UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

3560661291

BIOLOGY **5090/62**

Paper 6 Alternative to Practical **May/June 2013**

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.
Electronic calculators may be used.

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

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1 Some students investigated the effect of two different concentrations, **A** and **B**, of the same solution on strips of fresh Irish potato tissue.

Four strips of tissue, each measuring 5 mm thick and 60 mm long, were cut from a cleaned fresh potato. Two strips had the outer layer of skin left on them as shown in Fig. 1.1a; the other two strips had no skin, as shown in Fig. 1.1b.

The skin of a potato contains dead cells that have waterproof materials deposited in their walls.

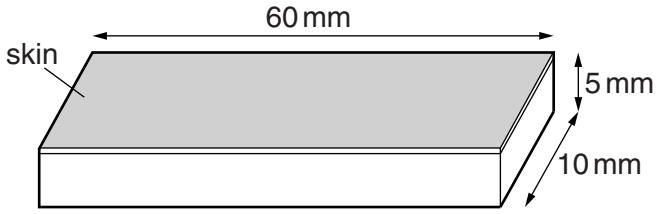


Fig. 1.1a

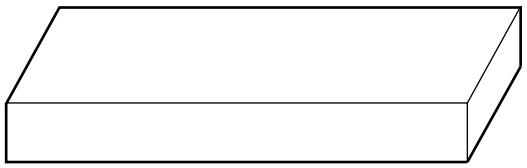


Fig. 1.1b

One strip with skin and one without skin were submerged in solution **A** in a shallow dish. The remaining two strips were submerged in solution **B** in a similar way.

The strips were measured at the start, after 10 minutes and after 20 minutes and these lengths were recorded in Table 1.1.

Table 1.1

	length of potato strip / mm			
time / mins	in solution **A**		in solution **B**	
	with skin present	without skin	with skin present	without skin
0 [at start]	60	60	60	60
10	60	58	60	62
20	58	56	62	65
change in length / mm				

(a) Calculate the change in length of the four potato strips after 20 minutes in the solutions **A** and **B**. Record your answers in Table 1.1. [3]

In the strips of potato **without the skin**, there was a change in texture as described in Table 1.2.

Table 1.2

texture	time / mins	in solution **A**	in solution **B**
	20	soft, flexible	hard, rigid

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(b) Explain fully what had happened to cause the difference in texture between these potato strips.

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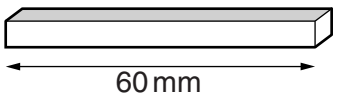
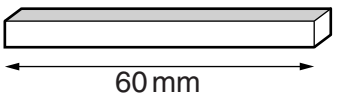
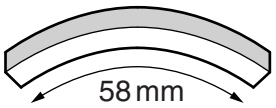
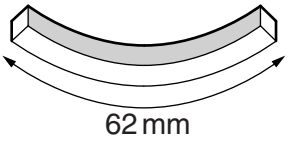
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.....[5]

In the strips of potato **with the skin**, there was a change in the shape as shown in Table 1.3.

Table 1.3

	time / mins	in solution **A**	in solution **B**
change in shape	0		
	20		

(c) Using the information in Table 1.3, suggest how the presence of the skin has caused the differences in shape.

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.....[3]

[Total: 11]

2 Fig. 2.1 shows a bean seedling and a pea seedling. Both seedlings had been growing for five days under the same conditions.

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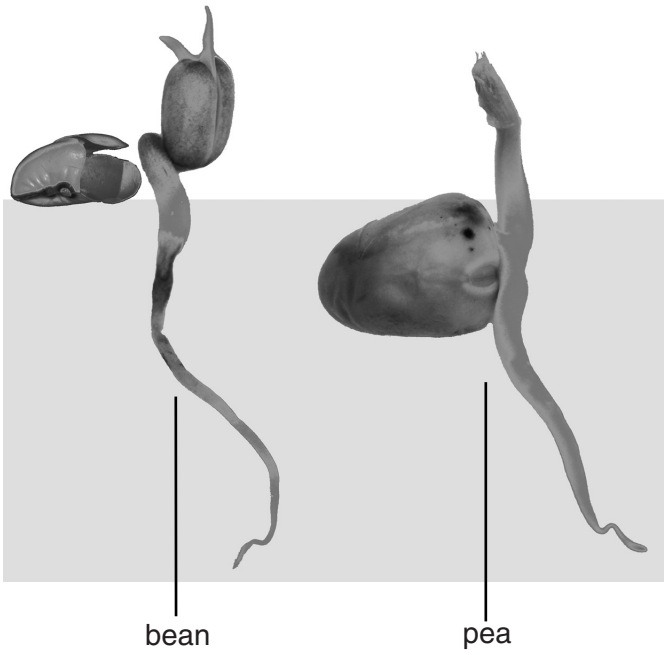


Fig. 2.1

(a) Complete Table 2.1 to show differences in four visible structural features of these seedlings.

