



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

CANDIDATE  
NAME

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**BIOLOGY**

**5090/02**

Paper 2 Theory

**October/November 2009**

**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 a pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.  
**DO NOT WRITE IN ANY BARCODES.**

**Section A**

Answer **all** questions.  
Write your answers in the spaces provided on the Question Paper.

**Section B**

Answer **all** the questions including questions 6, 7 and 8 **Either** or **8 Or**.  
Write your answers in the spaces provided on the Question Paper.  
Write an **E** (for Either) or an **O** (for Or) next to the number 8 in the Examiner's grid below to indicate which question you have answered.

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.  
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.

| For Examiner's Use |  |
|--------------------|--|
| <b>Section A</b>   |  |
| <b>Section B</b>   |  |
| 6                  |  |
| 7                  |  |
| 8                  |  |
| <b>Total</b>       |  |

This document consists of **15** printed pages and **1** blank page.



Section A

Answer **all** the questions in this section.

Write your answers in the spaces provided.

For  
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Use

1 Fig. 1.1 shows a parent plant (A) and two of its offspring (B and C).

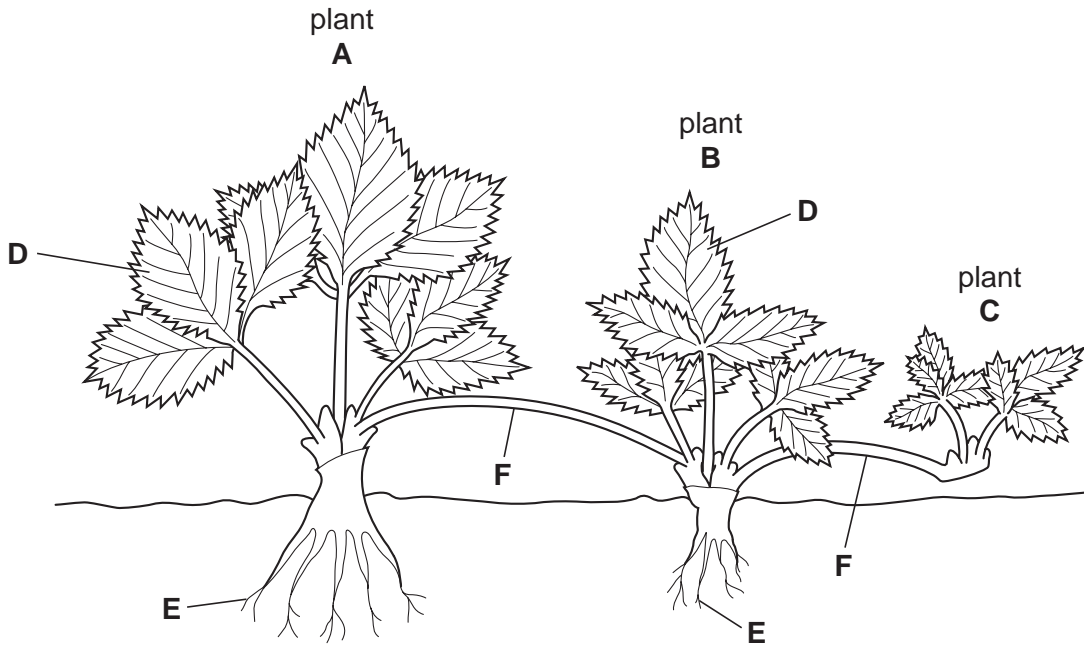


Fig. 1.1

(a) Name the type of reproduction shown in Fig. 1.1.

..... [1]

Plants A, B and C eventually separate and then produce offspring of their own using this same method of reproduction.

(b) State a **disadvantage** to the plant species of reproducing in this way.

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

(c) State two commercial advantages of this type of reproduction.

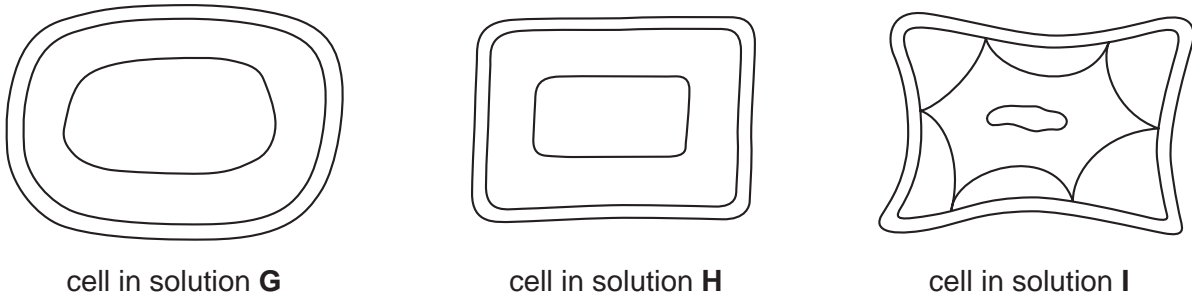
- 1. ....  
.....
- 2. ....  
..... [2]

(d) With reference to structures **D**, **E** and **F**, explain how plant **C** is able to grow before it becomes attached to the ground.

