Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

5154363115

BIOLOGY **0610/53**

Paper 5 Practical Test **May/June 2016**

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	
3	
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 **12** printed pages and **4** blank pages.

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Read through all of the questions in this paper carefully before starting work.

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.

You are going to set up a model of what happens in the elephant's ears as shown in Fig. 1.2.

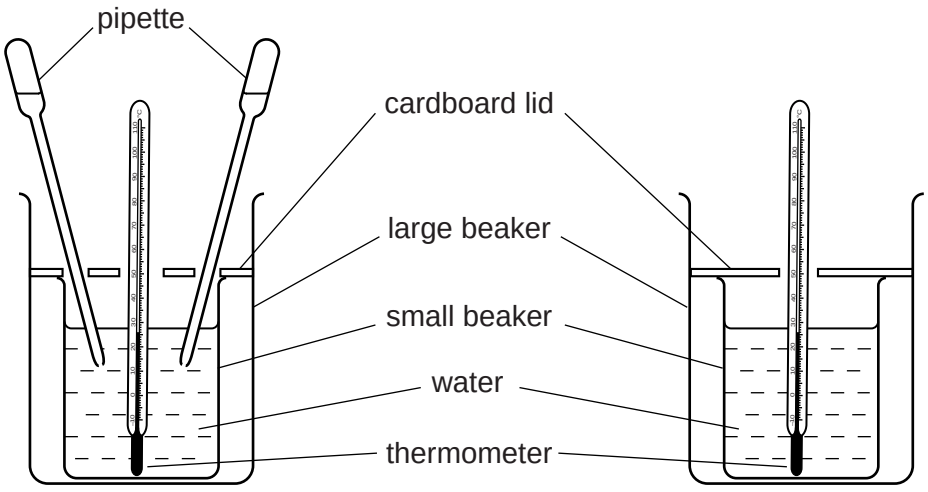


Fig. 1.2

You will place hot water into two small beakers and stand each one in a larger beaker. One of the small beakers will have 'ears' and the other will not.

The 'ears' will be represented by two plastic dropping pipettes. You will squeeze and release the pipette ears throughout the experiment so that water continuously moves out of and into the pipettes.

You will measure and record the starting temperature of the hot water in both small beakers and then record the temperature of the water every minute for a total of eight minutes.

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(a) Before you start the practical work, prepare a table to record your observations in the space below.

[6]

(b) Suggest **one** safety precaution that you will take during this experiment.

.....

.....

.....[1]

Step 1 Place one small beaker into each of the large beakers.

Step 2 Cut two circles from the piece of cardboard. The circles should fit inside the large beakers and completely cover the top of the small beakers.

Step 3 Make a small hole in each circle of cardboard for a thermometer to pass through and make two additional holes in **one** of the circles of cardboard for the pipette ears to pass through.

Step 4 Carefully insert the thermometers and pipette ears through the holes in the circles of cardboard as shown in Fig. 1.2.

Step 5 Raise your hand for hot water. The hot water will be poured into both of the small beakers.

Step 6 **Immediately** and carefully place the circles of cardboard on top of the small beakers. Measure and record the starting temperature of the water in both beakers.

Step 7 Start the timer.

Step 8 Begin to squeeze and release the pipette ears so that they empty and fill with hot water. Continue doing this throughout the experiment.

Step 9 Measure the temperature of the water in each small beaker every minute for a total of eight minutes.

Step 10 Record your observations in the table in part **(a)**.

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(c) (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.

.....

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.....

.....

.....[2]

(ii) Use the information in part **(c)(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]

(d) (i) Suggest and explain **two** sources of error in your experiment.

1 .....

.....

.....

.....

2 .....

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.....

.....
[4]

(ii) Suggest an improvement that will reduce one of the sources of error identified in **(d)(i)**.

.....

.....[1]

(e) Fig. 1.3 shows a different species of elephant, *Elephas maximus*, to the one shown in Fig. 1.1.



Fig. 1.3

(i) State **one** visible difference between the ears of the elephant in Fig. 1.3 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 **(c)(i)**, what can you conclude about the environmental conditions that the elephant shown in Fig. 1.3 lives in compared to the elephant in Fig. 1.1?

