Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

5404601978

BIOLOGY **0610/52**

Paper 5 Practical Test **October/November 2015**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, 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	
Total	

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **10** printed pages and **2** blank pages.

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1 During respiration, a chemical is produced that causes the indicator methylene blue to change from blue to colourless.

You are provided with a yeast suspension (*Saccharomyces cerevisiae)*, a solution of glucose and a solution of methylene blue.

You are going to test the effect of temperature on the rate of respiration in yeast.

Read through all of the instructions but DO NOT CARRY THEM OUT until you have drawn a table for your results in the space provided in 1(a).

You should wear the eye protection provided during the practical work in question 1.

Proceed as follows:

- Place 10 cm^3 of glucose solution into each of three large test-tubes.
- Add 1 cm^3 methylene blue to each of the large test-tubes containing glucose solution.
- Use the glass rod to stir the mixture until the methylene blue is mixed evenly.
- Place the large test-tubes into an empty beaker.
- Add 1 cm^3 of the yeast suspension provided into each of three standard test-tubes.
- Place the three standard test-tubes into the same beaker as the large test-tubes.
- You have three other beakers, labelled **cold**, **warm** and **hot**. The beaker labelled **cold** contains ice and water. The beaker labelled **warm** contains water at room temperature.
- Place one large test-tube containing glucose and methylene blue and one standard test-tube containing yeast suspension into each beaker.
- Raise your hand when you are ready for hot water to go into the beaker labelled **hot**.
- Use the thermometer to measure the temperature in each beaker.
- Record the temperatures in your table of results.

Leave the apparatus for 5 minutes. During the 5 minutes you should start to answer 1(d).

- After 5 minutes, pour the yeast suspension in each standard test-tube into the glucose and methylene blue mixture in each of the three large test-tubes.
- Use the glass rod to stir the mixture until it is mixed evenly and start timing.
- Record the time taken for the yeast suspension to return to its original colour.

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(a) Prepare a table to record your results.

In your table:

- record the temperatures in degrees Celsius
- record the times in **seconds**.

[6]

(b) (i) In this investigation you only recorded one set of results. Suggest a reason why it would have been better to repeat the investigation.

.....

.....[1]

(ii) State **one** conclusion about the effect of temperature on the rate of respiration in yeast.

.....

.....[1]

(c) (i) The method of timing how long it takes for the methylene blue in the three test-tubes to become colourless is a source of error. Suggest why.

.....

.....[1]

(ii) Describe how you could improve the method to reduce this source of error.

.....

.....

.....[1]

(iii) Suggest **one** source of error, **other than timing**, in this investigation.

.....

.....

.....[1]

(d) Some students investigated the effect of pH on the rate of respiration by measuring the volume of carbon dioxide produced by yeast in 30 minutes.

Their results are shown in Table 1.1.

Table 1.1

pH	average volume of carbon dioxide produced in 30 minutes / cm^3	rate of carbon dioxide production / cm^3 per minute
4	6	0.2
5	12	0.4
6	36	1.2
7	54	.....
8	63	2.1

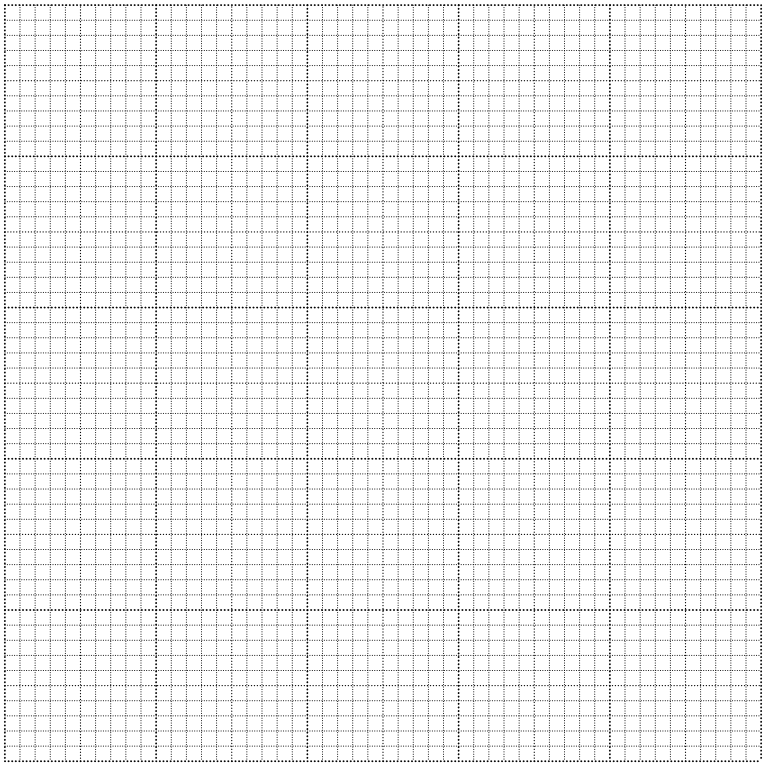
(i) Complete Table 1.1 by calculating the rate of carbon dioxide production at pH 7.

