UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

8927714268

BIOLOGY **5090/63**

Paper 6 Alternative to Practical **May/June 2010**

1 hour

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 in the spaces provided on the Question Paper.
You may use a soft 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.

Answer **all** questions.
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	
1	
2	
3	
Total	

This document consists of **8** printed pages.

UNIVERSITY of CAMBRIDGE International Examinations

1 Fig. 1.1 shows a section through a flower belonging to the pea family.

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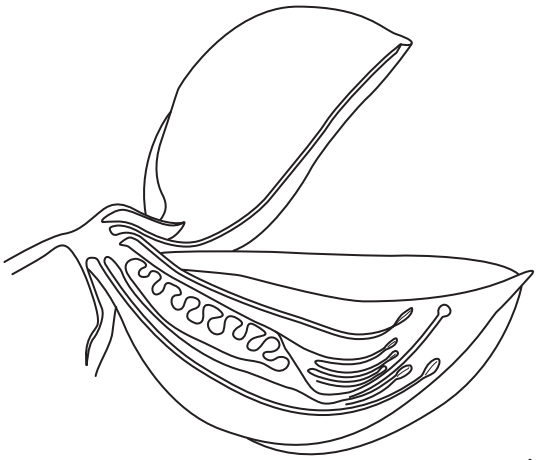

scale × 2

Fig. 1.1

(a) (i) Make a large labelled drawing of the carpel of the flower.

[5]

(ii) Suggest and explain how pollination might take place in this flower.

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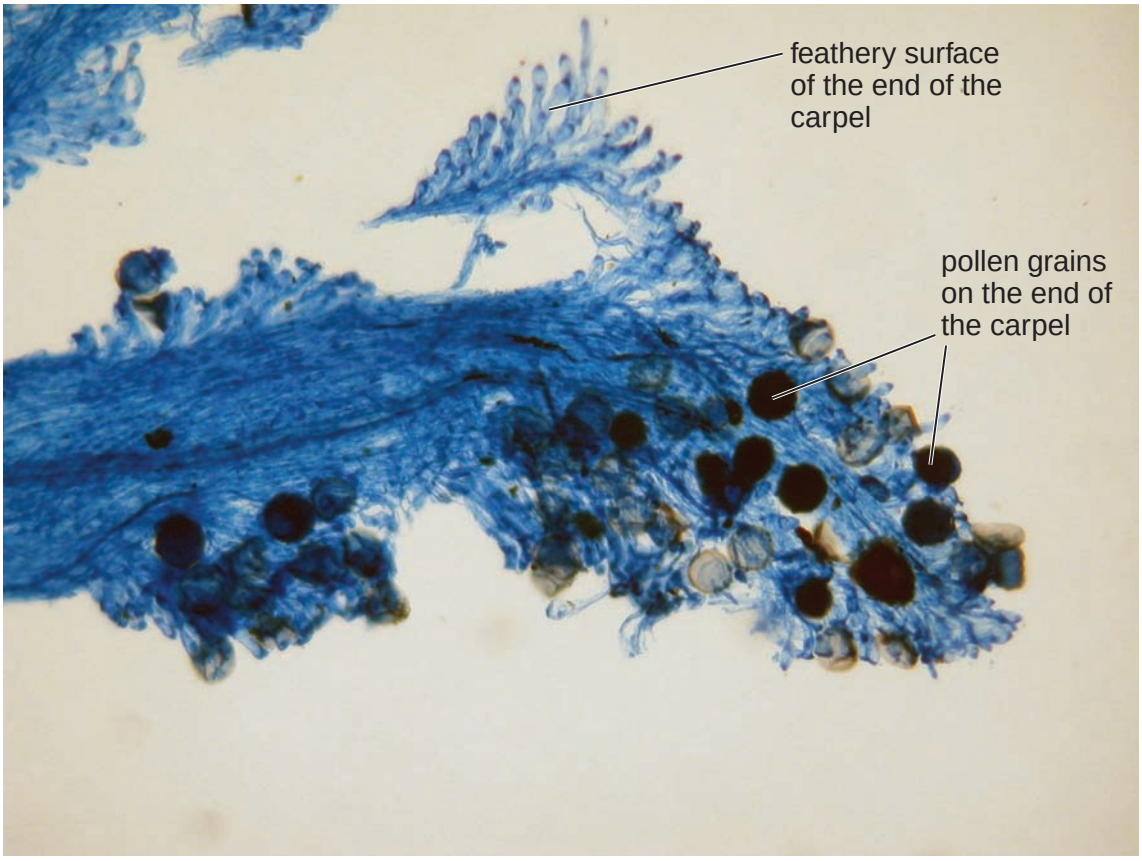
..... [3]

