UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2587516548

BIOLOGY **9700/34**

Advanced Practical Skills 2 **October/November 2010**

2 hours

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

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 ink.
You may use a pencil for any diagrams, graphs or rough working.
Do **not** use red ink, staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

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.

For Examiner's Use	
1	
2	
Total	

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

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You are reminded that you have only one hour for each question in the practical examination. You should read carefully through the whole of each question and then plan your use of the time to make sure that you finish all of the work that you would like to do.

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You will gain marks for recording your results according to the instructions.

1 There are molecules on the surface of yeast cells which cause the cells to stick together. When a yeast suspension is placed in a test-tube some of the cells sink slowly to the bottom.

(a) (i) Show clearly **on Fig. 1.1** what you would expect the contents of the test-tube to look like after 10 minutes. You will gain marks for clear labels.

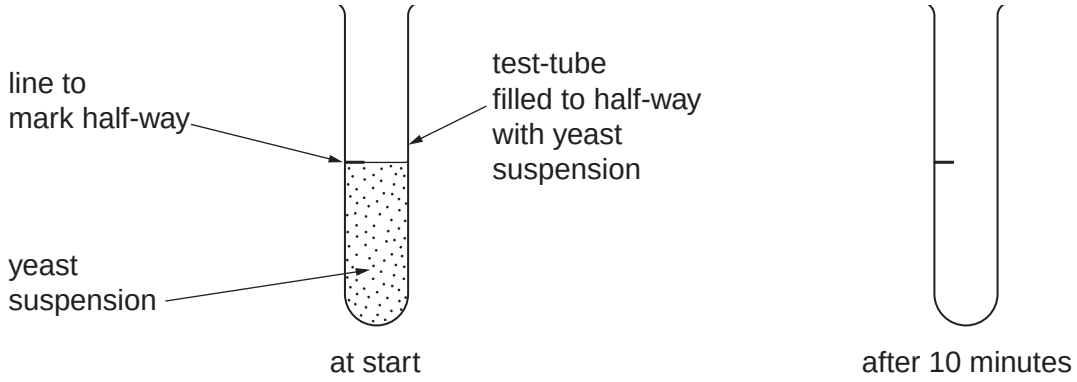


Fig. 1.1

[2]

You are required to investigate the effect of the independent variable, pH, on the sedimentation of a yeast cell suspension over a period of 10 minutes.

(ii) State the time intervals you will use and what you will use the graph paper scale to measure.

.....

.....

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.....

.....[2]

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You are provided with

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labelled	**contents**	**hazard**	**volume /cm^3**
pH 3	buffer solution	irritant	30
pH 4	buffer solution	irritant	30
pH 5	buffer solution	irritant	30
pH 6	buffer solution	irritant	30
Y	yeast suspension	none	60
C	calcium chloride solution	irritant	15

Proceed as follows:

1. Label one test-tube for each pH.

2. Use the marker provided to mark a line half-way along the length of each test-tube as shown in Fig. 1.1.

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[Turn over

You will need to put 1 cm^3 of **C** in each test-tube and then an equal volume of **Y** and each buffer solution so that the mixture will fill the test-tube to the half-way mark as shown in Fig. 1.2.

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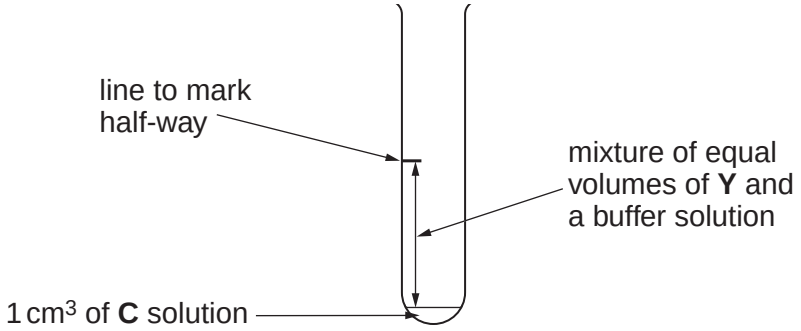


Fig. 1.2

(iii) Use the test-tube labelled **T** and the other apparatus provided and decide on the volume of **Y** and the volume of each buffer solution to use.

Describe all the steps you used to work out the volumes.

