Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **0610/63**

Paper 6 Alternative to Practical **October/November 2015**

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.
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.

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 **11** printed pages and **1** blank page.

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1 A student tested some solid egg white for protein.

(a) (i) Describe the method the student would use to test the egg white for protein.

.....

.....

.....

.....[2]

(ii) Describe how the student's observations would allow them to decide whether the egg white contained protein or not.

.....

.....

.....

.....[2]

(iii) You would be expected to wear eye protection for this investigation.
State **one** other safety procedure you should follow.

.....

.....[1]

Some students investigated the effect of different concentrations of enzyme on cooked egg white.

The students set up three test-tubes, **A**, **B** and **C**, as shown in Fig. 1.1.

They timed how long it took for all of the pieces of egg white in each test-tube to go clear.

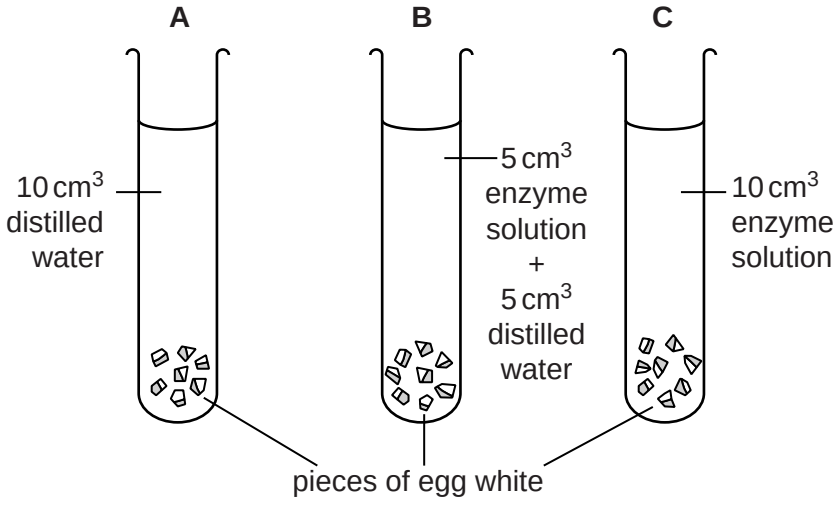


Fig. 1.1

Fig. 1.2 shows the students' results.

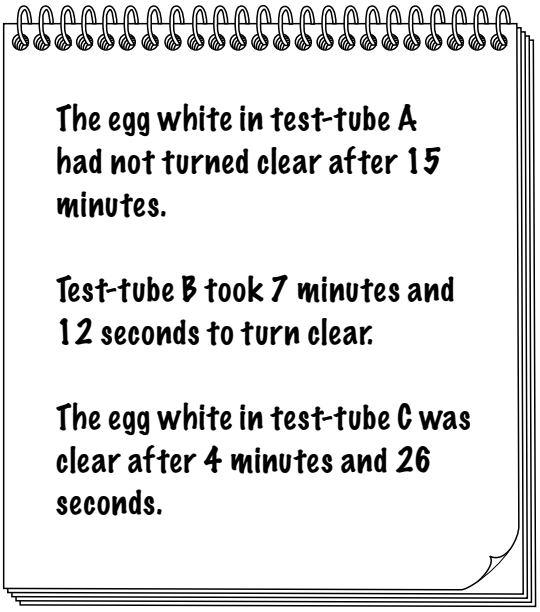


Fig. 1.2

(b) (i) In order to see patterns in the data more clearly, it is necessary to convert times from minutes and seconds into seconds.

Test-tube **A** had not turned clear after 900 seconds.

State the time **in seconds** it took for the pieces of egg white in test-tubes **B** and **C** to turn clear.

Test-tube **B** …… seconds

Test-tube **C** ……..seconds

[1]

(ii) Draw and complete a table to show the students' results.

[3]

(c) Using the results in **(b)(ii)**, describe the pattern shown.

.....

.....

.....

.....[2]

(d) State the purpose of test-tube **A** in the investigation.

.....

.....[1]

(e) The test-tubes were kept at 40°C throughout the investigation.

Suggest why this is important.

.....

.....

.....

.....[2]

(f) The students put the same mass of egg white into each test-tube.

However, the size of the pieces of egg white was not controlled.

Suggest why this is a source of error in this investigation.

.....

.....

