



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

CANDIDATE  
NAME

CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**BIOLOGY**

**0610/63**

Paper 6 Alternative to Practical

**May/June 2013**

**1 hour**

Candidates answer on the Question Paper.

No Additional Materials are required.

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**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 or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

**DO NOT WRITE IN ANY BARCODES.**

Answer **all** questions.

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.

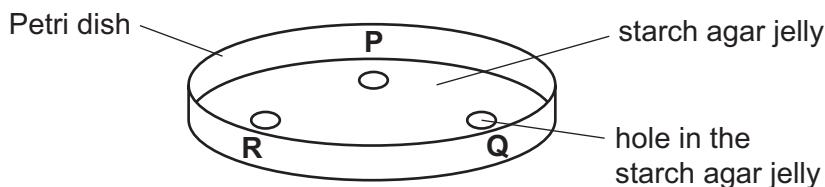
The number of marks is given in brackets [ ] at the end of each question or part question.

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This document consists of **13** printed pages and **3** blank pages.



- 1 (a) Some students investigated the effect of enzyme concentration on starch. They were provided with a Petri dish containing a layer of starch agar jelly. The students cut three small holes in the starch agar jelly and labelled them as shown in Fig. 1.1.



**Fig. 1.1**

They placed the starch agar jelly that had been cut out of the holes on a white tile and added two drops of dilute iodine solution to each piece.

The dilute iodine solution changed from yellow/brown to deep blue.

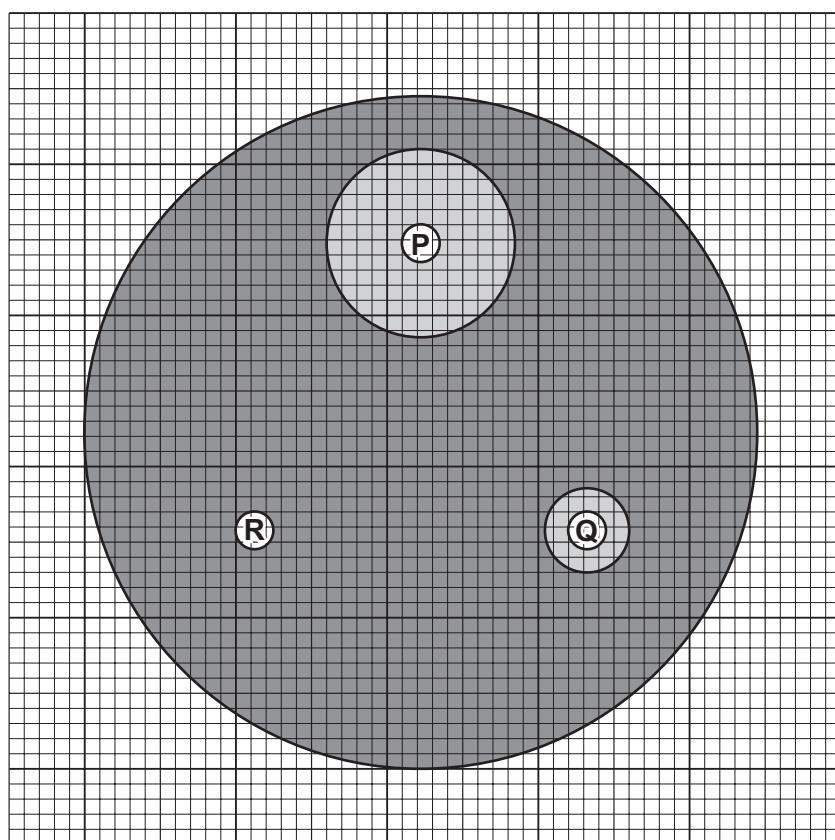
- (i) State why the colour changed.

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

The students were given two different concentrations of the same enzyme, solution 1 and solution 2.

- They put two drops of enzyme solution 1 into hole P.
- They put two drops of enzyme solution 2 into hole Q.
- They put two drops of water into hole R.
- After 15 minutes dilute iodine solution was poured over the surface of the starch agar jelly.

Fig. 1.2 shows the appearance of the surface of the starch agar jelly after dilute iodine solution had been added. The Petri dish was placed on a piece of squared paper.



key	
	deep blue
	clear
	hole in the starch agar jelly
1 small square = 4mm <sup>2</sup>	
□ = 4mm <sup>2</sup>	

**Fig. 1.2**

- (ii) Holes **P**, **Q** and **R** are the same size.  
Use the grid and count the squares to estimate the area of hole **R**.

area of hole **R** ..... mm<sup>2</sup> [1]

(iii) Describe the results shown in Fig. 1.2.

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- (iv) Explain the results shown in Fig. 1.2.

[3]

- (v) Suggest the name of the enzyme used in this investigation.

[3]

- (vi) State why water was added to hole R.

[1]

[1]

- (b)** Germinating seeds produce enzymes that change stored food into soluble materials.

Suggest a method similar to that in (a) that you would use to find out if germinating pea seeds produce the same enzyme as in enzyme solutions 1 and 2.

