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Centre Number	Candidate Number	Name

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level

BIOLOGY **9700/05**

Paper 5 Practical Test A2

October/November 2003

1 hour 30 minutes

Candidates answer on the Question Paper.
Additional Materials: As listed in Instructions to Supervisors.

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 in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
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.
You are advised to spend 40 minutes on Question 1, 20 minutes on Question 2 and 30 minutes on Question 3.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

For Examiner's Use	
1	
2	
3	
Total	

This document consists of **5** printed pages, **2** blank pages and a Report Form.

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[Turn over

Question 1 [40 minutes]

You are required to investigate some aspects of respiration in germinating beans, using the apparatus shown in Fig. 1.1.

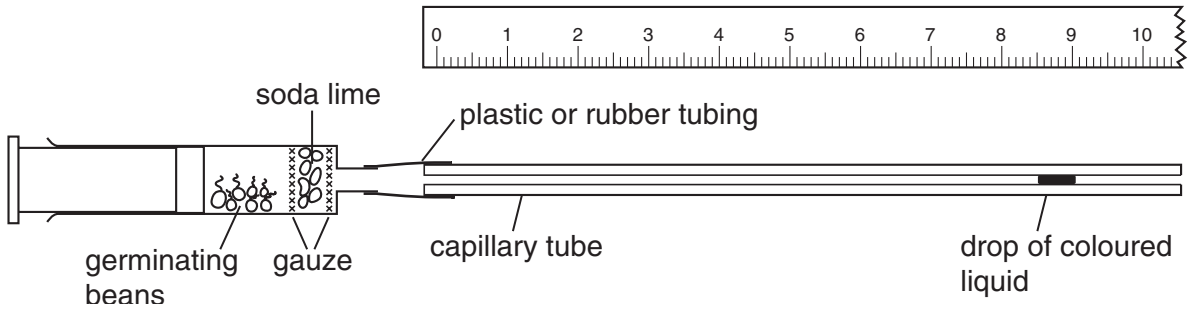


Fig. 1.1

You are provided with a syringe in which some soda lime has been placed.

Warning: Do not remove the soda lime from the syringe as it will burn your skin.

You are also provided with some germinating beans, labelled **S1**, and a coloured liquid, labelled **S2**.
Place four or five of these beans into the barrel of the syringe and carefully replace the plunger.
Attach the length of glass capillary tube to the syringe, using the rubber tubing provided.
Dip the end of the glass capillary tube into the coloured liquid and very gently pull on the syringe plunger so that a drop of liquid enters the capillary tube. Remove any excess liquid with paper towelling. The soda lime will not be harmed by small amounts of the coloured liquid.
Place the apparatus on a sheet of white paper alongside a mm ruler.
Your assembled apparatus should now look like that shown in Fig. 1.1.

Wait until the drop of coloured liquid starts to move.

(a) Mark the position of the coloured liquid with a marker pen on the capillary tube. Measure how far the liquid moves in one minute.
Repeat the measurement every minute for the next four minutes.

Construct a table in the space below and record your results.

[3]

(b) (i) From your table, calculate the mean distance travelled in mm min^{-1}.
Show your working.

.....[2]

(ii) With reference to respiration in the beans, explain why the drop of liquid moves along the capillary tube.

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.....[4]

(c) (i) In an identical experiment with the soda lime removed a student was not expecting the drop to move at all. The drop of liquid actually moved 1 mm towards the syringe in five minutes.

Suggest **one** reason why the drop actually moved towards the syringe.

.....

.....[1]

(ii) Each 10 mm of capillary tubing has a volume of 1 mm^3.
Use the information from **(b)** and **(c)** to calculate the RQ of the beans.
Show your working.

.....[3]

[Total :13]

Question 2 [20 minutes]

K3 is a stained, vertical section through a kidney of a small mammal.

(a) Draw a large, labelled, high-power drawing of a glomerulus and part of a tubule, either in transverse or longitudinal section.

[5]

(b) Find some nuclei in this region. They have an approximate diameter of 10 µm.

Use this fact and the eyepiece graticule provided to estimate the width of a glomerulus.

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.....[2]

[Total : 7]

Question 3 [30 minutes]

Rennin is an enzyme that coagulates milk protein and is found in the stomach of young mammals.
You are required to plan but **not** carry out an investigation into the effect of temperature on the activity of the enzyme.
You may use the following equipment:

a solution of rennin
milk
a water-bath
a thermometer
test-tubes
a graduated pipette
a stopwatch.

Explain your procedure.

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.....[10]

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REPORT FORM

The teacher responsible for this subject is asked to answer the following questions.

(a) Was the candidate physically handicapped in drawing or in using a microscope or is the candidate colourblind? If so, give brief details.

(b) Was the candidate handicapped by deficient material or apparatus? If so, give brief details.

(c) Was it necessary to make any substitutions for the materials sent from Cambridge? If so, give brief details of the circumstances.

(d) Any comments.

Signed ……

N.B. Information that applies to all candidates need be given on the first candidate's answer book only.