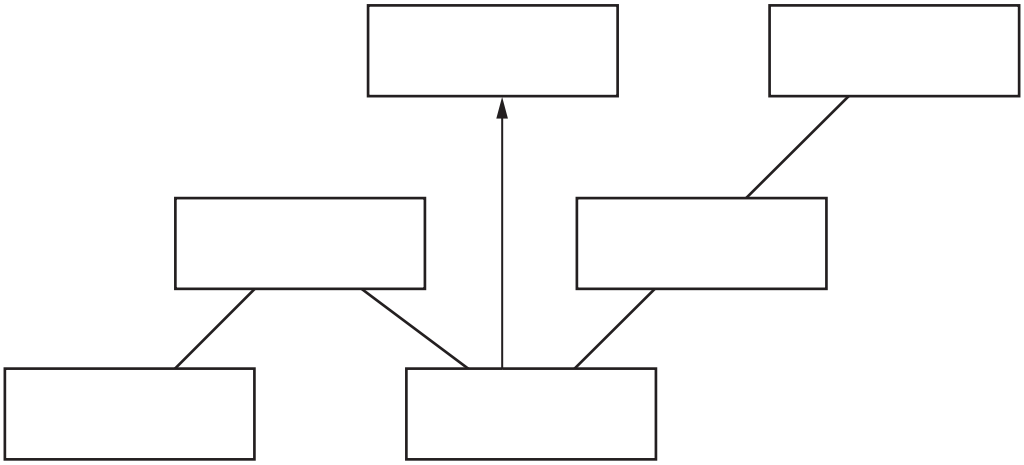


Fig. 4.1

(a) Fig. 4.2 is an incomplete food web for these organisms. Complete Fig. 4.2 by:

- writing the name of an organism in each box,
- completing the arrows to show the flow of energy.



[4]

Fig. 4.2

(b) Name the type of seed dispersal found in the Brazil nut tree. Give a reason for your answer.

.....

.....[2]

(c) Suggest the possible effects on the community in the rainforest if the orchids were killed by disease.

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.....

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.....

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.....[6]

[Total: 12]

5 Muscles are arranged around joints in pairs. One muscle contracts to bend a limb at a joint, and the other contracts to straighten it.

(a) **(i)** State the term for muscles that act in this way .....[1]

(ii) Name the muscle in your arm that contracts to move your hand away from your nose after smelling a flower.

.....[1]

(b) Fig. 5.1 shows how muscles are arranged in the human leg and pelvis, and also shows the leg in two different positions, **R** and **S**.

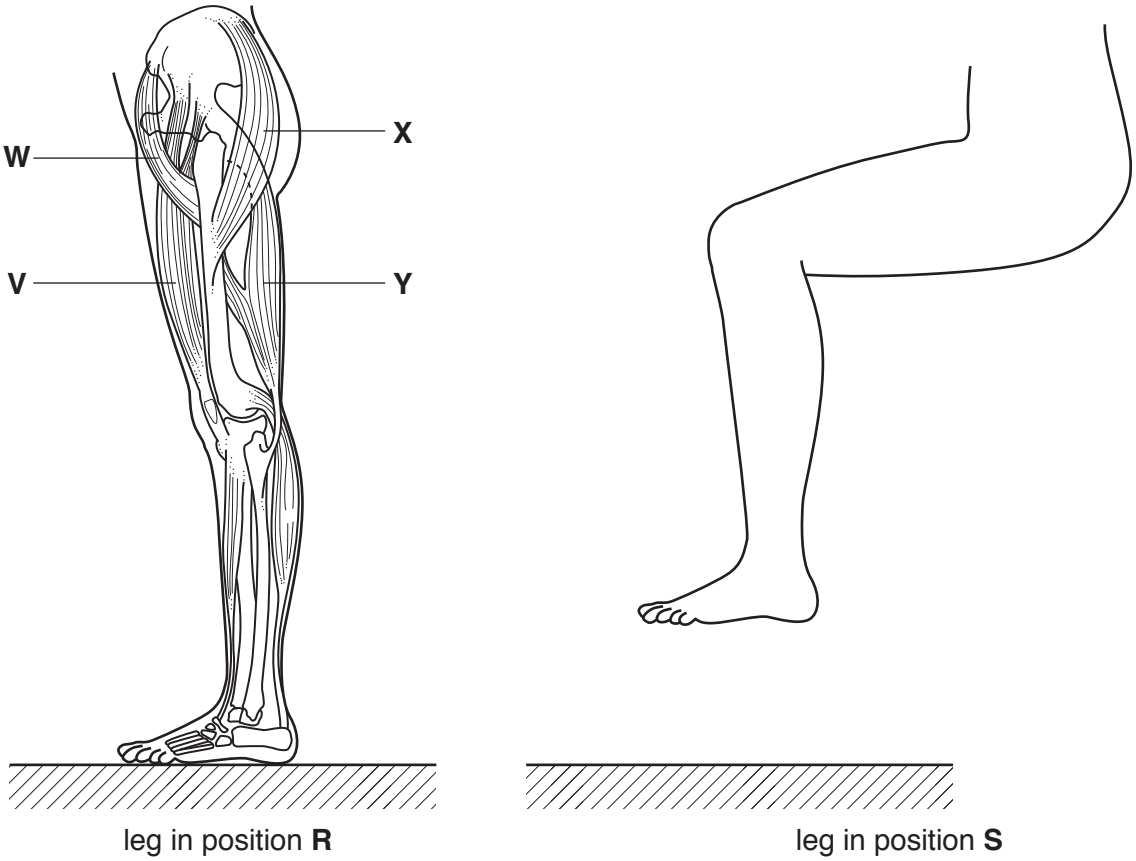

Fig. 5.1

(i) Using the letters in Fig. 5.1, identify the two muscles that contract to move the leg off the ground from position **R** to position **S**.

..... and ..... [2]

(ii) State what happens to the other muscles in Fig. 5.1 during this action.

.....[1]

(c) Describe how a similar arrangement of muscles in the eye helps vision in dim light.

.....

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.....[3]

[Total: 8]

Section B

Answer **both** questions in this section.

6 **(a)** Explain why most living organisms depend on photosynthesis.

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.....[6]

(b) Explain why increasing the light intensity in which a plant is growing does **not** necessarily increase its rate of photosynthesis.

.....

.....

.....

.....

.....

.....[4]

[Total: 10]

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7 **(a)** Describe the causes and symptoms of each of the following:

(i) rickets,

.....

.....

.....

.....

.....

.....[4]

(ii) scurvy.

.....

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.....

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.....

.....[4]

(b) Suggest why the alimentary canal does not produce any enzymes to work on vitamins.

.....

.....

.....[2]

[Total: 10]

Section C

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

8 **(a)** Explain how water is taken into a plant.

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.....[4]

(b) Suggest and explain why plants that absorb a toxic chemical from the soil that slows down the rate of respiration, do not grow as well as those growing in toxin-free soils.

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.....[6]

[Total: 10]

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9 **(a)** Describe and explain the features of a gas exchange surface.

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.....[4]

(b) Explain the effect of exercise on the breathing rate of a person.

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.....[4]

(c) Living at high altitude increases the number of red blood cells in a person's blood.

Suggest why athletes sometimes train at high altitude.

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.....[2]

[Total: 10]

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