Fig. 1.2 shows a detailed photograph of the pollen grains on the end of the carpel.



× 400

Fig. 1.2

(b) By means of fully labelled diagram(s), show what happens to a pollen grain from this stage shown in Fig. 1.2 to the time fertilisation takes place.

[3]

Fig. 1.3 shows a section through a fruit developed from a carpel of the flower in Fig. 1.1.

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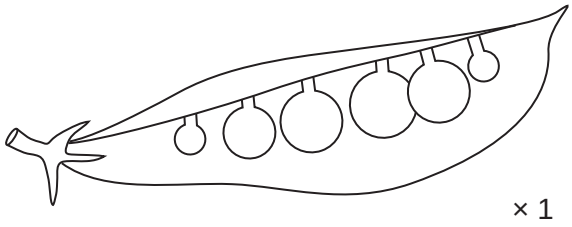

× 1

Fig. 1.3

(c) Label **two** structures on Fig. 1.3 other than a seed. [2]

The seeds when developed are used as food. Fig. 1.4 shows a different type of pea known as 'Mangetout', in which the whole fruit, including the seeds, is eaten.

× 1

'Mangetout'

Fig. 1.4

The apparatus in Fig. 1.5 can be used to measure the energy content of food.

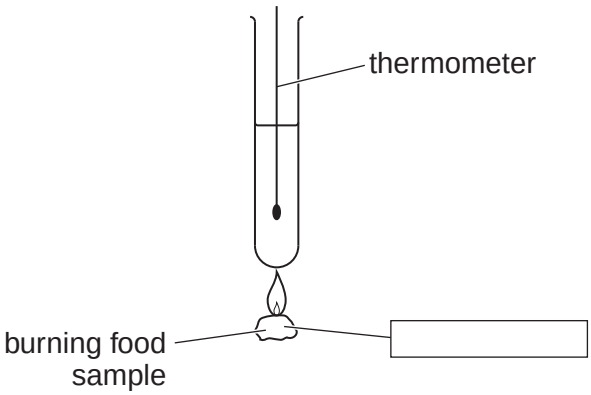

Fig. 1.5

(d) Design an investigation that you could carry out to compare the energy content of the two foods in Fig. 1.3 and Fig. 1.4. Include safety factors in your design.

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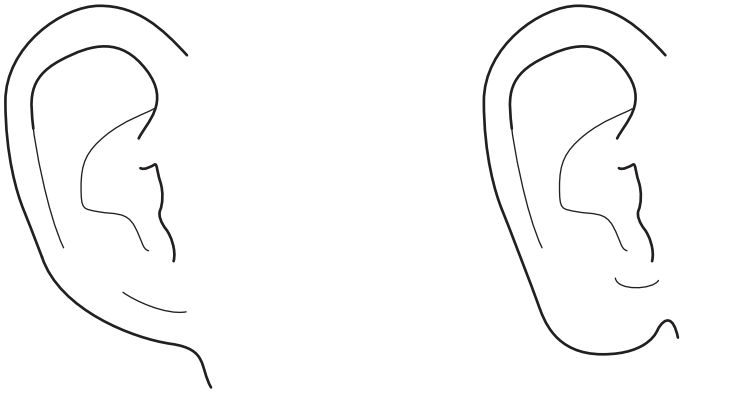
.....[6]

[Total: 19]

2 There is variation in the way in which human ear lobes are naturally joined to the head.

Fig. 2.1 shows the two versions.



