| Centre Number | Candidate Number |
|---|---|
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Candidate Name _____

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**General Certificate of Education Advanced Subsidiary Level**

# BIOLOGY 8700/3

PAPER 3 Practical Test

**OCTOBER/NOVEMBER SESSION 2001** 1 hour 15 minutes

Candidates answer on the question paper.
Additional materials:
As listed in Instructions to Supervisors

**TIME** 1 hour 15 minutes

**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **both** questions.
Write your answers in the spaces provided on the question paper.

**INFORMATION FOR CANDIDATES**

The intended number of marks is given in brackets [ ] at the end of each question or part question.
You are advised to spend 55 minutes on Question 1 and 20 minutes on Question 2.

| FOR EXAMINER'S USE | |
|---|---|
| 1 | |
| 2 | |
| TOTAL | |

**This question paper consists of 4 printed pages, 3 blank pages and a Report Form.**


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Local Examinations Syndicate
**[Turn over**

**Question 1** [55 minutes]

You are required to investigate the effect of temperature on the enzyme urease. Urease catalyses the following reaction.

urea + water → ammonium carbonate

*Proceed as follows:*

Prepare two tins or beakers to act as water-baths. The temperature of the water in one should be about 50 °C, in the other, the water should boil. Label three test-tubes **A**, **B** and **C** respectively. Add one tablet of urease to tube **A** and place the bottom of the tube on the bench on a pad of paper or cloth.

Using a glass rod, **very gently** crush the tablet into a powder, taking care not to break the bottom of the test-tube. Repeat this procedure for tubes **B** and **C**. To each of the three tubes, add 3 $cm^3$ of distilled water and stir to dissolve. Place tube **A** in the water-bath at 50 °C, tube **B** in the boiling water and tube **C** in a test-tube rack at room temperature.

After **five minutes**, remove tubes **A** and **B** from the water-baths and cool them under a running tap. Measure out 10 $cm^3$ of urea solution into each of three further test-tubes.

Adjust the temperature of one water-bath to 38–40 °C, the other is no longer needed. Place tubes **A**, **B** and **C** and the three containing **urea solution** into this water-bath. After **three minutes**, tip the contents of one of the urea tubes into each of tubes **A**, **B** and **C**. Stir the contents using a glass rod. Note the time and leave these tubes in the water-bath for **30 minutes**.

Set up a burette containing **0.05 mol $dm^{-3}$ sulphuric acid.**
Label three flasks or beakers **A**, **B** and **C** respectively.

**You should begin Question 2 during the 30 minute period.**

After **30 minutes**, remove tubes **A**, **B** and **C** from the water-bath. Pour the contents of these tubes into the flasks or beakers similarly labelled. To each flask, add **four drops** of indicator.

**(a)** Record the colour of the contents of the three flasks.

**A**..... **B** ..... **C** ..... [1]

Titrate the contents of **A**, **B** and **C** in turn with sulphuric acid. Add the sulphuric acid drop by drop, shaking gently after each drop, until an end point is reached (a grey/pink colour).

**(b)** Record your results in a suitable table.

[5]

**(c)** Explain your results as fully as possible, using your biological knowledge.

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.....[5]

**(d)** State the ways in which you would have expected the results to be different if tubes **A** and **B** had been maintained at their respective temperatures for one hour instead of five minutes.

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.....[2]

**(e)** State **two** variables that are **not** controlled in your procedure that are likely to affect the rate of enzyme reaction.

..... *and* .....[2]

**(f)** Other than controlling the variables you mentioned in **(e)**, but using the same apparatus and materials, state **three** ways in which you could obtain more reliable results if more time was available.

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.....[3]

[Total : 18]



**[Turn over**

**Question 2** [20 minutes]

Slide **K1** is a stained transverse section of the stem of a herbaceous flowering plant. Examine **K1**, using your microscope.

Fig. 2.1 shows an outline of half of the section, without any of the details.

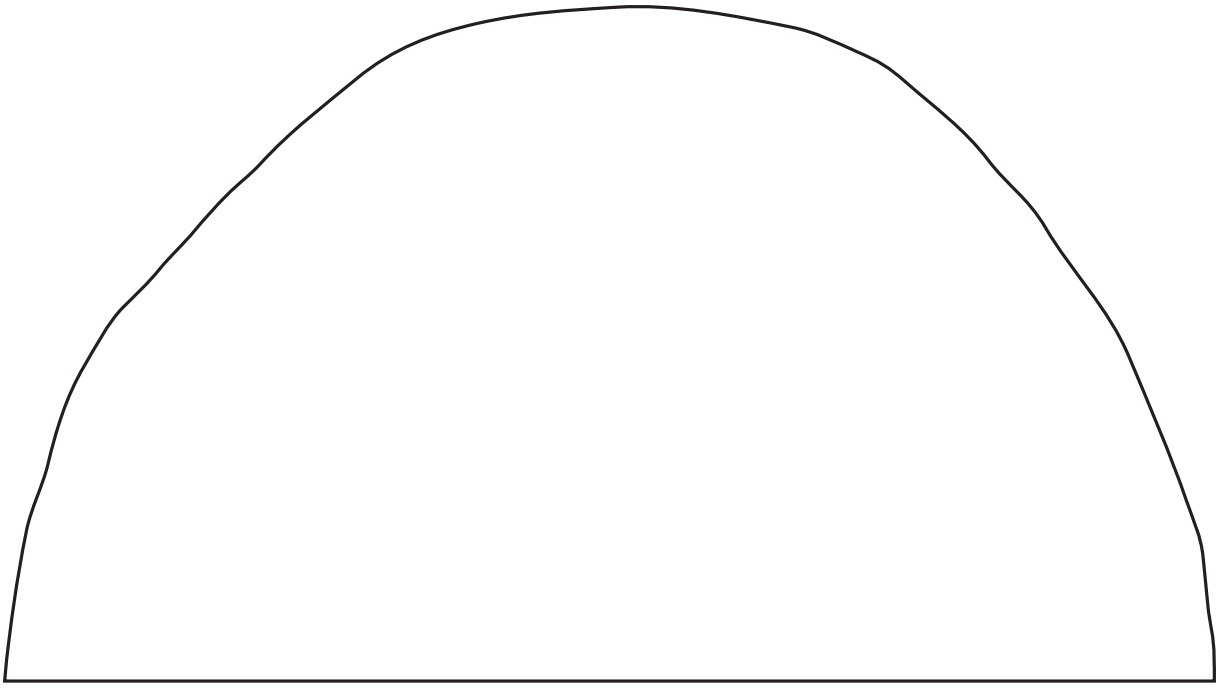


**Fig. 2.1**

**(a)** Draw the outlines of **all** the vascular bundles in the half section on Fig. 2.1. Your plan should show accurately the numbers of the bundles, their sizes and positions. [5]

Slide **K2** is a stained longitudinal section of the stem of the same species of plant as **K1**. Examine **K2**, using your microscope.

**(b)** **(i)** On Fig. 2.1, indicate one possible position at which **K2** could have been taken. Label this '*position of K2*'. [1]

**(ii)** Give reasons for your decision in **(i)** based on your observations of both slides.

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.....[1]

[Total : 7]

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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 using a microscope? 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 only be given on the first candidate's answer book.*