[4]

[4]

(c) Fig. 1.3 shows a pea seedling.



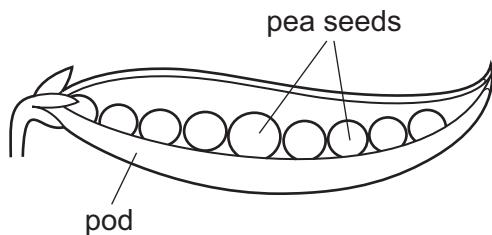
**Fig. 1.3**

Make a large, labelled drawing of the pea seedling in the space provided on page 7.

Draw the pea seedling in the space below.

[4]

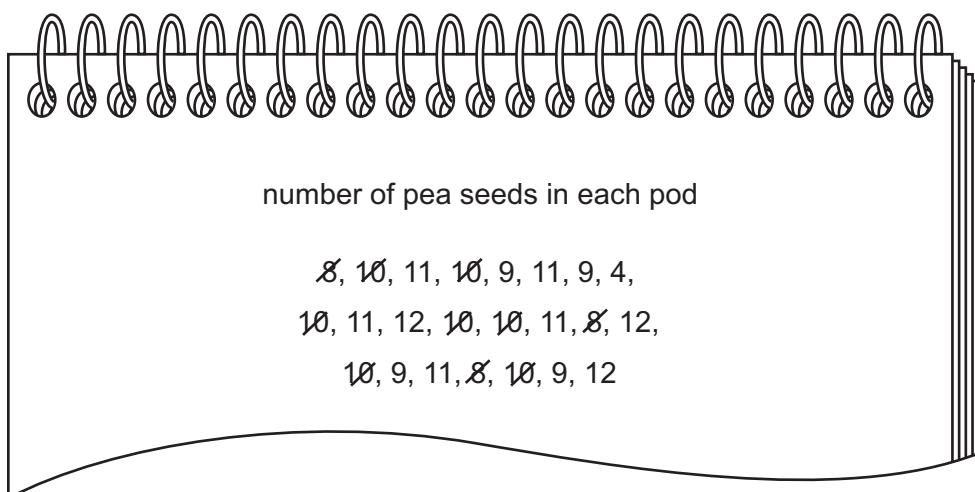
- (d) Fig. 1.4 shows pea seeds in a pod.



**Fig. 1.4**

The number of pea seeds in a pod varies.  
 Two students picked a sample of 23 pods.  
 They opened the pods and counted the number of pea seeds.

Fig. 1.5 shows the students' results.



**Fig. 1.5**

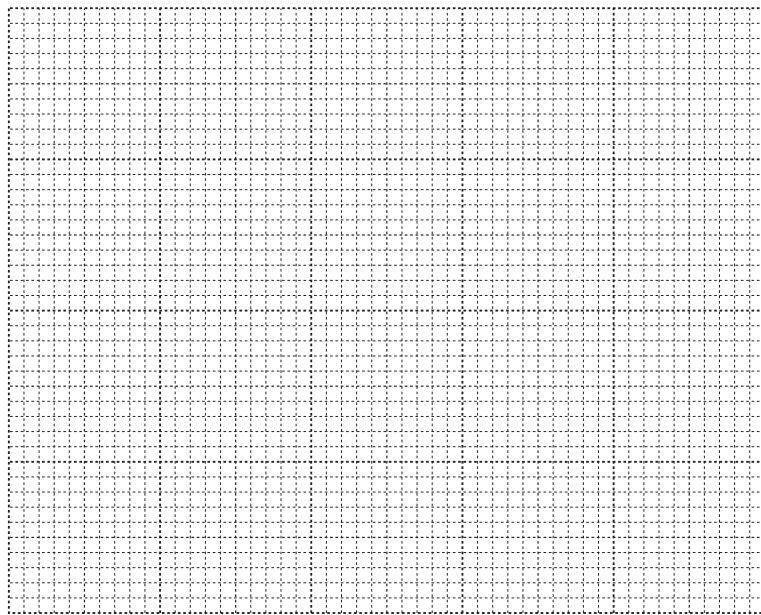
- (i) Complete Table 1.1 using the results from Fig. 1.5 to show how many pods there were with each number of pea seeds.  
 Two rows have been completed for you.

**Table 1.1**

number of pea seeds in each pod	tally	number of pods
4		
5		
6		
7		
8	///	3
9		
10	## //	7
11		
12		

[2]

- (ii) Draw a histogram on Fig. 1.6 to show the number of pods with each number of pea seeds.



[4]

**Fig. 1.6**

- (iii) Put an X in the bar on the graph which seems to be anomalous. [1]

(iv) Most pods contained 10 or 11 pea seeds.

Suggest a reason for some pods containing 8 or 12 pea seeds.

.....  
.....

[1]

[Total: 26]

2 Fig. 2.1 shows an arthropod.



$\times 2.5$

**Fig. 2.1**

(a) You are going to calculate the actual length of the part of the leg that is marked **ST** in Fig. 2.1.

