Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0993917174

BIOLOGY **0610/63**

Paper 6 Alternative to Practical **May/June 2016**

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 **13** printed pages and **3** blank pages.

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1 Fig. 1.1 shows an elephant, *Loxodonta africana*. They have large ears which help them to control their body temperature.



Fig. 1.1

When the elephant is too hot, more blood is pumped into the blood vessels in the elephant's ears. Increasing blood flow to the surface of the skin helps the elephant to cool down.

A student set up a model of what happens in the elephant's ears, as shown in Fig. 1.2.

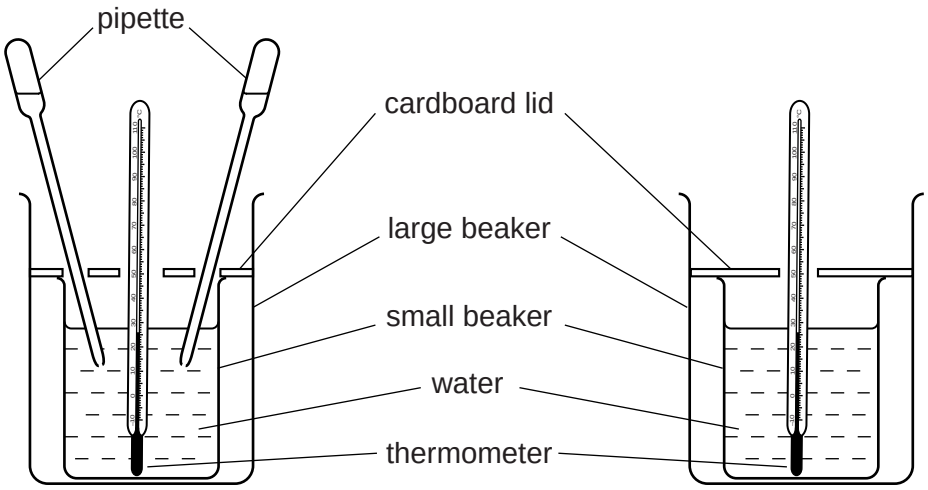


Fig. 1.2

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They placed hot water into two small beakers and stood each one in a larger beaker. One of the small beakers had ‘ears’ and the other did not.

The ‘ears’ were represented by two plastic dropping pipettes. The student squeezed and released the pipette ears throughout the experiment so that water continuously moved out of and into the pipettes.

The student placed a cardboard lid on top of each small beaker. They made holes in the cardboard lids so that a thermometer and the pipettes could pass through them.

(a) The student recorded the starting temperature of the water in both small beakers.

The thermometer readings are shown in Fig. 1.3.

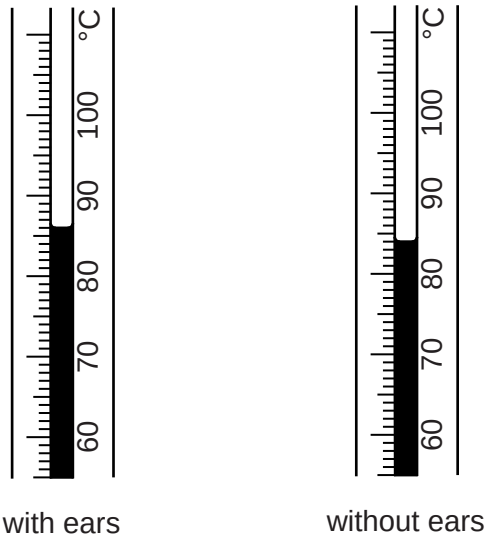


Fig. 1.3

Read the starting temperatures of the two thermometers shown in Fig. 1.3 and record the temperatures below.

with ears ..... without ears ..... [2]

(b) The student measured and recorded the temperature of the hot water in both beakers every minute for a total of eight minutes.

The student obtained the results shown in Fig. 1.4.

