UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTER NUMBER						CANDIDATE NUMBER				

8003549956

Biology (US) **0438/53**

Paper 5 Practical Test **May/June 2013**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

READ THESE INSTRUCTIONS FIRST

Write your Center 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.

For Examiner's Use	
1	
2	
3	
Total	

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

For Examiner's Use

1 You are going to investigate the effect of enzyme concentration on starch.

(a) You are provided with a Petri dish containing a layer of starch agar jelly. Three small holes have been cut in the starch agar jelly as shown in Fig. 1.1.
The three pieces of starch agar jelly, removed from these holes, are presented on a white tile.

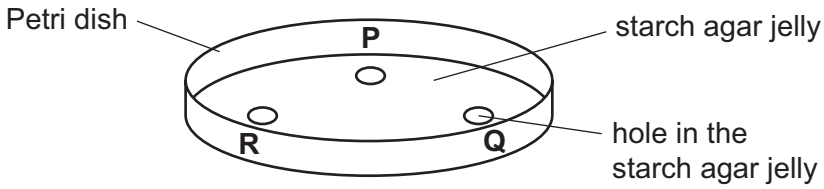

Fig. 1.1

- Remove the film from the white tile and add a drop of dilute iodine solution to each piece of starch agar jelly.

(i) Describe your observations.

.....

..... [1]

You have been provided with two enzyme solutions, labeled **1** and **2**. These are different concentrations of the same enzyme.

- Remove the lid of the Petri dish. Label the holes **P**, **Q** and **R** on the outside of the Petri dish, as shown in Fig. 1.1.
- Carefully put **two** drops of enzyme solution **1** into hole **P**. Do not over fill the hole.
- Carefully put **two** drops of enzyme solution **2** into hole **Q**. Do not over fill the hole.
- Carefully put **two** drops of water into hole **R**. Do not over fill the hole.
- Replace the lid on the Petri dish.
- Record the time .....

Leave the Petri dish for 15 minutes. **While you are waiting** begin work on parts **(b)** and **(c)**.

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- After 15 minutes remove the Petri dish lid.
- Wash the surface of the starch agar jelly in the Petri dish with water. Pour the water into the container labeled **waste**.
- Pour dilute iodine solution onto the starch agar jelly at one side of the Petri dish. Tilt the Petri dish so that the iodine solution flows to the opposite side of the dish and covers all of the surface of the starch agar jelly, as shown in Fig. 1.2.

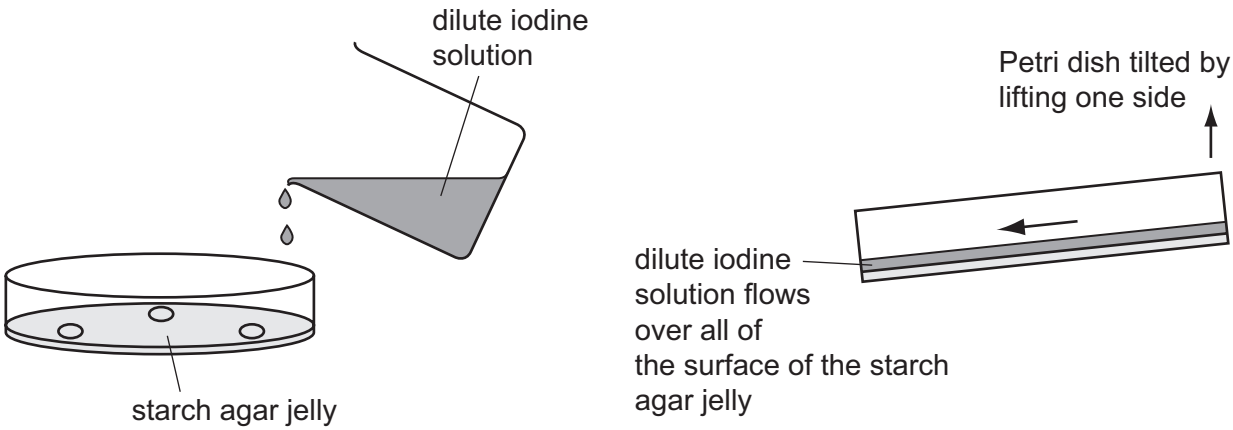

Fig. 1.2

- Immediately pour the dilute iodine solution from the surface of the Petri dish into the container labeled **waste**.
- Wash the surface of the starch agar jelly with water. If you require more water, raise your hand. Pour the water into the container labeled **waste**.
- Leave the Petri dish for 1 minute.
- Hold the Petri dish up to the light and examine the starch agar jelly.

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(ii) Make a drawing to show the appearance of the surface of the starch agar jelly on Fig. 1.3. Include labels.