.....

.....

.....[1]

State the volume of **Y** and the volume of each buffer solution to use.

volume of **Y** .....

volume of each buffer solution .....

[1]

3. Put the volume of buffer solution labelled **pH 3**, stated in **(iii)**, into the test-tube labelled **pH 3**.

4. Put 1 cm^3 of **C** to the same test-tube.

5. Repeat steps 3 and 4 with each of the other buffer solutions **pH 4**, **pH 5** and **pH 6**.

6. Stir the yeast suspension **Y** with a glass rod.

7. Put the volume of **Y**, stated in **(iii)**, into each test-tube to make the total volume up to the half-way mark.

8. Put a bung or cork into the test-tube and invert the test-tube twice to mix well. Repeat with each test-tube.

9. Immediately start timing. At your selected times, record your observations. You may need to lift each test-tube to eye level to take each reading. Take care not to disturb the contents of the test-tube.

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(iv) Prepare the space below and record your observations.

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[5]

(v) Use your results to state the effect of pH on the yeast suspension.

.....

.....

.....[1]

(vi) Identify **one** significant source of error in this experiment.

.....

.....

.....[1]

(vii) State the degree of uncertainty of using the graph paper scale as a measure.

.....[1]

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(viii) Suggest how you could make this investigation

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as accurate as possible,

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as reliable as possible.

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.....[3]

A yeast cell suspension can be used to produce ethanol for use as a fuel. The yeast cells are allowed to sediment out at the end of the process so that they can be reused. It has been found that calcium chloride affects the rate of sedimentation.

Table 1.1 shows the effect of adding calcium chloride to a yeast suspension.

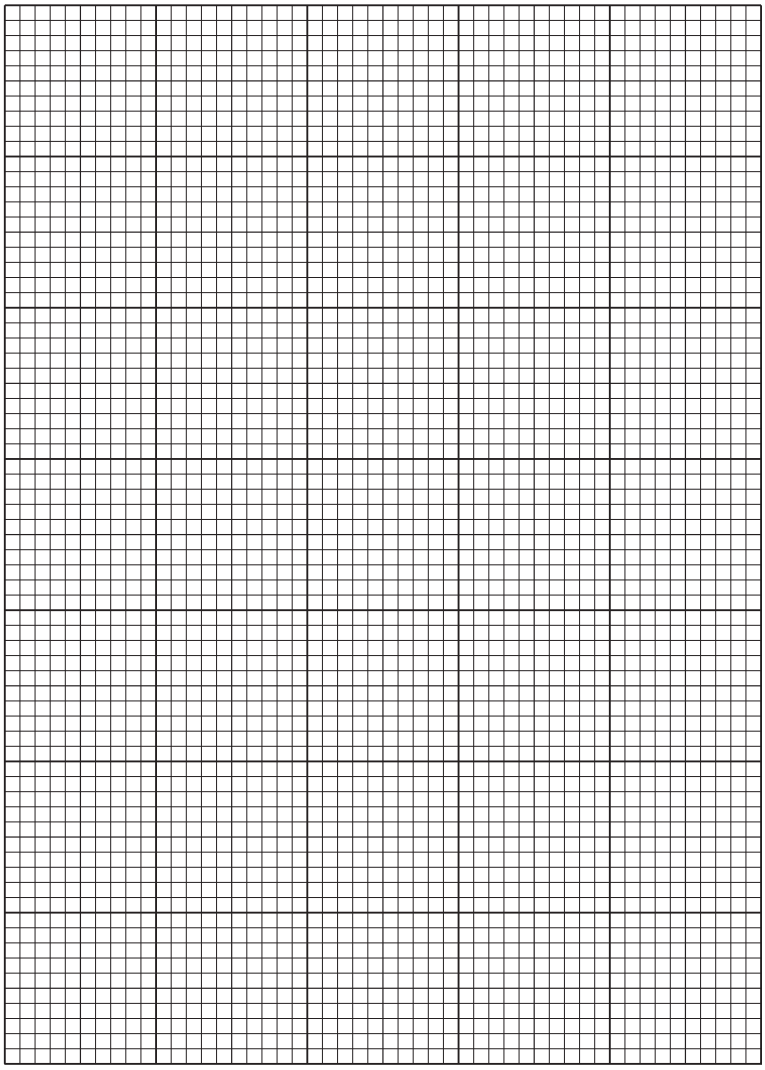
calcium chloride concentration / m mol	sedimentation time / min
0.00	85
0.25	140
0.40	69
0.50	50
0.75	12
1.00	12

Table 1.1

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(b) (i) Plot a graph of the data shown in Table 1.1.