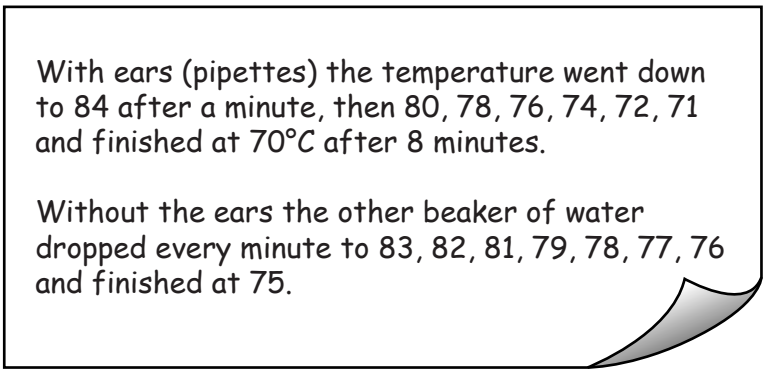


Fig. 1.4

Prepare a table to record the observations shown in Fig. 1.4 **and** the starting temperatures from Fig. 1.3.

Complete the table by entering all of the results.

[4]

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(c) Suggest **one** safety precaution that should be taken during this experiment.

.....

.....

.....[1]

(d) **(i)** A student repeated this experiment and calculated the change in temperature of the water each minute for eight minutes in both small beakers.

The change in temperature in the small beaker with pipette ears was 18 °C.

The change in temperature in the small beaker without pipette ears was 11 °C.

Explain why it is important to calculate the change in temperature in each beaker.

.....

.....

.....

.....

.....[2]

(ii) Use the information in part **(d)(i)** to calculate the **rate** of temperature change in the small beaker with pipette ears for the student's experiment.

Show your working.

Give your answer to two significant figures.

rate of temperature change .....°C per min
[2]

(e) **(i)** Suggest why the student used cardboard lids on top of each of the small beakers.

.....

.....

.....[1]

(ii) Suggest and explain **one** source of error in the method as a result of using the cardboard lids.

.....

.....

.....[2]

(iii) Suggest **two** improvements which could be made to the method, other than changing the cardboard lids.

1 .....

.....

.....

2 .....

.....

.....
[2]

(f) Fig. 1.5 shows a different species of elephant, *Elephas maximus*, to the one shown in Fig. 1.1.



Fig. 1.5

(i) State **one** visible difference between the ears of the elephant in Fig. 1.5 and those of the elephant shown in Fig. 1.1.

.....

.....[1]

(ii) Based on this difference and the results of the student's experiment in part **(d)(i)**, what can you conclude about the environmental conditions that the elephant shown in Fig. 1.5 lives in compared to the elephant in Fig. 1.1?

.....

.....

.....[1]

[Total: 18]

2 A student placed the cut end of a celery stick into a coloured dye as shown in Fig. 2.1.



Fig. 2.1

The student left the celery stick in the dye for five minutes and then removed it.

The student cut a 0.5 cm slice from the end of the celery stick that had been in the dye.

The cut surface of the celery stick is shown in Fig. 2.2.



Fig. 2.2

(a) Make a large drawing of the piece of celery shown in Fig. 2.2.

Label, with the letter **D**, a part of the celery stick that has been coloured by the dye.

[4]

(b) The size of the piece of celery in Fig. 2.2 is shown by the line **AB**.

Measure the length of **AB** on Fig. 2.2.

length of **AB** on Fig. 2.2 …… mm

Mark on your drawing a line in the same position as the line **AB** on Fig 2.2.

Measure this line.

length of line on drawing……..mm

$$\text{magnification} = \frac{\text{length of line on drawing}}{\text{length of } \mathbf{AB}}$$

Calculate the magnification of your drawing using the information above and your answers.

Show your working.

Give your answer to the nearest whole number.

magnification .....
[3]

(c) It is possible to measure how far the dye has travelled up the celery stick.

This is done by cutting 0.5 cm pieces from the end of the celery stick (that has been in the dye) and counting how many pieces are cut before the dye is no longer visible.

(i) A student cut seven 0.5 cm pieces from the end of a celery stick before the dye was no longer visible.

Calculate how far up the celery stick the dye had travelled. Write your answer in **millimetres**.

..... mm
[1]

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(ii) Plan an experiment, similar to that carried out by the student, to investigate the effect of leaf area on the rate of water uptake by a celery stick.