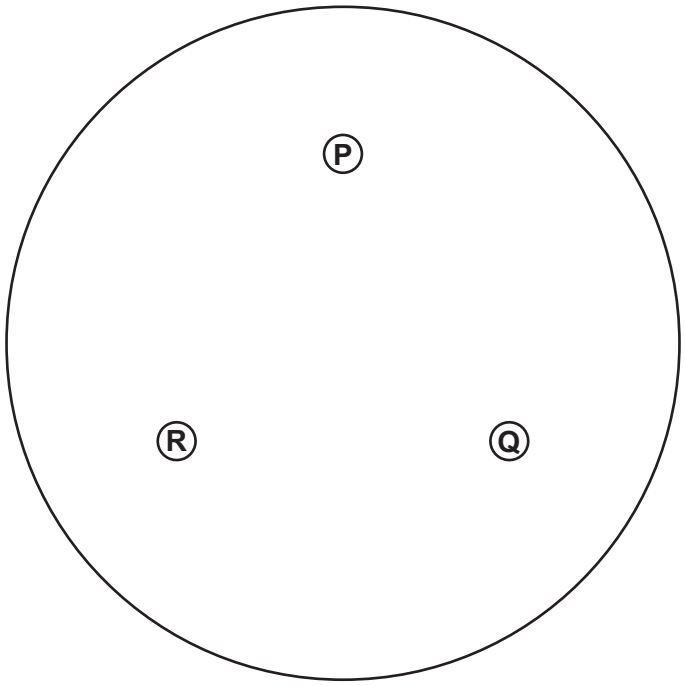

Fig. 1.3

[4]

(iii) Explain the observations you have drawn in **(a)(ii)**.

.....

.....

.....

.....

.....

..... [3]

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

.....

[1]

(v) State why water was added to hole **R**.

.....

.....

[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]

(c) You are provided with a pea seedling. Remove the film from the pea seedling.

Make a large, labeled drawing of the pea seedling.

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[4]

Question 1 continues on page 8.

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

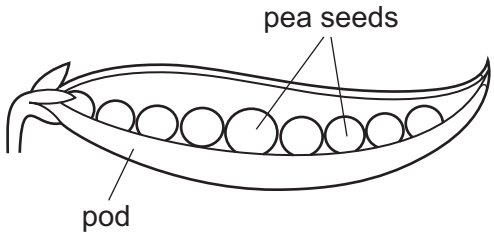


Fig. 1.4

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.

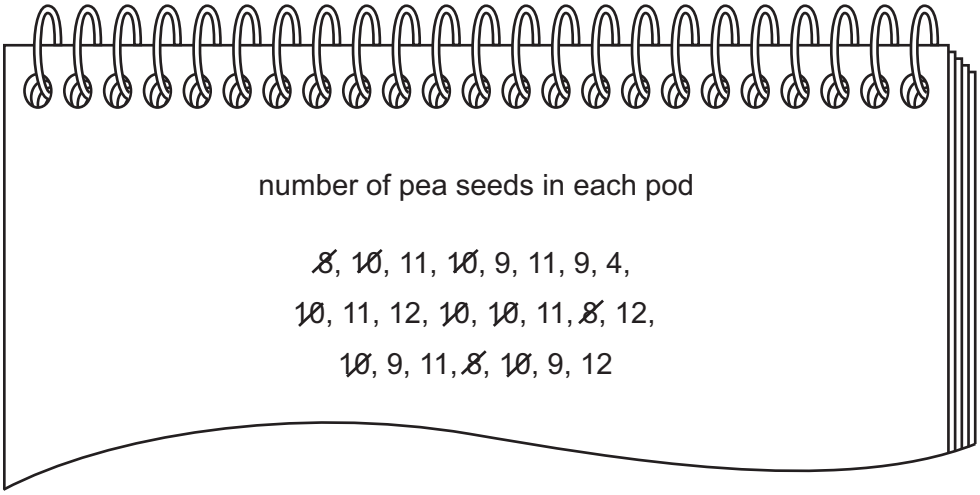


Fig. 1.5

For Examiner's Use

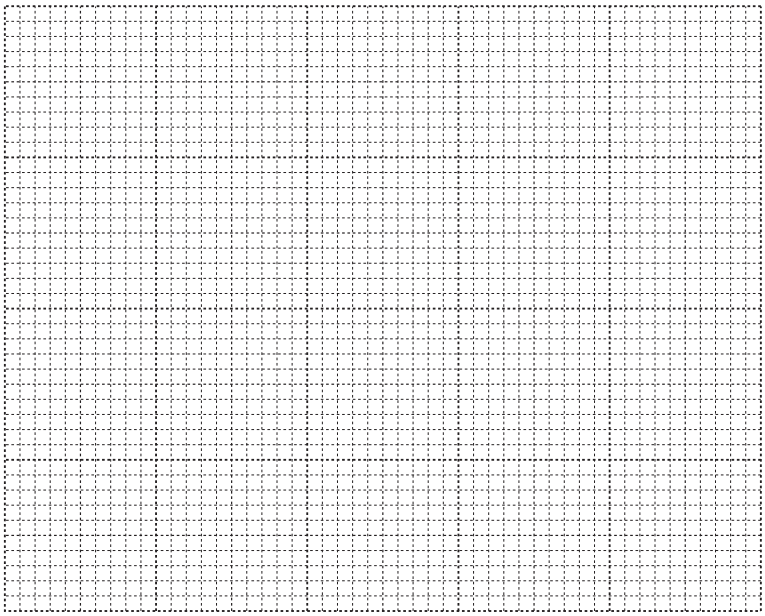
(i) Complete Table 1.1 using the results from Fig. 1.5 to show how many pods there were with each number of pea seeds.
Two rows have been completed for you.