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[4]

(ii) State the concentration of calcium chloride required for the yeast to sediment out at 40 minutes.

You may lose marks if you do not show your working or if you do not use appropriate units.

concentration of calcium chloride required ..... m mol
[1]

[Total: 22]

2 **M1** is a slide of a stained transverse section through a plant organ.

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(a) **(i)** Select a large vascular bundle and draw a large plan diagram of the vascular bundle.

Label the xylem tissue.

[5]

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(ii) The epidermis has hair-like structures called trichomes.

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Make a high-power drawing of one trichome, made up of at least three cells, **and** one epidermal cell on each side touching the base of the trichome.

Label the trichome.

[5]

Fig. 2.1 is a photomicrograph of a stained transverse section of a different plant organ.

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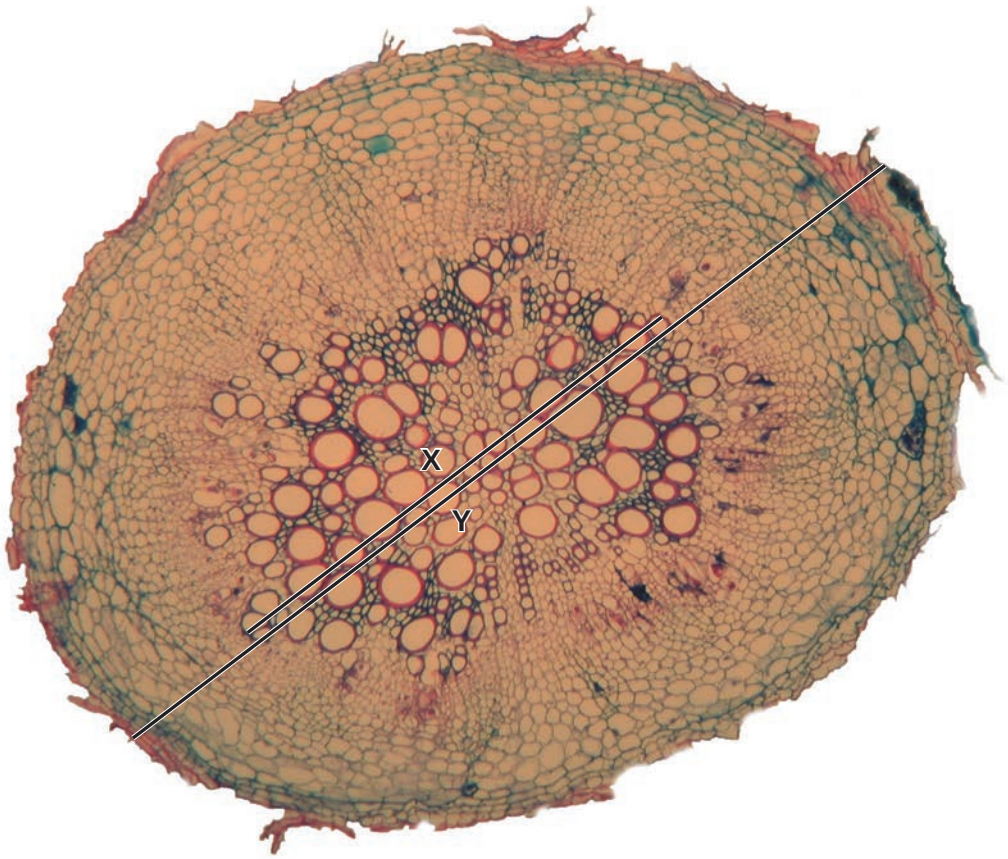


Fig. 2.1

(b) (i) Calculate the ratio of the total diameter of the plant organ labelled **Y** to the diameter of the vascular tissue labelled **X**.

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[3]

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(ii) Prepare the space below so that it is suitable for you to describe the observable differences between **M1** and **Fig. 2.1**.

Record your observations in the space you have prepared.

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[5]

[Total: 18]

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