× 1

attached free

Fig. 2.1

(a) Feel your own ear lobes and record whether you have attached or free ear lobes.

.....[1]

The results of a survey of the ear lobes of some students are shown in Table 2.1.

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Table 2.1

age/years	number of students with free ear lobes		number of students with attached ear lobes	
	male	female	male	female
1	21	112	4	2
1	3 9	14	3	5
1	41	0 8	4	3
1	51	310	2	5
total	43	44	13	15

(b) (i) What can you conclude from these results?

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.....[2]

(ii) Calculate the approximate ratio of free to attached ear lobes in this group.

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.....[2]

(iii) Explain how this ratio might help in understanding the way in which the attachment of ear lobes is inherited.

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.....[2]

[Total: 7]

3 Milk can be changed into yoghurt by adding two species of bacteria.

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These bacteria use lactose, the sugar in milk, as an energy source. As a result, lactic acid is produced.

This acid lowers the pH which causes the milk to thicken and form yoghurt.

Some students investigated the effect of time on this decrease in pH and the formation of yoghurt.

(a) Suggest how the students may have measured

(i) any changes in pH that took place during the process,

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..... [1]

(ii) any change in thickness that took place during the process.

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..... [2]

(b) Certain factors should be kept constant during this investigation.

Suggest two such factors and explain why each should be kept constant.

factor 1 .....

explanation .....

.....

.....

factor 2 .....

explanation .....

.....

..... [4]

Table 3.1 shows the results obtained by the students.

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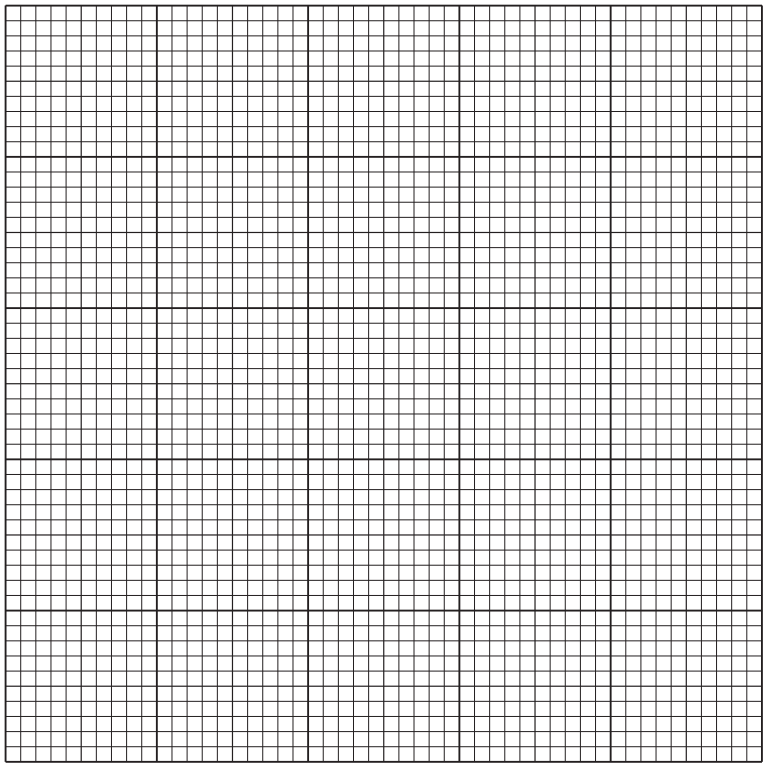
Table 3.1

time / hours	pH	description of yoghurt
1	7	liquid 'runny'
2	6.8	liquid
3	5.4	thicker but still liquid
4	5.1	slightly set
5	4.6	set, not liquid

(c) Using the results in Table 3.1, construct a graph to show the relationship between time and pH.



[4]

(d) Suggest, giving reasons, what might have happened in this investigation if measuring had continued for 10 hours.

suggestion .....

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reasons .....

.....[3]

[Total: 14]