UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

BIOLOGY **5090/21**

Paper 2 Theory **May/June 2011**

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

Section C
Answer **one** question.
Write your answers in the spaces provided on the Question Paper.

You are advised to spend no longer than one hour on Section A.
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	
Section A	
Section B	
Section C	
Total	

This document consists of **11** printed pages and **1** blank page.

UNIVERSITY of CAMBRIDGE International Examinations

Section A

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

Write your answers in the spaces provided.

1 Fig. 1.1 shows how, in 1951, some compounds of mercury (an inorganic substance) entered and passed along a food chain.

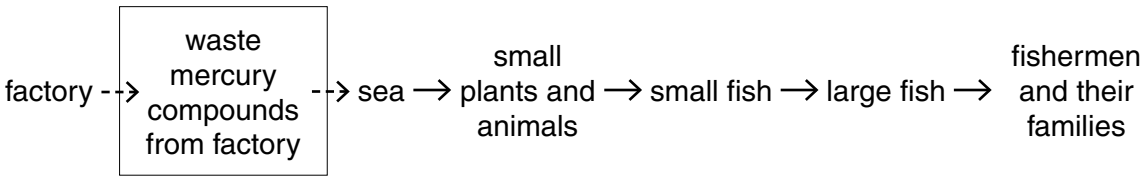

Fig. 1.1

(a) Name a producer in Fig. 1.1. .....[1]

Table 1.2 shows the concentration of mercury in parts per billion (ppb) in unpolluted sea water, in polluted seawater, in the flesh of the small fish and in the flesh of the large fish.

Table 1.2

unpolluted seawater / ppb	polluted seawater / ppb	flesh of small fish / ppb	flesh of large fish / ppb
0.1	2.0	200	20 000

(b) Calculate how many times more concentrated the mercury is in the polluted seawater than in the unpolluted seawater.

.....[1]

(c) Explain why the concentration of mercury changed with each successive member of the food chain.

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.....[5]

(d) Suggest why many of the fishermen and their families suffered from mental illness.

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.....[2]

[Total: 9]

2 Fig. 2.1 shows an experiment on the uptake of water by a leafy shoot placed in a light, breezy environment.

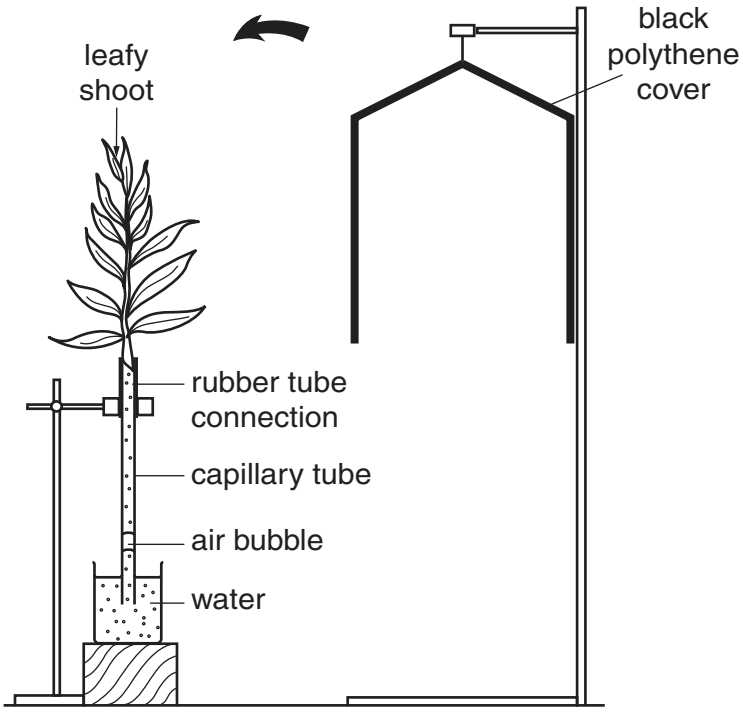

Fig. 2.1

(a) Explain what is likely to happen to the air bubble in the capillary tube.

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.....[3]

The black polythene cover is then placed over the plant.

(b) (i) State the effect this is likely to have on what happens to the bubble.

.....[2]

(ii) Explain your answer to **b(i)**.