Table 2.1

structural feature	bean seedling	pea seedling
1. radicle		
2. plumule		
3. cotyledon		
4. testa		

[4]

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(b) (i) Measure the total uncurled length of the **pea** seedling in Fig. 2.1 and record it below.

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.....

Measure the total uncurled length of the **bean** seedling in Fig. 2.1 and record it below.

.....
[2]

(ii) Make a large labelled drawing to show the whole of the **pea** seedling, twice its actual size.

[6]

Peas and beans belong to the same plant group, legumes. Seeds of legumes are known to contain protein.

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(c) (i) Describe a practical test you could carry out on a fresh pea seed to show it contains protein.

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.....[3]

(ii) Describe an investigation you could carry out using this test to compare the protein content of fresh pea seeds and fresh bean seeds.

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.....[3]

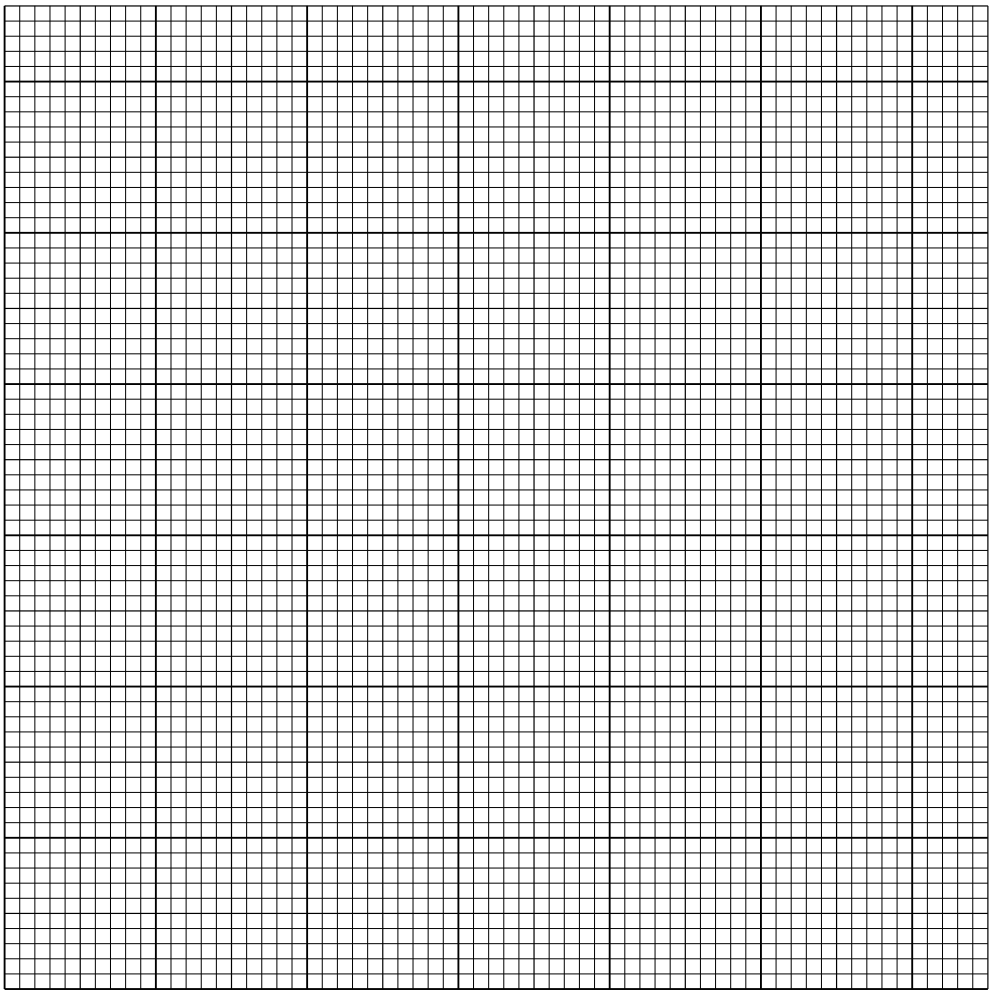
Seeds of legumes are known to contain higher levels of protein than any other food plants. Table 2.2 shows the approximate masses of protein found in 100 g masses of some fruits and vegetables.

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Table 2.2

type of fruit or vegetable	carrot	lentil	pea	potato	soya bean	tomato
mass of protein in g / 100 g	1.0	23.5	19.0	5.0	22.0	1.5

(d) (i) Draw a bar chart on the grid below to show the protein content of these foods.



[3]

(ii) Of the types of fruits and vegetables named in Table 2.2, suggest which are legumes.

.....[1]

[Total: 22]

3 The composition of inhaled air differs from that of exhaled air.

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Complete Table 3.1 for water vapour in exhaled air and state the test for the presence of each of the three gases.

Table 3.1

	inhaled air	exhaled air	test
carbon dioxide	0.04%	4.0%	
oxygen	21%	16.0%	
water vapour	variable – depends on environment		

[7]

[Total: 7]

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