- structure D* ..... [2]  
.....
- structure E* ..... [2]  
.....
- structure F* ..... [3]  
.....  
.....

[Total: 11]

- 2 Fig. 2.1 shows three similar plant cells 5 minutes after being placed in different solutions, **G**, **H** and **I**. One of these solutions has a composition and water potential exactly the same as that of the cell sap in the cells.



**Fig. 2.1**

- (a) On **one** of the cells in Fig. 2.1, label clearly
- (i) with the letter **J**, a structure made of cellulose,
  - (ii) with the letter **K**, the part of the cell that would contain the nucleus.
- [2]

- (b) Identify the solution that has a **higher** water potential than the cell sap. Explain what has happened to cause the appearance of the cell in that solution.

*solution* ..... [1]

*explanation* .....

.....

.....

..... [4]

- (c) (i) On the cell in solution **I**, shade all the regions that would contain solution **I**. [1]

- (ii) Explain your answer to (i).

.....

.....

.....

..... [3]

[Total: 11]

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Use*

- 3 During heart transplant procedures, it is possible to keep the heart beating while it is being transported many miles from the donor to the patient. Fig. 3.1 shows diagrammatically how the heart is kept beating during transportation.

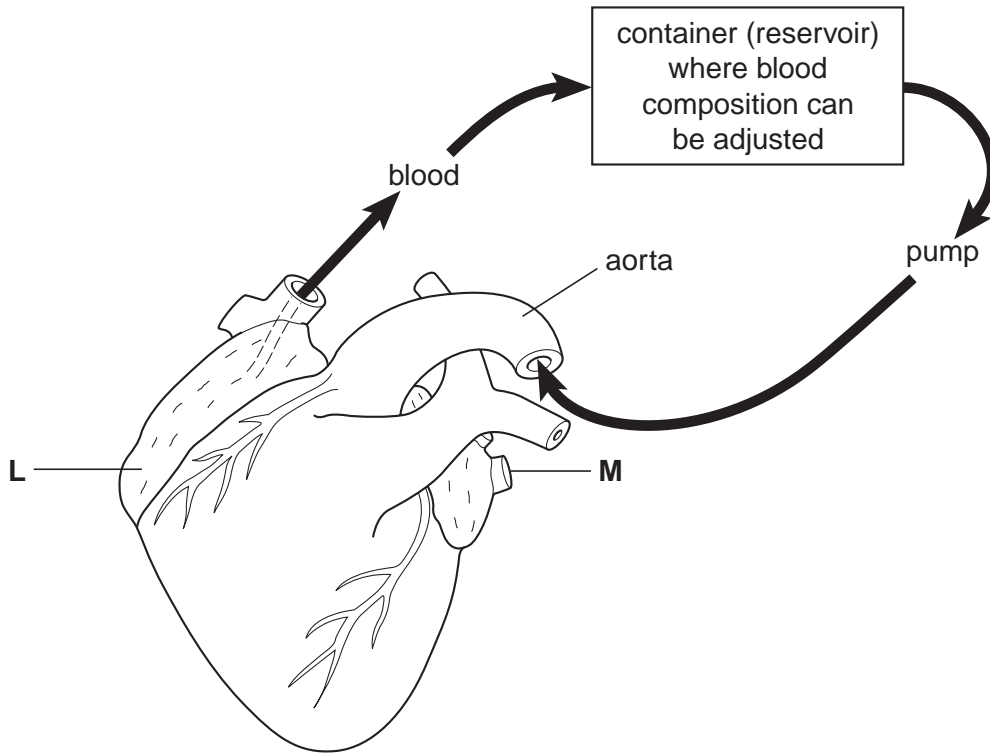


Fig. 3.1

- (a) Identify structures **L** and **M** on Fig. 3.1.

**L** .....

**M** .....

[2]

- (b) Suggest **two** chemicals which must be added to the blood in the reservoir, and explain your suggestions.

*chemical 1* .....

*explanation* .....

.....

*chemical 2* .....

*explanation* .....

..... [4]

(c) Using your knowledge of the structure of the heart, explain why blood entering the aorta from the reservoir flows into the heart muscle and **not** into the left ventricle.

*For  
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Use*

.....

.....

.....

.....