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.

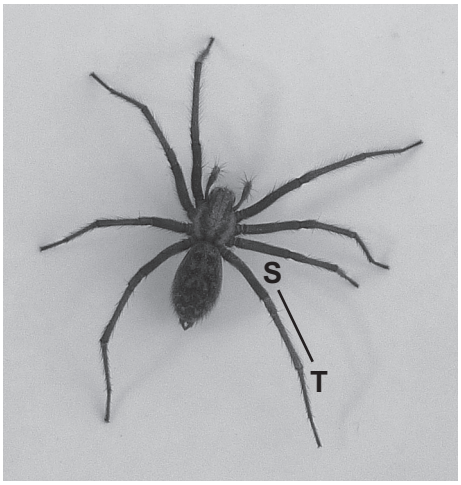
Suggest a reason for some pods containing 8 or 12 pea seeds.

.....

..... [1]

[Total: 26]

2 Fig. 2.1 shows an arthropod.



× 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.

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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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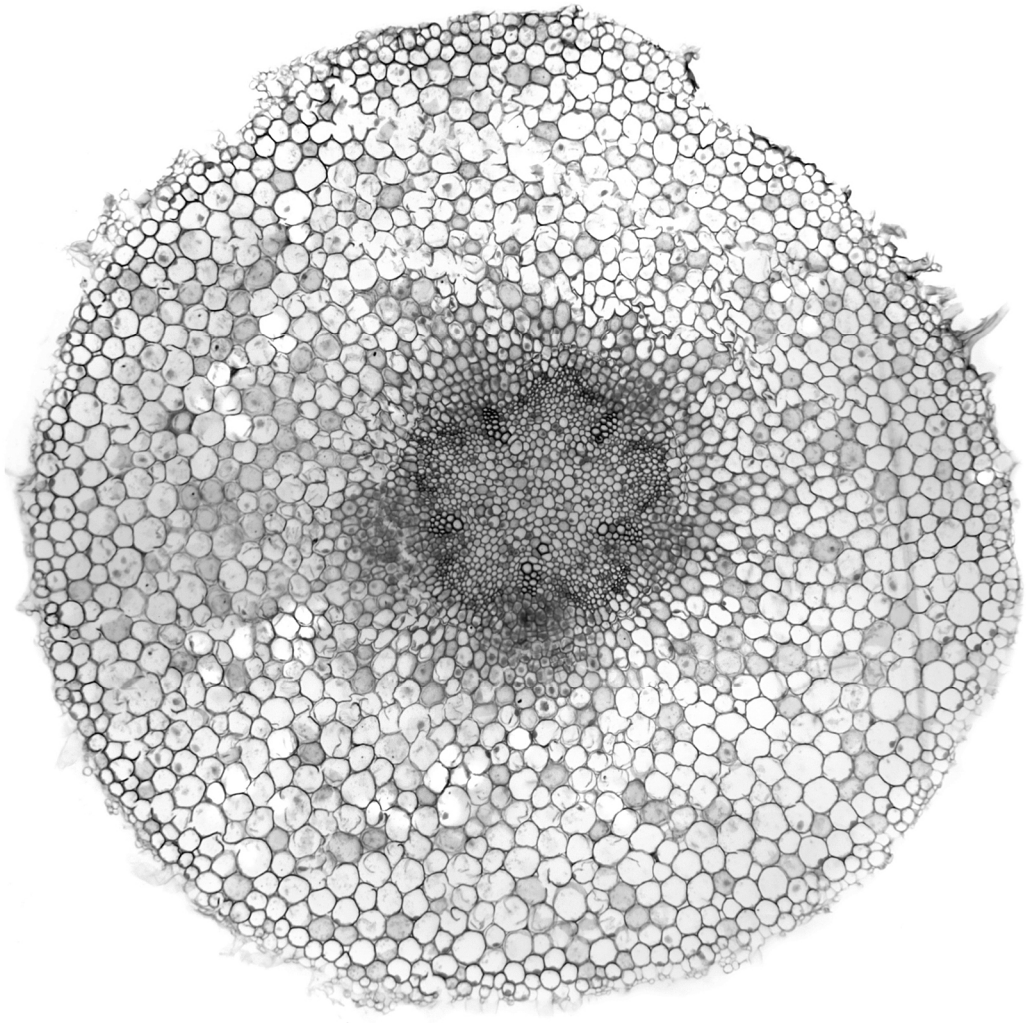

Fig. 3.1

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 colors.

Table 3.1

substance	reagent	results		
		initial color	final color	positive or negative (✓or ×)
water	cobalt chloride	blue		✓
reducing sugar		blue		✓
protein		blue		×
fat	ethanol + water	colorless		×

[6]

[Total: 8]

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