Write your answer in the space in Table 1.1.

Show your working in the space below.

[1]

(ii) Plot the data from Table 1.1 to show the effect of pH on the rate of carbon dioxide production by yeast.



[4]

(iii) Describe **and** explain the trend shown by the results in Table 1.1 and the graph you have drawn.

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.....

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.....[3]

[Total: 19]

2 Fig. 2.1. shows photomicrographs of two types of pollen grain, **R** and **S**.

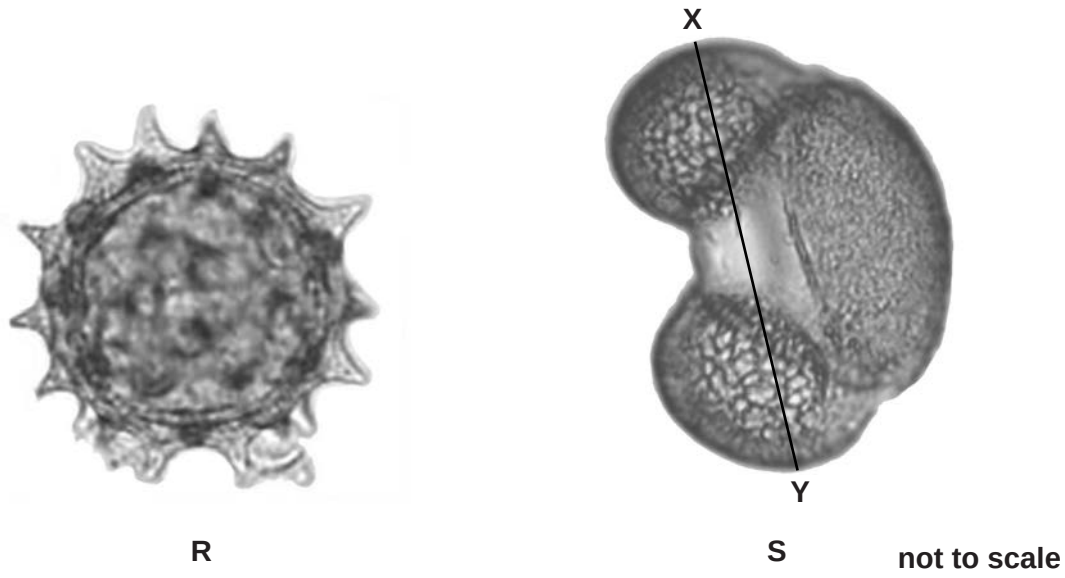


Fig. 2.1

(a) (i) Make a large drawing of pollen grain **S**.

[3]

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(ii) Measure the length of the line **XY** on Fig. 2.1. Include the unit.

length of **XY** .....

Draw the line **XY** on your drawing, in the same position as on Fig. 2.1.

Measure the length of **XY** on your drawing. Include the unit.

length of **XY** on your drawing .....

Calculate the magnification of your drawing.
Show your working.

magnification x .....
[5]

(b) (i) State **two** ways, visible in Fig. 2.1, in which pollen grain **R** is different from pollen grain **S**.

Write your answers in Table 2.1.

Table 2.1

feature	pollen grain **R**	pollen grain **S**
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

[2]

(ii) Describe **one** feature, visible in Fig. 2.1, of pollen grain **R** that helps it to be dispersed.

.....

.....[1]

(c) Some students placed samples of each type of pollen grain on a microscope slide and added a drop of dilute sugar solution. Pollen tubes started to grow.

To find out which of the pollen tubes grew faster, students measured the length of the pollen tubes every 2 minutes for 20 minutes.

(i) Suggest how the pollen tubes could be measured using a microscope.