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.....[6]

[Total: 11]

3 Fig. 3.1 shows some stages in human reproduction.

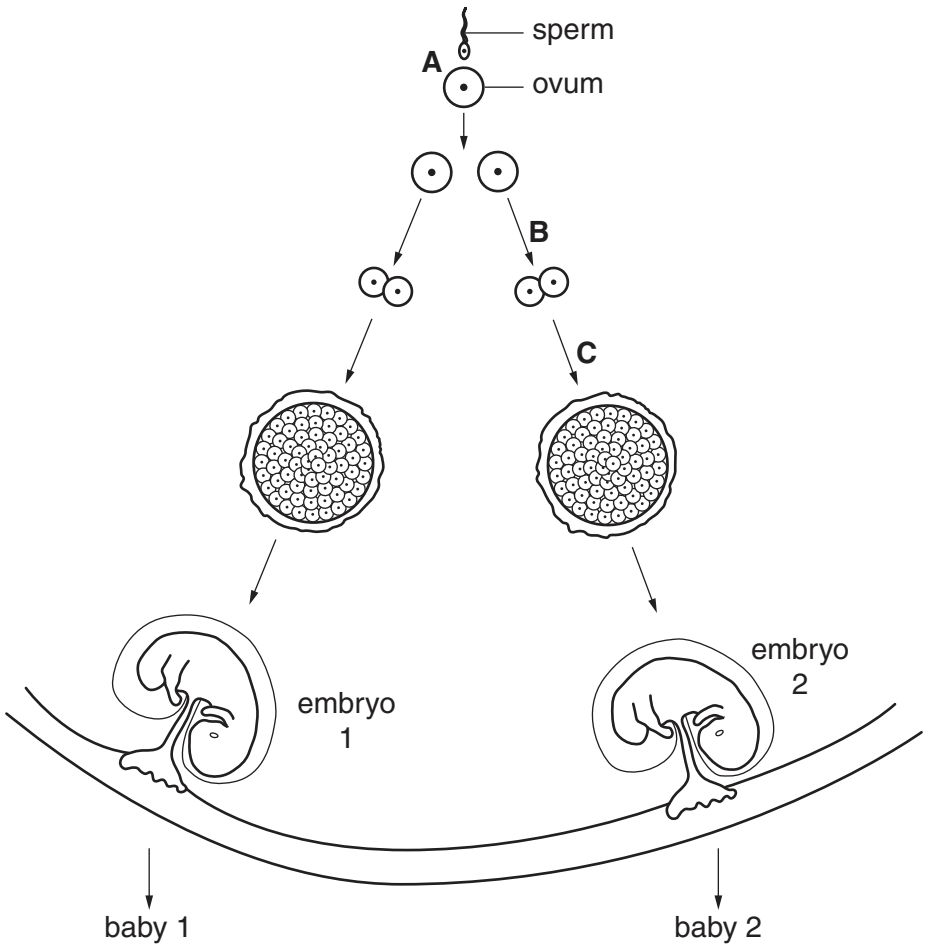

Fig. 3.1

(a) Name the process about to occur at **A** and state where in the reproductive system it normally occurs.

process .....

where it occurs .....[2]

(b) Name the type of cell division taking place at **B** and **C**.

.....[1]

The two embryos develop, are born and grow to become adults.

(c) Suggest two ways in which these two adults must be **similar** to each other, and explain your answers.

1. .....

2. .....

explanation

.....

.....[4]

(d) Suggest two ways in which they may **differ** from one another, and explain your answers.

1. .....

2. .....

explanation

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.....[4]

[Total: 11]

4 Fig. 4.1 shows a section through a flower. A pollen grain has been deposited on the carpel.

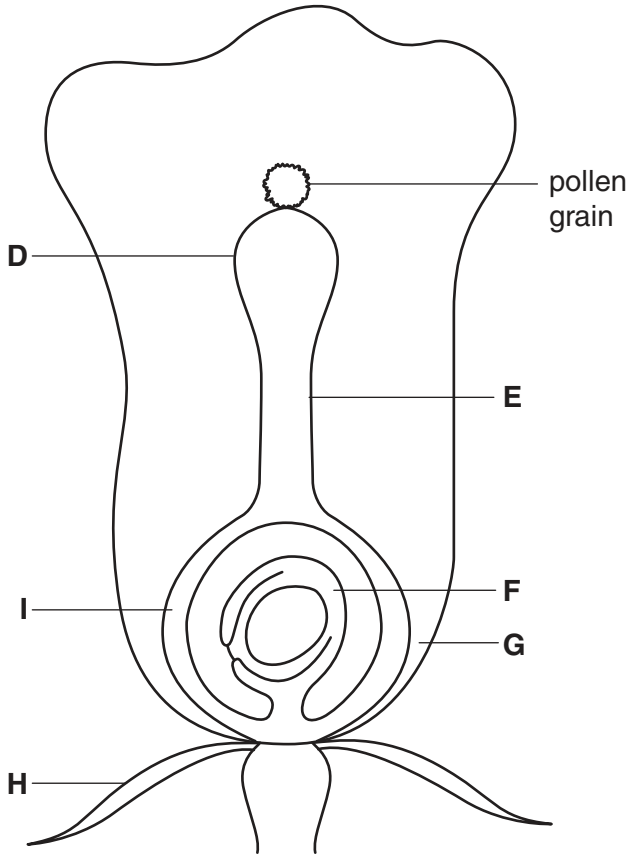

Fig. 4.1

(a) (i) Name the process that has occurred in bringing the pollen grain to the carpel.

