Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Advanced Level

BIOLOGY **9700/05**

Paper 5 Practical Test A2

May/June 2006

1 hour 30 minutes

Candidates answer on the Question Paper.
Additional Materials: As listed in the 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.
You may use a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **both** questions.
You are advised to spend 45 minutes on each question.

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	
TOTAL	

This document consists of **8** printed pages.

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

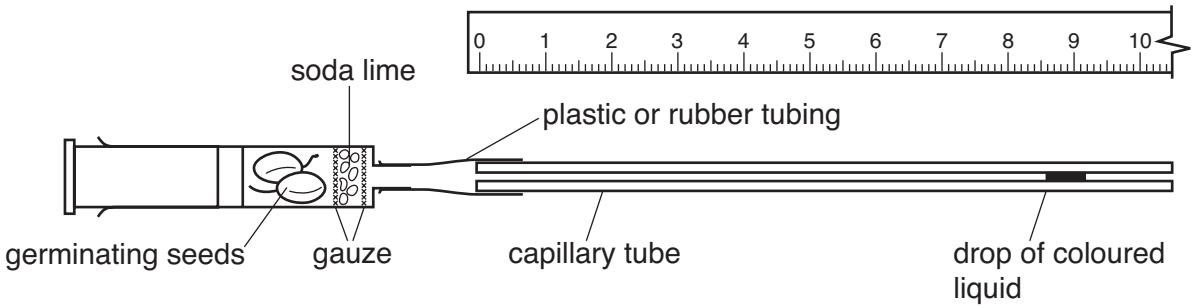


Fig. 1.1

You are provided with some germinating seeds and a syringe in which some soda lime has been placed and a length of glass capillary tube attached.

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

Remove the plunger and insert the germinating seeds into the syringe. Replace the plunger so that it touches the seeds.

Dip the end of the glass capillary tube into the coloured liquid, labelled **L1**, and very gently pull on the syringe plunger so that a drop of liquid enters the capillary tube. Remove any excess liquid with a paper towel. The soda lime will not be affected by small amounts of coloured liquid.

Place the apparatus on a sheet of white paper alongside a mm ruler.

Your apparatus should now look like that shown in Fig. 1.1.

Wait until the drop of coloured liquid starts to move.

If the drop does not move within one minute, add more germinating seeds to the syringe and set up the apparatus again.

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(a) Mark the position of the coloured liquid on the capillary tube.

Measure how far the liquid moves in one minute.

Repeat the measurement every minute for the next four minutes.

If the drop reaches the end of the capillary tube, remove the plunger from the syringe and reset the apparatus with a fresh drop of coloured liquid.

Construct a table in the space below and record your results, showing the mean distance moved per minute by the drop of coloured liquid.

[4]

(b) A student carried out the same experiment using the apparatus shown in Fig. 1.2.

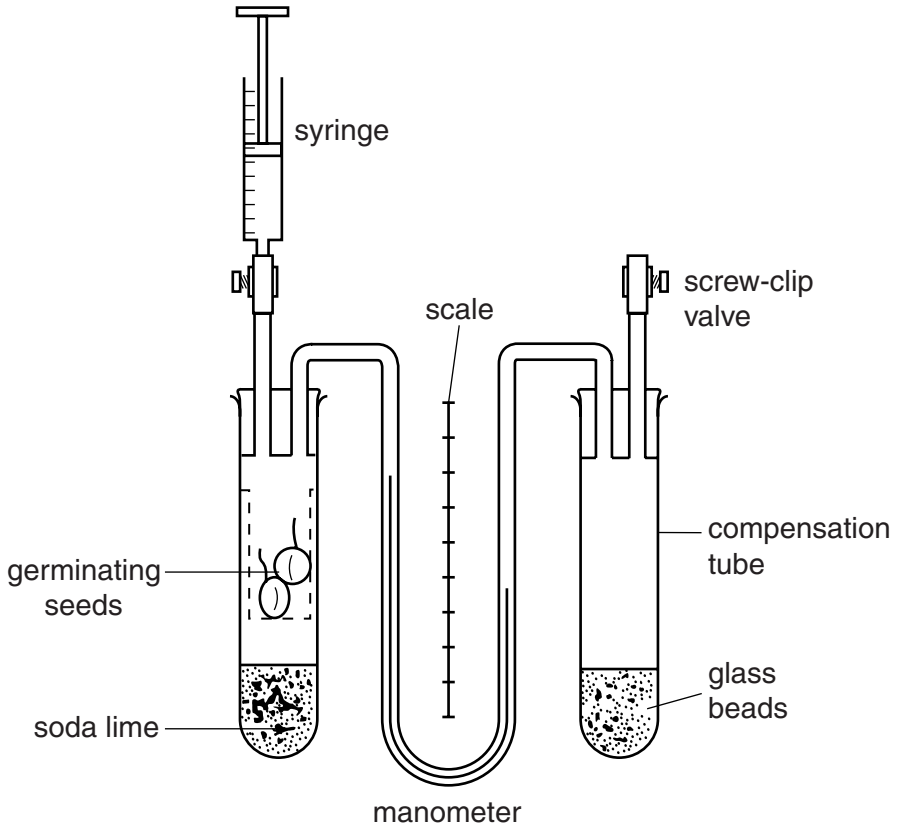


Fig. 1.2

The following data was obtained with the apparatus as shown in Fig. 1.2.