.....[1]

(g) Enzymes usually have a pH at which they work fastest. This is called the optimum pH.

Fig. 1.3 shows the rate of activity of three different enzymes over a range of pH values.

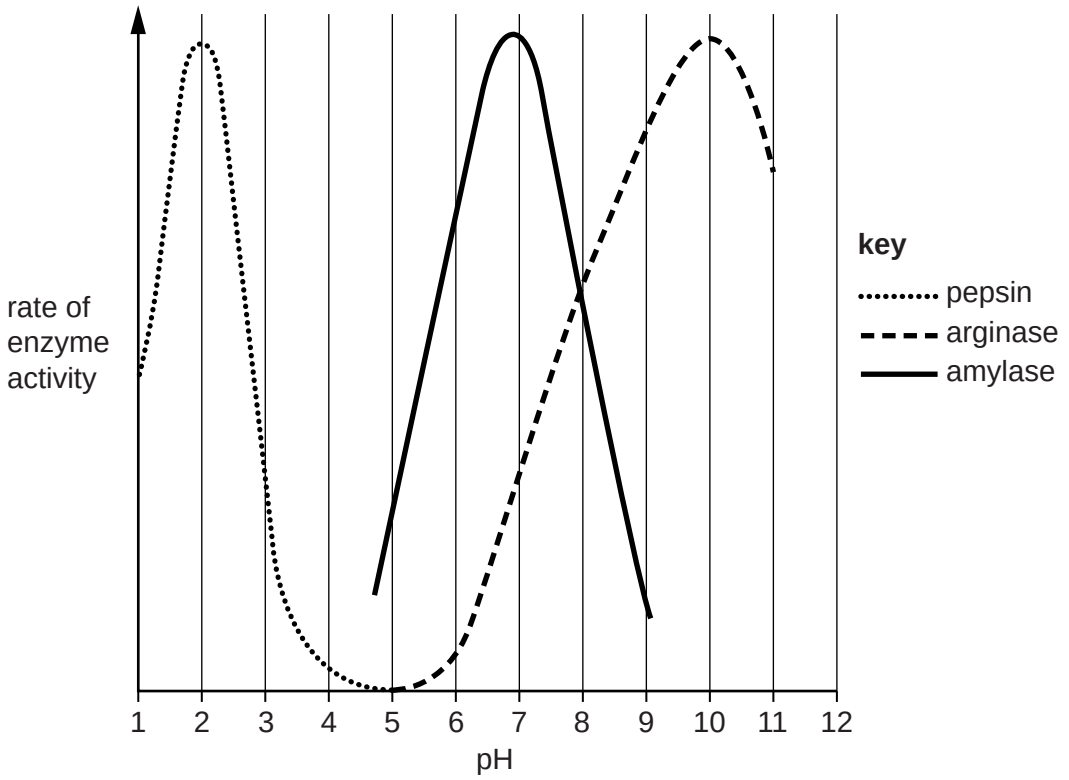


Fig. 1.3

(i) State the optimum pH for arginase.

.....[1]

(ii) Your stomach contains acid. Suggest which enzyme is most likely to be found in your stomach.

.....[1]

[Total: 17]

2 Fig. 2.1 shows a leaf from a plant.

Fig. 2.1

(a) Draw a large diagram of the leaf shown in Fig. 2.1.

[3]

(b) A group of students investigated the rate of transpiration from four leaves.

They covered different surfaces of the leaves with petroleum jelly. Petroleum jelly creates a waterproof barrier.

They then measured the mass of each leaf.

The leaves were left hanging from a piece of string in a warm place for 24 hours.

The students then measured the mass of each leaf again.

Table 2.1 shows their results.

Table 2.1

leaf	surfaces covered with petroleum jelly	mass at start / g	mass at end / g	percentage decrease in mass / %
P	upper and lower	4.8	4.6	4.2
Q	upper only	4.6	4.1	10.9
R	lower only	4.6	4.3	6.5
S	none	4.2	3.5	

(i) Calculate the percentage decrease in mass for leaf **S**.

Show your working.

Write your answer to one decimal place.

..... %
[2]

(ii) Suggest why it is important to calculate the percentage decrease in mass for each leaf.