..... [1]

(ii) State how this process has been brought about in this flower and give two reasons for your answer.

how the process has been brought about .....

.....

reason 1 .....

reason 2 .....[3]

(b) On Fig. 4.1, draw and label the pollen tube and the nuclei as they would appear just before the nuclei fuse. [3]

(c) Changes occur in the flower after the nuclei fuse. Use the letters in Fig. 4.1 to identify

- the parts of the flower that will die as the fruit is formed .....
- the part of the flower that will form the testa .....
- the part of the flower that will form the fruit wall. .....[4]

[Total: 11]

5 Fig. 5.1 shows the percentage of undigested molecules of starch as they pass through the alimentary canal.

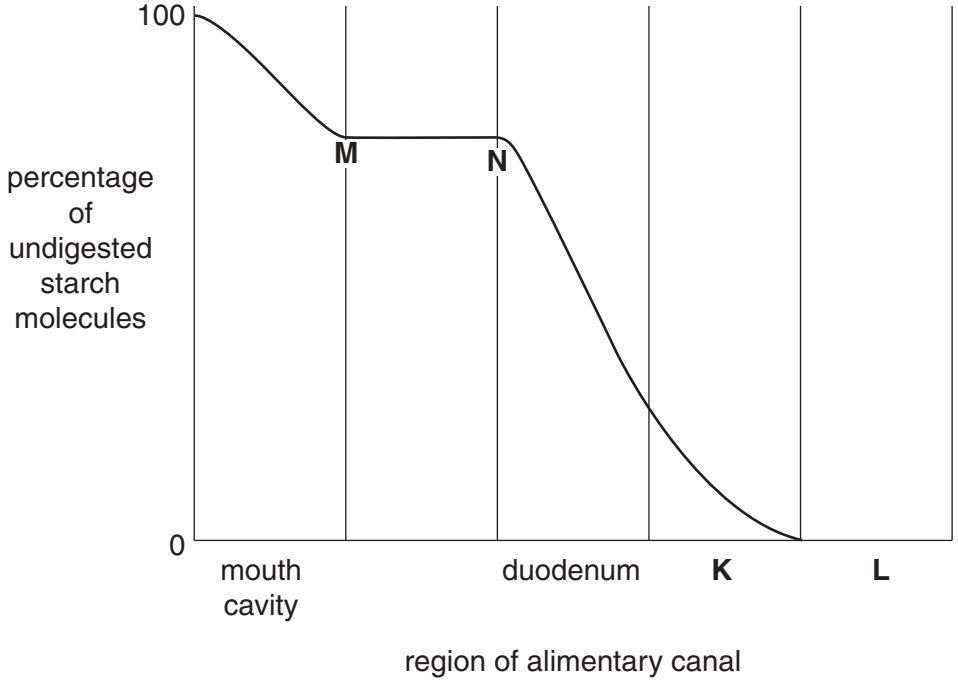

Fig. 5.1

(a) Name the parts of the alimentary canal represented by **K** and **L**.

K .....

L ..... [2]

(b) State and explain what happens to the digestion of starch between **M** and **N**.

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.....[4]

(c) Explain why the curve is not shown extending into region **L** of the graph.

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.....[2]

[Total: 8]

Section B

Answer **all** questions in this section.

Write your answers in the spaces provided.

6 **(a)** With reference to the blood vessels involved, describe

- how the liver is supplied with the requirements for its functions
- how its products are taken away.

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.....[8]

(b) Explain the importance of capillaries in excretory organs.

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.....[2]

[Total: 10]

7 **(a)** Describe how processes that occur in a green leaf play a part in the carbon cycle.

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.....[7]

(b) Explain why varying the light intensity does not always alter the rate of photosynthesis in a plant.

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.....[3]

[Total: 10]

Section C

Answer **one** question from this section.

Write your answers in the spaces provided.

8 **(a)** Describe the functions of the cell membrane.

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.....[5]

(b) Explain the advantages to a plant of having its cell membranes surrounded by cell walls.

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.....[5]

[Total: 10]

9 **(a)** For each of the following, state where, in the reflex arc, they are found and state their functions.

- sensory neurones

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- relay neurones

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- motor neurones

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.....[5]

(b) Explain why, just after hearing a sudden loud noise, a person's heart beats faster.

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.....[5]

[Total: 10]

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