.....

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.....[1]

[Total: 18]

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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]

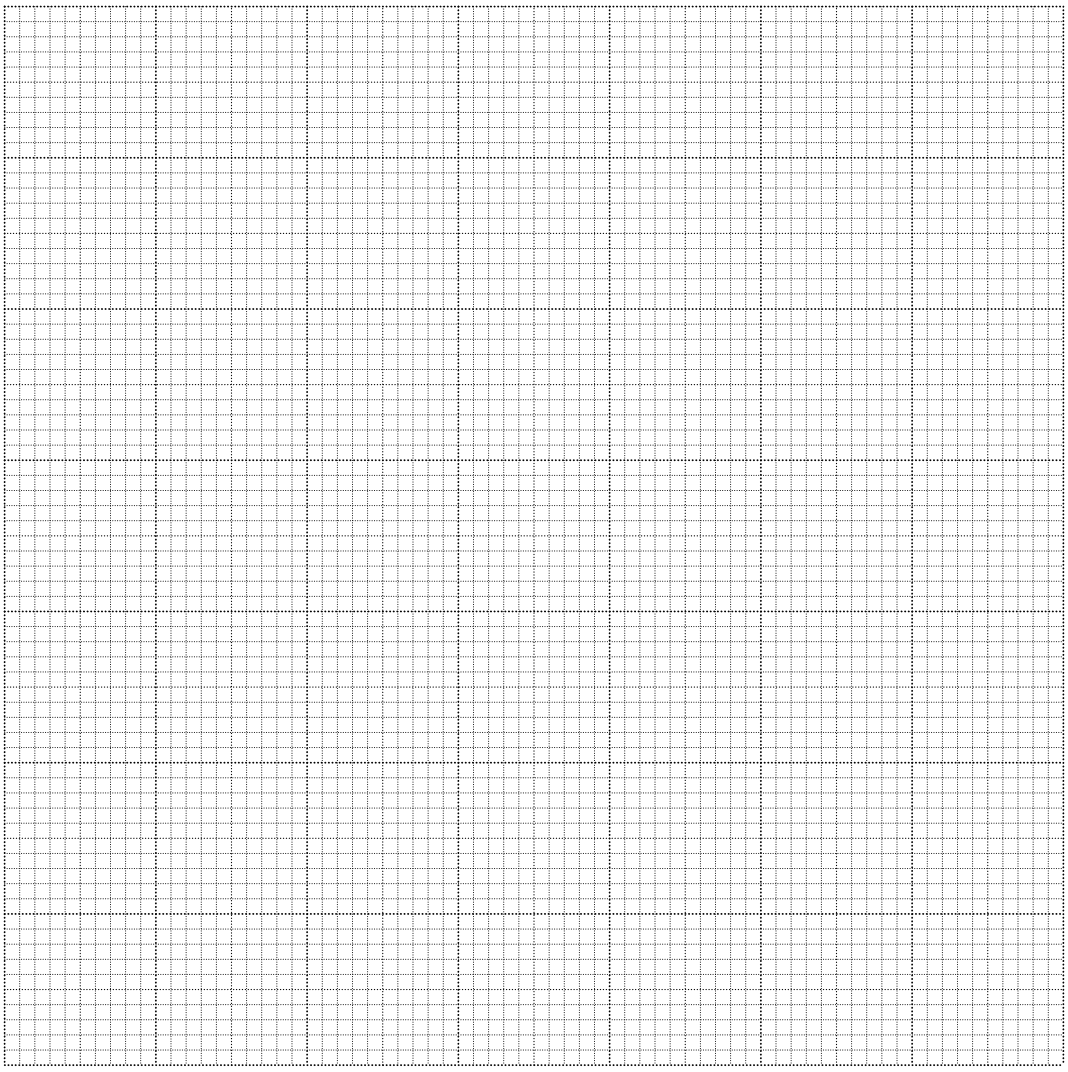
3 Table 3.1 shows the relationship between an animal's life expectancy and its heart rate.

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.

.....

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.....[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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