.....[1]

Their results are recorded in Table 2.2.

Table 2.2

time / min	length of pollen tubes / µm	
	pollen grain **R**	pollen grain **S**
2	0.5	0.4
4	1.8	1.5
6	4.2	3.9
8	12.6	13.4
10	18.8	21.1
12	24.9	29.6
14	30.2	36.8
16	36.6	44.2
18	41.9	52.8
20	48.5	59.8

(ii) Compare the growth of pollen grain **S** with pollen grain **R**, using the data from Table 2.2.

.....

.....

.....

.....

.....[3]

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(d) The plant that produces pollen grain **R** produces fruits that contain seeds. These fruits disperse the seeds by splitting along the edges, throwing out the seeds.

The students counted the number of seeds in a random sample of 100 fruits.

Fig. 2.2 is a frequency histogram of their results.

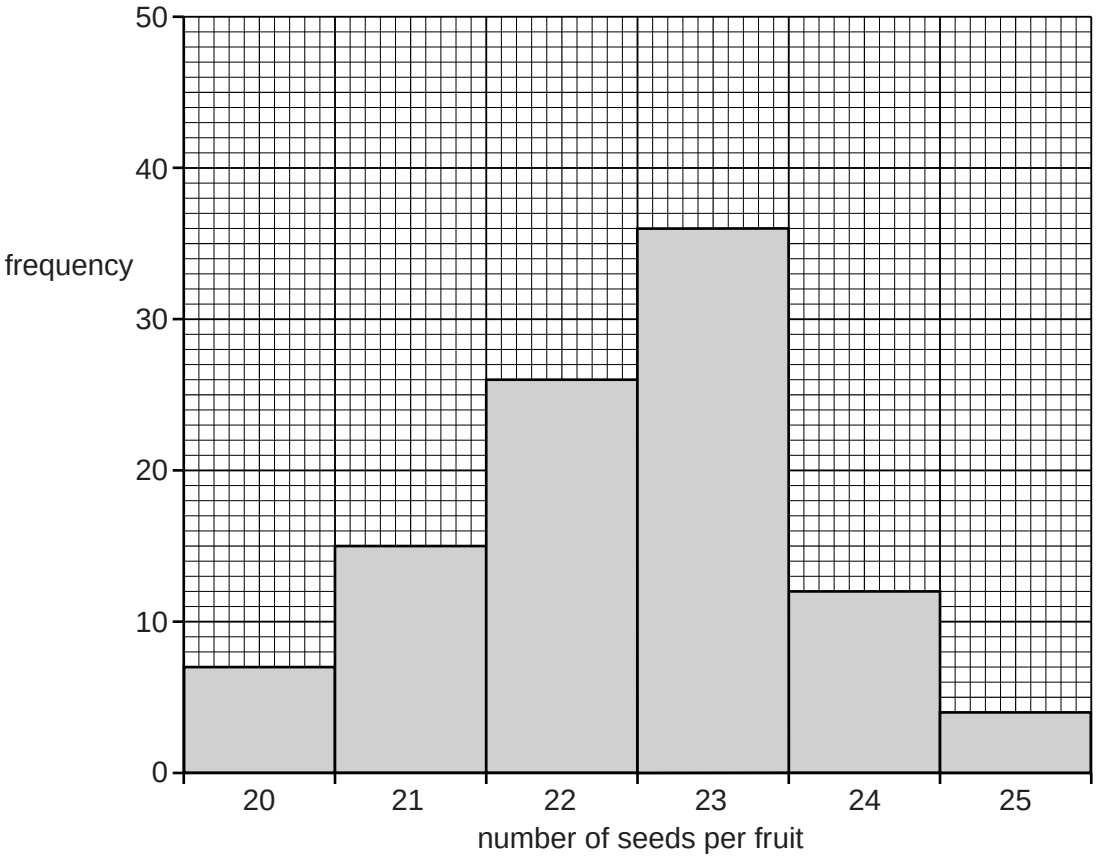


Fig. 2.2

(i) Suggest how the students could collect a random sample and count the seeds accurately.

.....

.....

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.....

.....

.....[3]

(ii) Identify the most frequent number of seeds in a fruit.

.....[1]

(iii) Identify the number of seeds per fruit that has a frequency of 12.

.....[1]

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[Turn over

(iv) Suggest **one** reason why some fruits have a lower number of seeds than others.

.....

.....[1]

[Total: 21]

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