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.....[6]

[Total: 14]

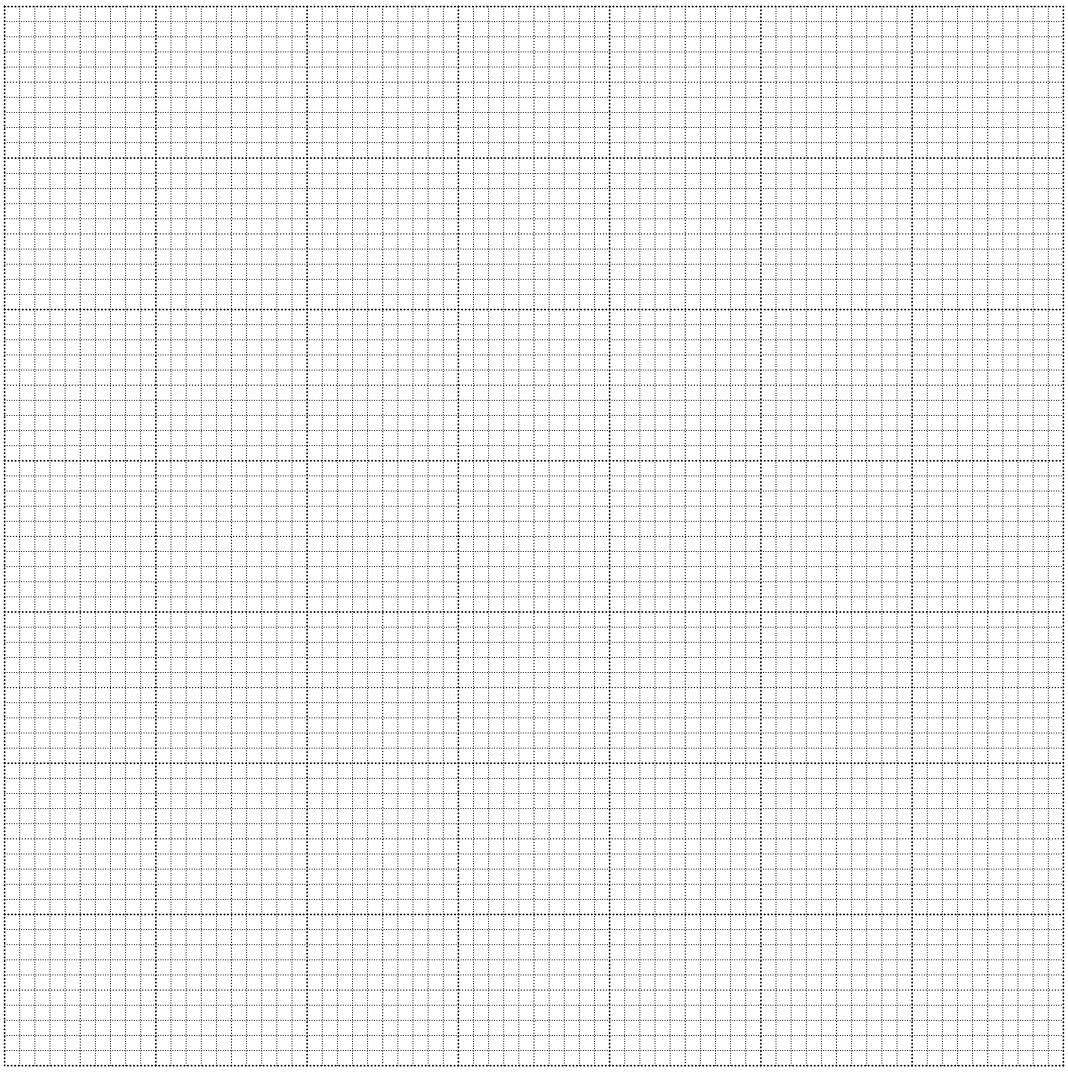
3 Table 3.1 shows the relationship between an animal's life expectancy and its heart rate.

Table 3.1

life expectancy / years	heart rate / beats per min
1	300
16	200
18	150
26	40
30	20

(a) Plot a graph of the data in Table 3.1 on the grid.

You should include a straight line of best fit **on the graph**.



[4]

(b) Use the data to describe the trend shown by the graph.

.....

.....

.....

.....

.....[2]

(c) Cows have an average heart rate of 60 beats per minute.

Use your graph to predict the life expectancy of a cow.

Show **on the graph** how you obtained your answer.

..... years
[2]

[Total: 8]

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