Droplet moved 1.8 mm per min^{-1} towards the syringe.

The soda line was removed from the test tube containing the seeds and replaced with an equal volume of glass beads.

Droplet moved 1.0 mm in 5 minutes away from syringe.

Each 10 mm of capillary tube has a **volume** of 8 mm^3.

(i) Calculate the **volume** of oxygen produced.
Show your working.

.....[1]

(ii) Calculate the **volume** of carbon dioxide consumed.
Show your working.

.....[3]

(iii) Calculate the **RQ** of the germinating seed from the data provided.
Show your working.

.....[1]

(c) Explain the advantage of using the apparatus shown in Fig. 1.2, rather than the simpler respirometer that you used in Fig. 1.1.

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.....

.....

.....[1]

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(d) A student carried out a similar experiment using green pond weed. The soda lime and glass beads were replaced with a series of different concentrations of sodium hydrogen carbonate solution. The apparatus is shown in Fig. 1.3.

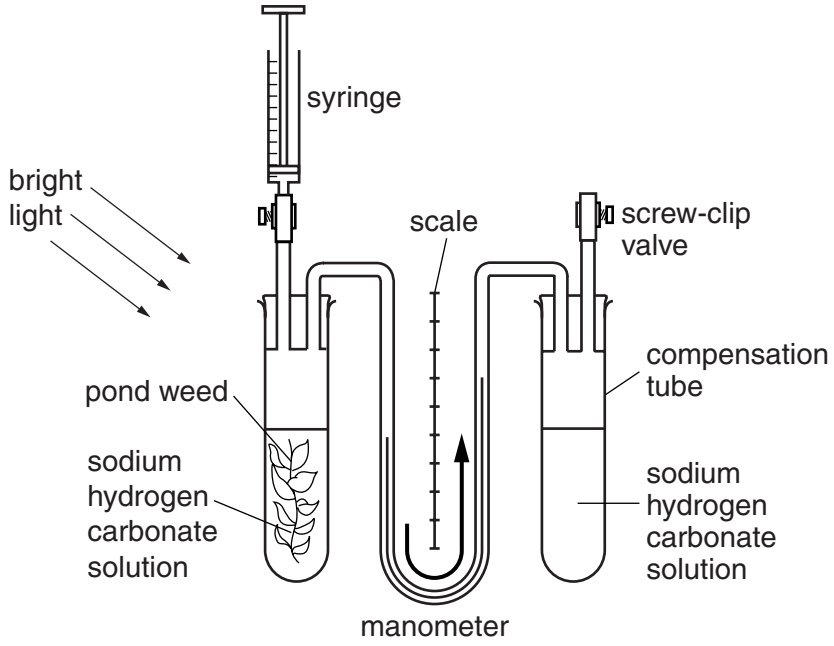


Fig. 1.3

(i) Fig. 1.4 is a graph showing the rate of movement of the manometer fluid, against sodium hydrogen carbonate concentration.

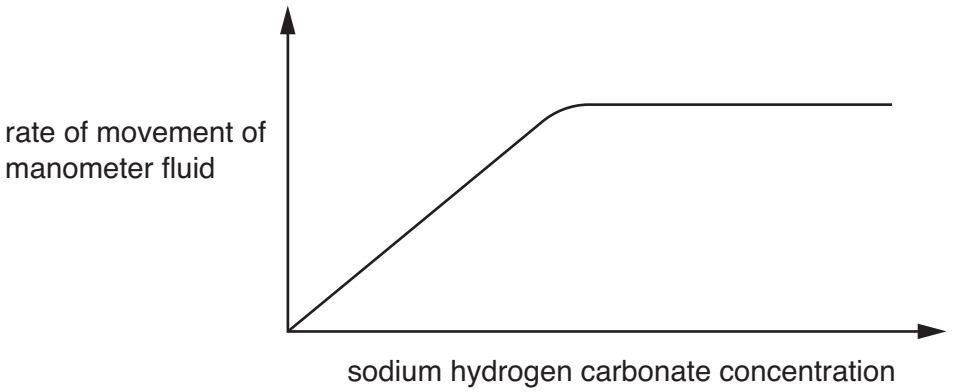


Fig. 1.4

Fully explain the shape of the graph.

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.....

.....[3]

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(ii) The student knows that the equation for photosynthesis is:

$6H_2O + 6CO_2 \rightarrow C_6H_{12}O_6 + 6O_2$

The student thought that as the volume of carbon dioxide used equalled the volume of oxygen produced, the manometer fluid should remain still.
Suggest why the manometer fluid did **not** remain still.

.....

.....

.....[2]

[Total: 15]

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2 **S1** is a slide of a transverse section of a leaf.

(a) Make a large, plan diagram to show the distribution of the tissues using the eyepiece graticule to help you represent the proportions of the structures.

[6]

(b) Using the ruler to measure both specimen and drawing, calculate the magnification of your drawing. Indicate clearly on your drawing where you took the measurements. Show your working.

magnification ……[2]

(c) Use the high-power of your microscope and make a large, annotated drawing of one of the stomata and surrounding guard cells, indicating those features which are characteristic of xerophytes.

[5]

(d) Describe two **other** features visible in the transverse section of the leaf which are characteristic of xerophytes.

1 .....

.....

.....

2 .....

.....

.....[2]

[Total : 15]

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