UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

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| CANDIDATE NAME | |
| CENTRE NUMBER | CANDIDATE NUMBER |

*5736715400*

**BIOLOGY** **0610/62**

Paper 6 Alternative to Practical **October/November 2012**

**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 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.

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|---|---|
| 1 | |
| 2 | |
| 3 | |
| Total | |

This document consists of **11** printed pages and **1** blank page.


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**1** Milk is the main food for young mammals and contains all the required nutrients for the first few months of life. Milk needs to be clotted before it can be digested.

The stomach of a young mammal produces an enzyme which causes soluble proteins in milk to form insoluble clots.

Some students investigated the effect of temperature on this enzyme using two types of milk. The students measured the time taken for clots to form.

Table 1.1 shows the results for **fresh** milk.

Table 1.2 shows the results for **dried** milk mixed with water.

**Table 1.1**

| temperature / °C | time taken for **fresh** milk to clot / seconds | | | |
|---|---|---|---|---|
| | 1st reading | 2nd reading | 3rd reading | mean |
| 33 | 36 | 42 | 30 | 36 |
| 35 | 35 | 34 | 30 | 33 |
| 37 | 15 | 20 | 25 | …… |
| 39 | 19 | 15 | 20 | 18 |
| 41 | 27 | 25 | 23 | 25 |

**(a)** Complete Table 1.1 by calculating the mean value for 37 °C.

Write your answer in Table 1.1 [1]

**Table 1.2**

| temperature / °C | time taken for **dried** milk to clot / seconds | | | |
|---|---|---|---|---|
| | 1st reading | 2nd reading | 3rd reading | mean |
| 33 | 210 | 160 | 200 | 190 |
| 35 | 165 | 174 | 150 | 163 |
| 37 | 150 | 125 | 130 | 135 |
| 39 | 118 | 90 | 110 | 106 |
| 41 | 69 | 102 | 60 | 77 |

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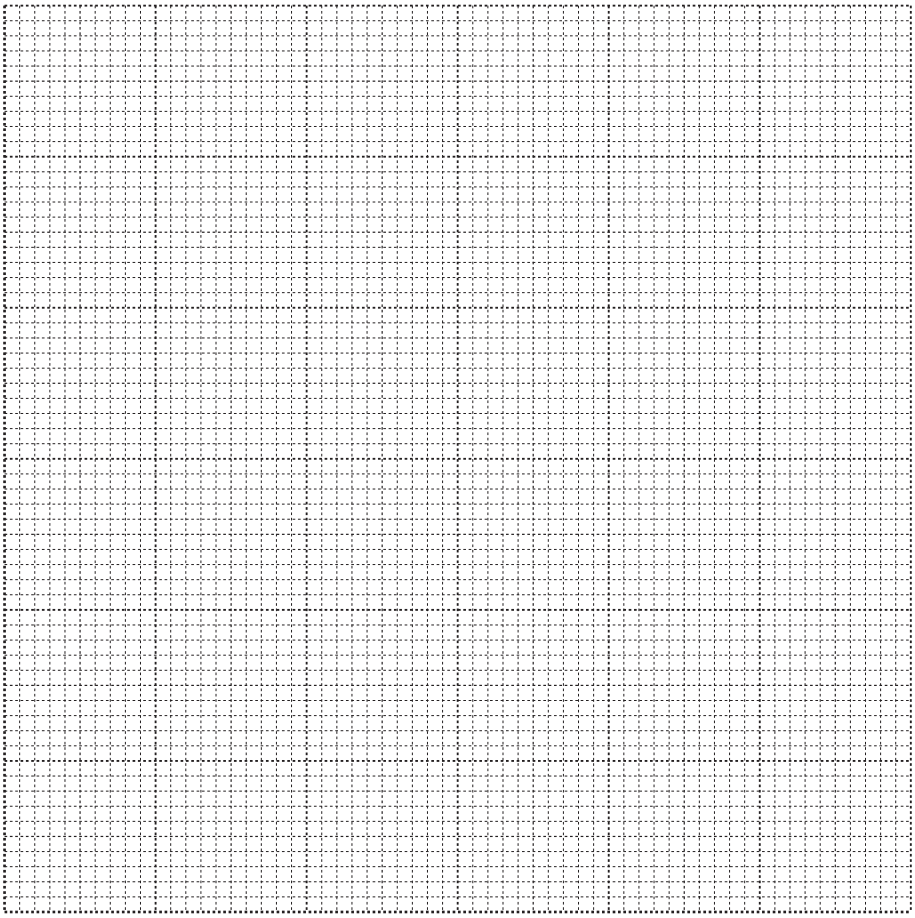
**(b) (i)** Plot a graph of the data for **both** types of milk on **one** set of axes to show the effect of temperature on the **mean** clotting time.