..... [3]

[Total: 9]

4 Fig. 4.1 shows two models of seeds which use the same type of seed dispersal.

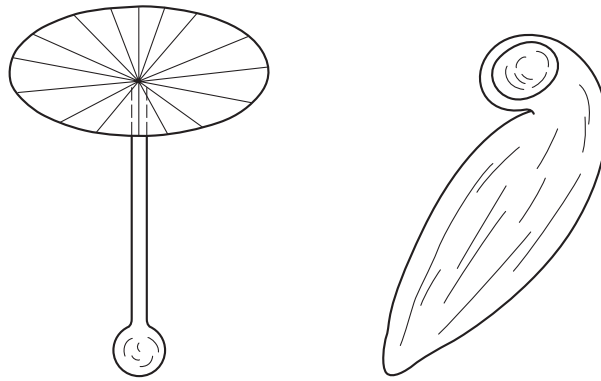


Fig. 4.1

(a) Name the structure within which a seed develops.

.....

[1]

(b) Suggest the type of seed dispersal shown.  
Explain how the structures in Fig. 4.1 are adapted for this type of dispersal.

*type of dispersal* .....

*adaptation and explanation* .....

..... [3]

Fig. 4.2 shows the percentage of seeds of a particular plant that germinate at different temperatures.

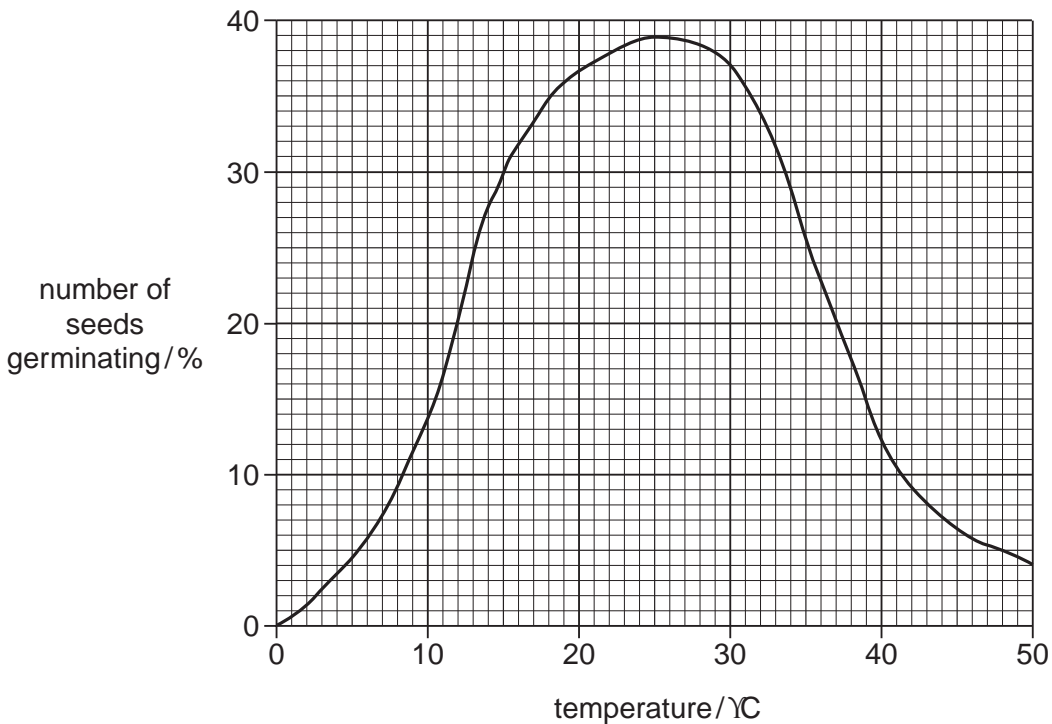


Fig. 4.2



(c) State two possible reasons why no more than 40% of the seeds germinate, even at the optimum temperature.

1. ....

2. .... [2]

(d) Suggest three reasons why, after germination, many seedlings do not live to become mature plants.

1. ....

2. ....

