



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

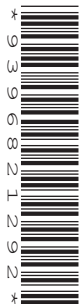
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BIOLOGY

5090/62

Paper 6 Alternative to Practical

October/November 2011

1 hour

2

- 1 An investigation was carried out into the effect of temperature on the rate of activity of the enzyme, catalase, found in liver, on its substrate, hydrogen peroxide :
- Some fresh liver was ground with a small volume of water and sand in a mortar.
 - This mixture was then filtered to produce a solution that contained the enzyme.
 - Small samples of the enzyme solution and the substrate were each kept at the temperatures shown in Table 1.1 before being mixed together.
 - On mixing, a mass of bubbles was released, forming a layer of foam on the surface of the liquid.
 - The depth of this layer was measured after a time as an indication of the rate of reaction.

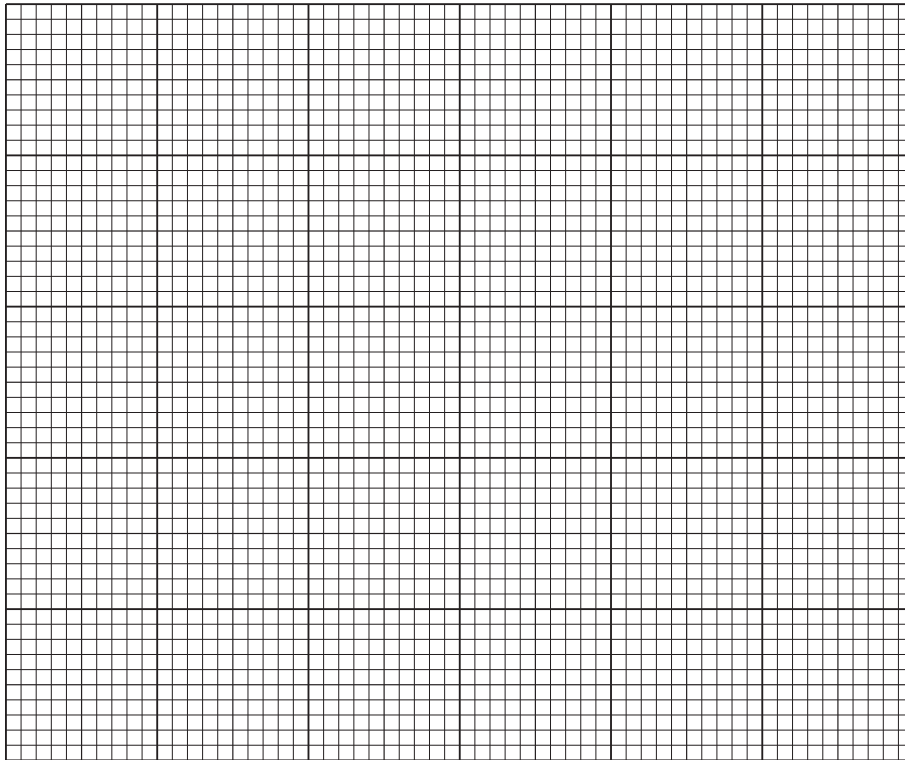
The results are shown in Table 1.1.

Table 1.1

temperature / °C	depth of foam / mm
10	07
20	15
35	41
45	39
55	19
60	06

- (a) (i) Construct a graph from the figures in Table 1.1 on the grid below.

The curve should be a line of best fit.



[4]

- (ii) By referring to the curve, suggest the optimum temperature for this enzyme and the depth of foam that would be produced.

optimum

foam depth

[2]

- (iii) Suggest what would have been observed if both the enzyme solution and the substrate had been kept at 90 °C before being mixed together. Explain your answer.

.....

.....

..... [2]

- (b) (i) Suggest why sand was added to the liver during the grinding.

.....
.....
..... [2]

- (ii) State how you could test that the bubbles of gas forming the foam are oxygen.

.....
.....
..... [2]

- (c) (i) State how this investigation could be improved to give a more accurate figure for the optimum temperature.

.....
.....
..... [2]

- (ii) Suggest ways in which the results of this investigation could be made more reliable.

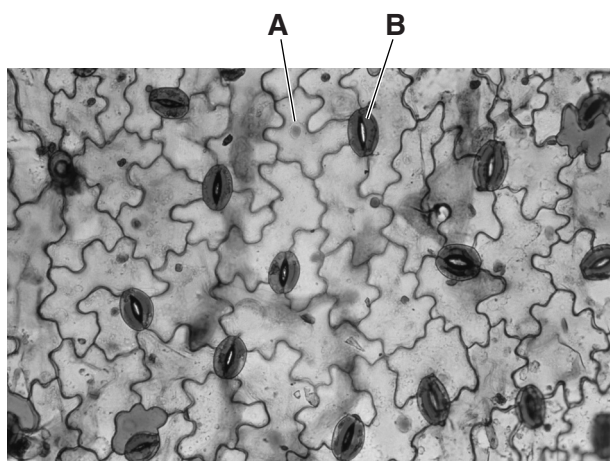
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[Total: 18]

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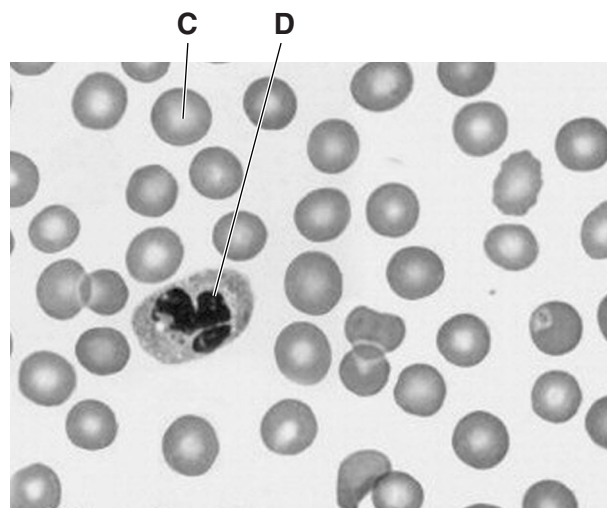
Turn over for Question 2

2 Fig. 2.1 and Fig. 2.2 show two different tissues.



× 400

Fig. 2.1



× 800

Fig. 2.2

(a) (i) Name the cells labelled **A**, **B**, **C** and **D**.

A

B

C

D

- (b) Describe, giving practical details, how you would prepare and examine a tissue such as that shown in Fig. 2.1.

.....

.....

.....

..... [3]

- (c) (i) Make large, labelled drawings of cell **C** and cell **D** shown in Fig. 2.2.

[3]

- (ii) Calculate the magnification of your drawing of cell **D** compared with the actual size of cell **D** that was photographed in Fig. 2.2.
Show all working clearly, including where measurements were taken.

magnification [4]

(d) Complete Table 2.1 to show four differences in the appearance of cell **A** and cell **D**.

Table 2.1

	feature	cell A	cell D
1			
2			
3			
4			

[4]

[Total: 22]

Copyright Acknowledgements:

Fig. 2.1 © J.C. Revy; ISM / Science Photo Library.

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