[5]

**(ii)** Describe **and** compare the effect of temperature on the clotting time for both types of milk.

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..... [4]

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**(c)** Suggest **and** explain why each test has been carried out three times.

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..... [2]

**(d)** Enzymes are involved in the clotting process. A water bath was used to keep the temperature constant, at each temperature, for each test.

Suggest why it is important to keep the temperature constant.

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..... [3]

**(e)** The clots are separated and used in cheese making.

Describe how you would safely carry out a test to compare the protein content of the separated clots with the protein content of the liquid.

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..... [4]

[Total: 19]

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**2** Fig. 2.1 shows part of a plant organ cut vertically in half.

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**Fig. 2.1**

**(a) (i)** Make a large, labelled drawing of the cut surface of this organ.

[4]

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**(ii)** Suggest **two** biological functions of this organ for the plant.

1 .....

2 ..... [2]

**(b)** A student removed a small sample of the organ and tested it for the presence of starch. State the name of the reagent used to test for the presence of starch.

..... [1]

**(c)** Fig. 2.1, on page 5, shows roots growing from the organ.

Fig. 2.2 shows some cells found just behind the growing tip of a root.

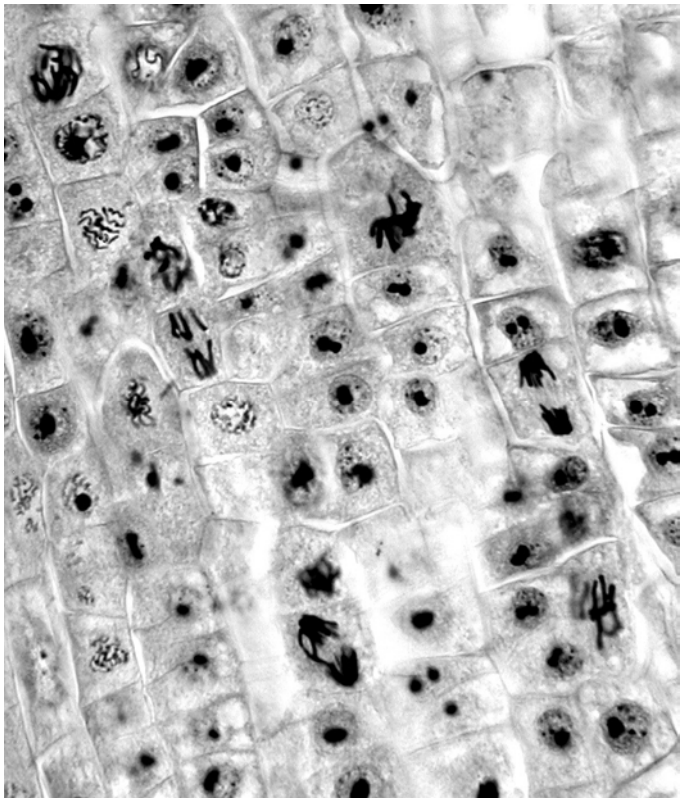

**Fig. 2.2**

**(i)** Some of these cells are dividing. During division the 'daughter' chromosomes separate at the equator and move towards the poles of the cell.

On Fig. 2.2 draw a circle around **one** cell that shows the chromosomes which have separated. [1]

**(ii)** Name the type of cell division taking place in Fig. 2.2.

..... [1]

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Fig. 2.3 shows some mature root cells further from the tip.