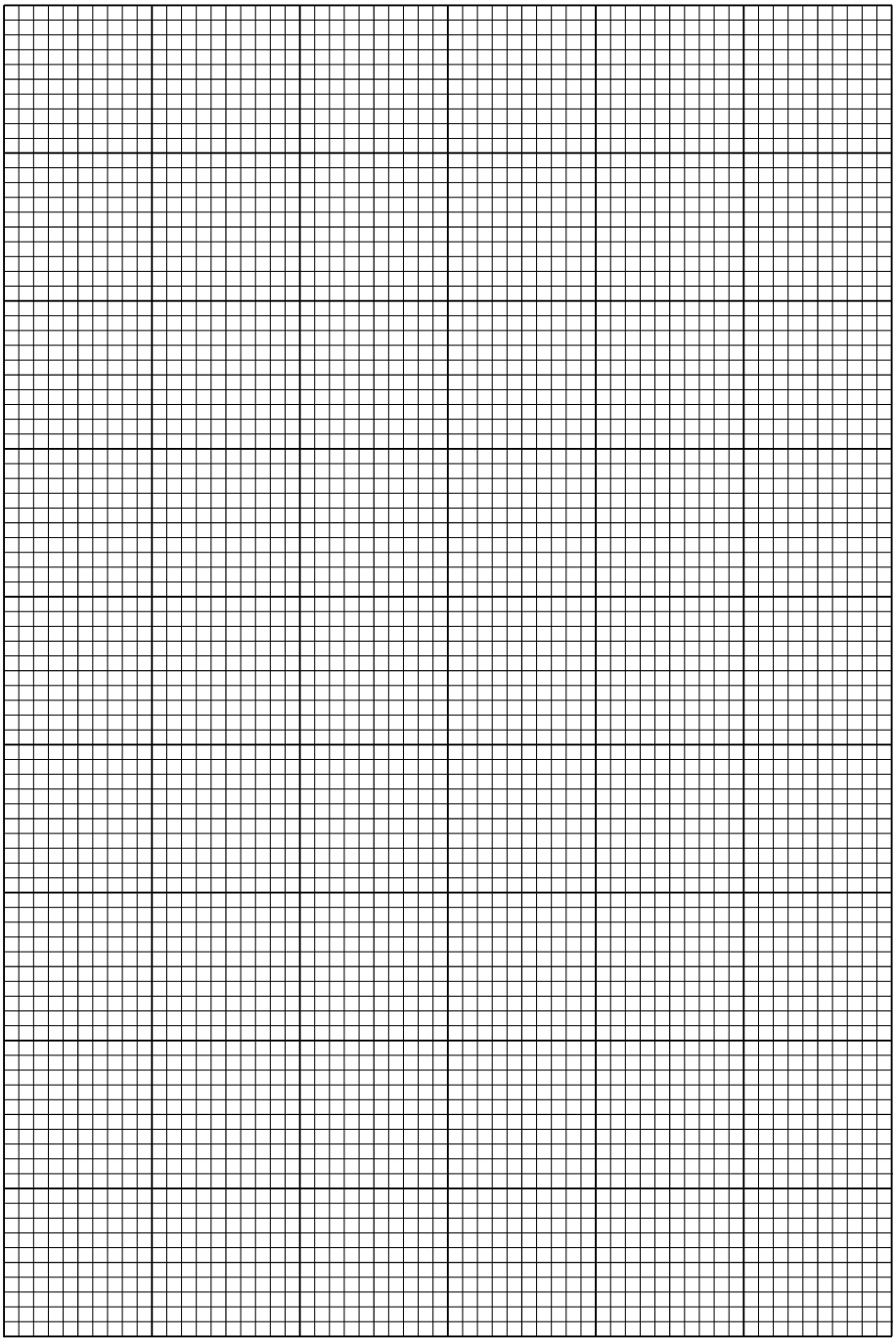
.....

.....

.....

.....[2]

(iii) Plot a bar chart to show the percentage decrease in mass for each leaf.



[4]

(iv) Use the results to explain whether the upper or lower surface of the leaf loses the most water.

.....

.....[1]

(c) The students decided to investigate how temperature affects the rate of transpiration.

Suggest the variable they should change (independent variable), the variables they should control (control variables) and the variable they should measure (dependent variable).

independent variable

.....

control variables

.....

.....

.....

dependent variable

.....