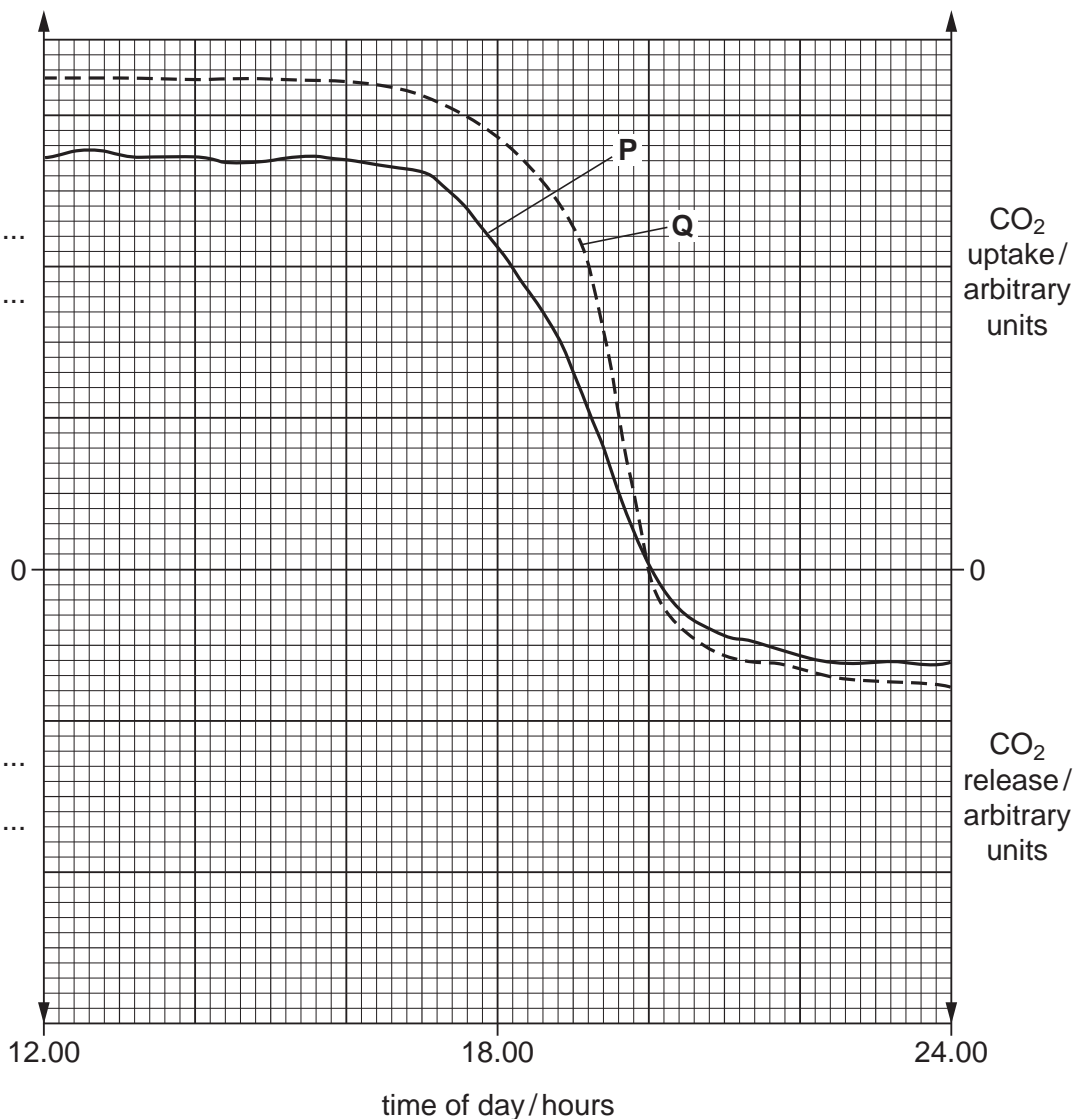
3. .... [3]

[Total: 9]

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5 In Fig. 5.1, curve **P** shows carbon dioxide uptake and release by a plant during a twelve-hour period between 12.00 hours and 24.00 hours.

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**Fig. 5.1**

(a) Name the process mainly responsible for the shape of graph **P** from 12.00 hours to 16.00 hours.

..... [1]

(b) (i) State the time at which there is no net movement of carbon dioxide into or out of the plant.

..... [1]

(ii) Explain the shape of the curve after this time.

.....  
..... [3]

(c) Name a factor that might cause the curve to appear like curve **Q** rather than curve **P** in Fig. 5.1.

..... [1]

(d) On Fig. 5.1, draw a curve to show the uptake and release of oxygen by the plant during the same period of time.

Label your axis in the spaces provided on Fig. 5.1. [4]

[Total: 10]

*For  
Examiner's  
Use*

**Section B**

Answer **all** the questions including questions 6, 7 and 8 **Either** or 8 **Or**.

Write your answers in the spaces provided.

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6 (a) Define a *hormone*.

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..... [4]

(b) Describe how the nervous system is involved in producing a **named** reflex action.

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..... [6]

[Total: 10]

7 (a) State where DNA is found and describe its importance in living organisms.

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.....  
.....  
.....  
..... [3]

(b) Describe the causes of

(i) sickle cell anaemia,

.....  
.....

(ii) Down's syndrome.

.....  
..... [3]

(c) Explain, with the use of a genetic diagram, how a child may be born with a blood group different from that of either parent.

[4]

[Total: 10]



8 Or

(a) Explain what is meant by *the non-cyclical nature of energy flow*.

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[3]

(b) (i) Distinguish between a food chain and a food web.

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(ii) Explain the feeding relationships between the main groups of organisms in a food web.

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[7]

[Total: 10]

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