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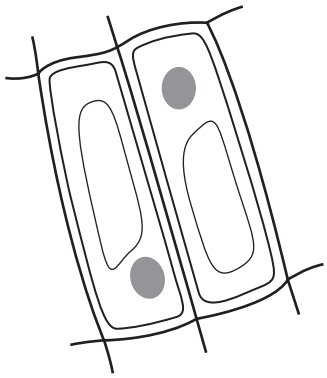

**Fig. 2.3**

**(d)** Describe two visible differences between the dividing cells shown in Fig. 2.2 and the mature cells shown in Fig. 2.3.

| **dividing cells** | **mature cells** |
|---|---|
| 1 …….. …… | ..…… ……... |
| 2 …….. …… | ..…… ……... |

[2]

[Total: 11]

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**3** Flies lay eggs which hatch into maggots. An investigation was carried out on the respiration rate of maggots.

Fig. 3.1 shows some living maggots in a large test-tube.

The apparatus was left to settle with the clip open.

The clip was then closed and a drop of coloured liquid was introduced into the open end of the capillary tube.

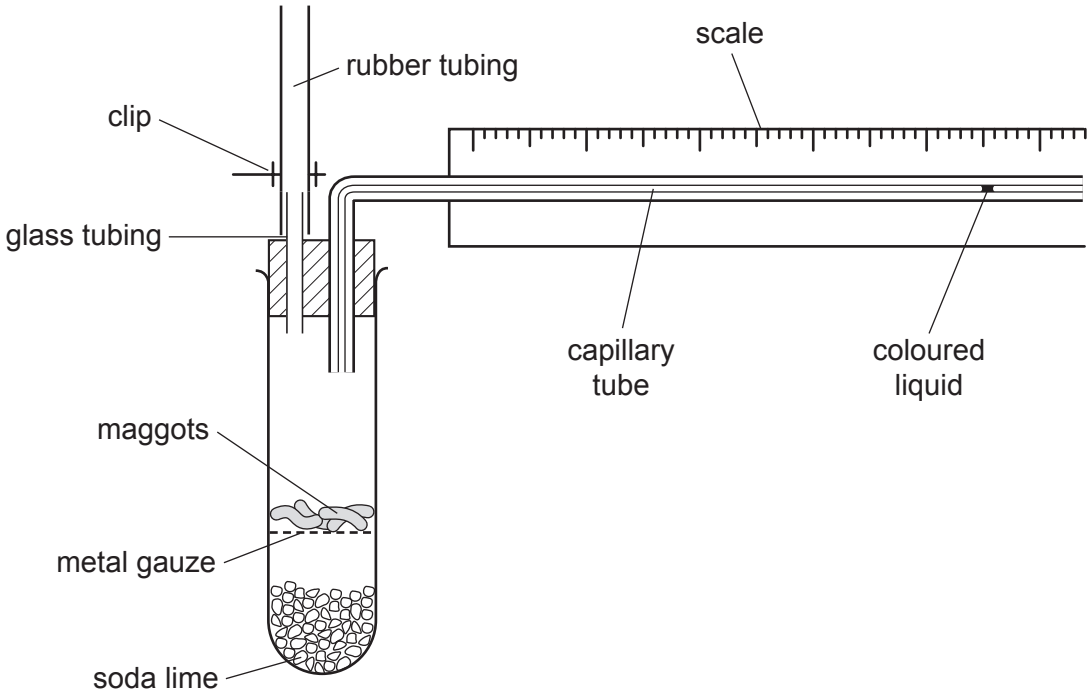


**Fig. 3.1**

Soda lime absorbs carbon dioxide.

During the investigation, the drop of coloured liquid moved along the capillary tube **towards** the test-tube.

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**(a)** Explain why the drop of coloured liquid moved towards the test-tube.

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..... [4]

**(b)** Suggest a suitable control for this investigation.

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..... [1]

Some students carried out a similar investigation with another sample of maggots to find the effect of temperature on this process.

The distance moved by the drop of coloured liquid was measured after one minute at each temperature.

Fig. 3.2 shows the results.