[4]

[Total: 16]

3 Fig. 3.1 is a photomicrograph of some human blood cells.

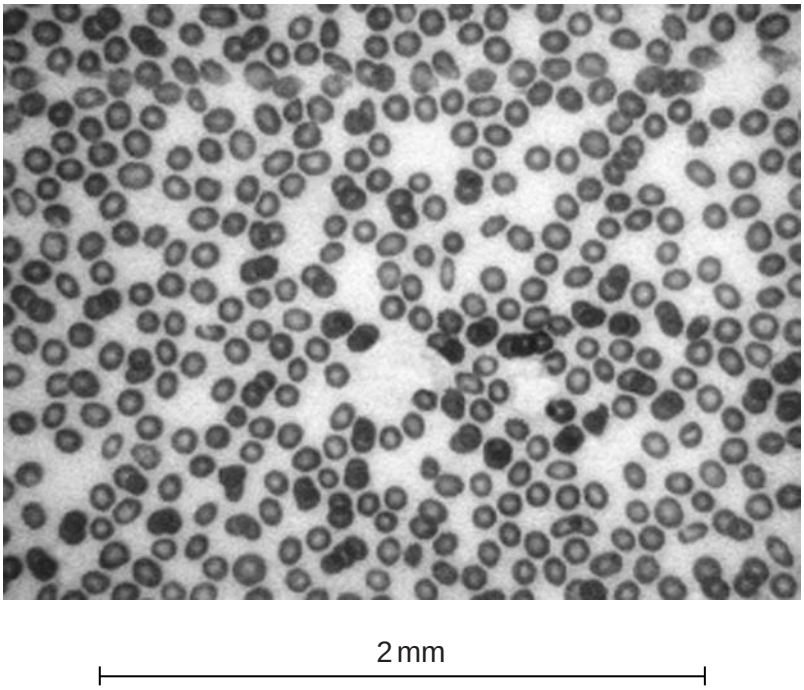


Fig. 3.1

Fig. 3.2 is a photomicrograph of some frog blood cells.

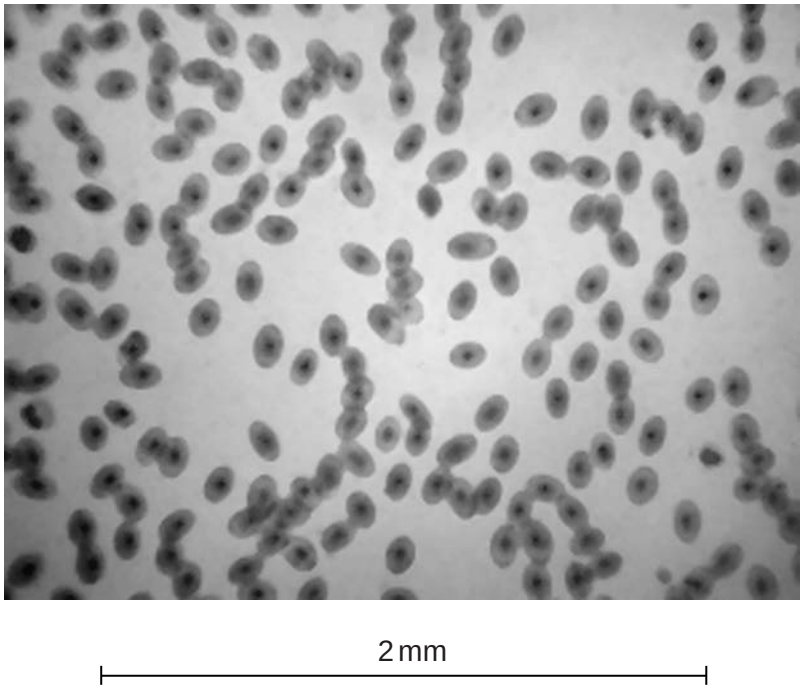


Fig. 3.2

[Turn over

(a) Complete Table 3.1 to show how human red blood cells are different from frog red blood cells.

Table 3.1

feature	human red blood cells	frog red blood cells

[3]

(b) Both photomicrographs have the same magnification.

Measure the length of the scale bar in millimetres.

length of scale bar ..... mm

Use the scale bar to calculate the magnification of the photomicrographs.

Show your working.

Give your answer to the nearest whole number.

magnification × .....
[3]

(c) The structure of frog red blood cells means that they can undergo a process that human red blood cells cannot.

Suggest what this process might be.

.....[1]

[Total: 7]