Measure the length of line **ST**.

length of line **ST** ..... mm

Calculate the actual length of the part of the leg that is marked **ST**.

Show your working.

actual length of leg ..... mm [3]

- (b) Use features, **visible** in Fig. 2.1, to identify the group of arthropods to which this animal belongs.

Give **two** reasons for your answer.

Group .....  
.....

reason 1 .....  
.....

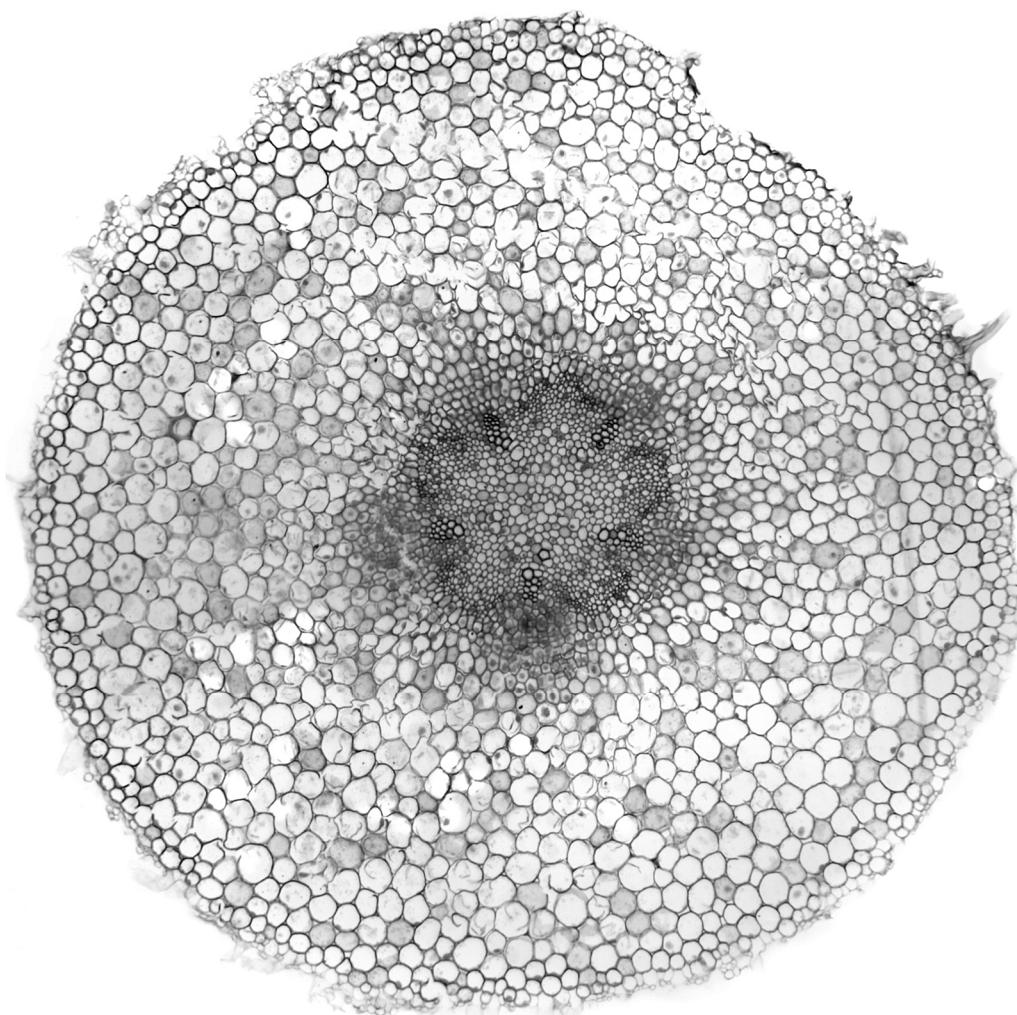
reason 2 .....  
.....

[3]

**[Total: 6]**

- 3 (a) Fig. 3.1 shows a section of a dicotyledonous root as seen with a microscope.

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**Fig. 3.1**

On Fig. 3.1:

draw a line to a root hair cell and label it;  
draw a line to a cortex cell and label it.

[2]

- (b) When stems have just been cut, drops of liquid often appear on the cut surface of the stem.

A dicotyledonous stem was cut and the liquid was collected and tested for:

- water;
- reducing sugar;
- protein;
- fat.

The results are shown in Table 3.1.

Complete Table 3.1 to show the reagents and final colours.

**Table 3.1**

substance	reagent	results		
		initial colour	final colour	positive or negative (✓ or ✗)
water	cobalt chloride	blue		✓
reducing sugar		blue		✓
protein		blue		✗
fat	ethanol + water	colourless		✗

[6]

**[Total: 8]**





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*Copyright Acknowledgements:*

Question 3 Fig. 3.1 © Ref: C003 / 4134; *Broad bean root, light micrograph*; Dr Keith Wheeler, Science Photo Library.

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