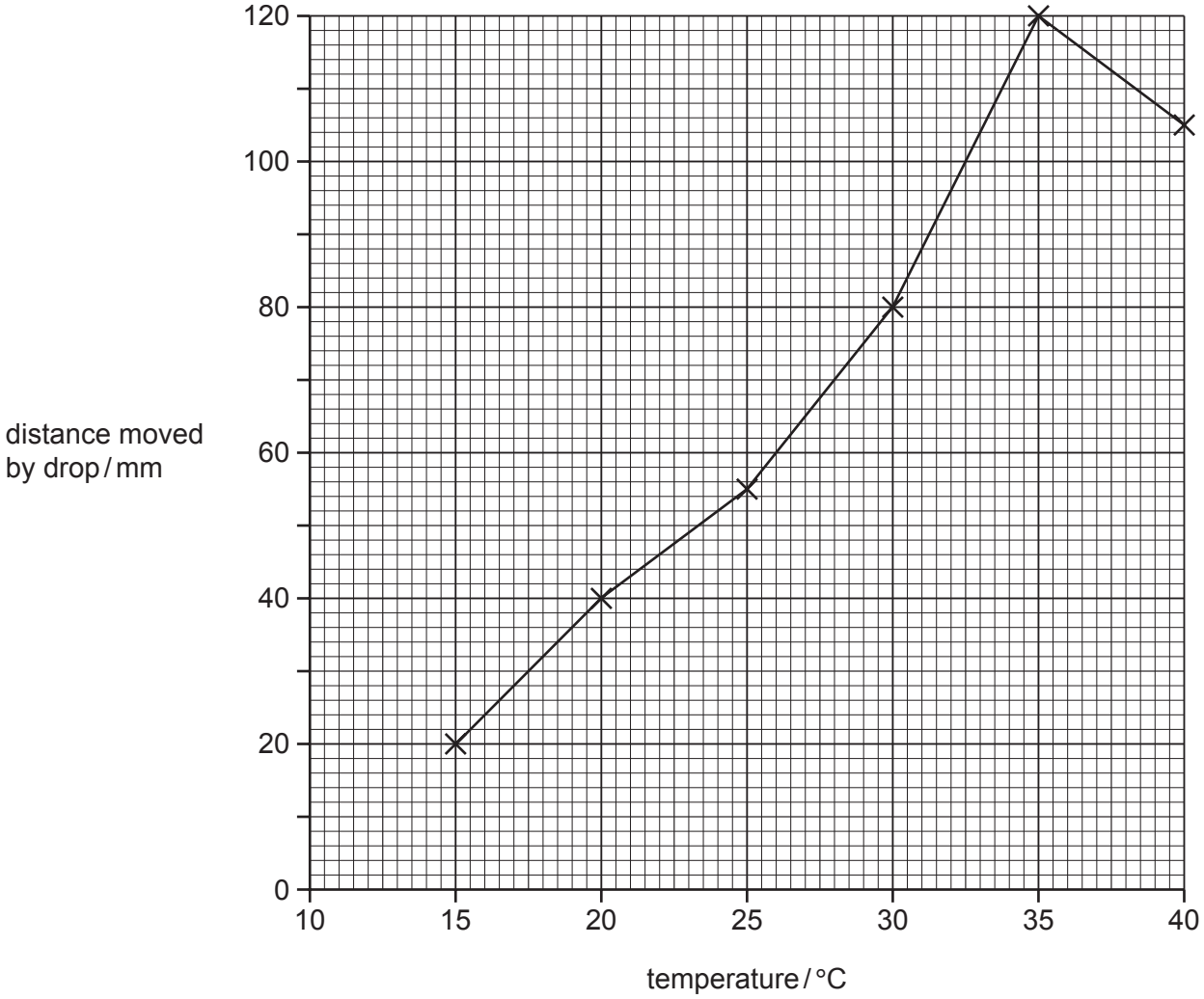


**Fig. 3.2**

**(c)** Describe the results shown on the graph.

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..... [3]

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**(d)** Explain the difference between the results at 20 °C and 30 °C.

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..... [2]

[Total: 10]

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