

Candidate Name \_\_\_\_\_

Centre Number

Candidate  
Number

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**International General Certificate of Secondary Education  
CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**BIOLOGY**

PAPER 6 Alternative to Practical

**0610/6**

**MAY/JUNE SESSION 2002**

1 hour

Candidates answer on the question paper.  
No additional materials are required.

**TIME** 1 hour

**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Use a sharp pencil for your drawings. Coloured pencils or crayons should **not** be used.

**INFORMATION FOR CANDIDATES**

The intended number of marks is given in brackets [ ] at the end of each question or part question.

**FOR EXAMINER'S USE**

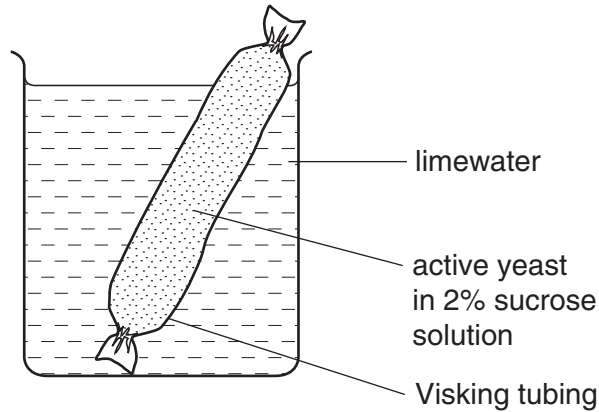
<b>1</b>	
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>TOTAL</b>	

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**This question paper consists of 10 printed pages and 2 blank pages.**



- 1 A 15 cm length of Visking tubing was knotted at one end to make a small tube. A  $10\text{ cm}^3$  sample of a mixture of active yeast in 2% sucrose solution was placed in the tube and the tube was knotted at the top. The tube was suspended in a small beaker containing limewater, as shown in Fig. 1.1. The apparatus was left for 30 minutes at room temperature ( $22^\circ\text{C}$ ) and then observed.



**Fig. 1.1**

- (a) (i) Suggest what changes you might expect to observe in the contents of the tube and the beaker.

.....  
 .....  
 .....  
 .....[3]

- (ii) State the metabolic process responsible for these changes.

.....[1]

- (b) A similar apparatus was set up but the limewater was replaced by distilled water. The apparatus was left at room temperature for one hour.

The contents of the Visking tubing and the beaker were tested using both the biuret test for protein and Benedict's test for reducing sugar.

The results of the biuret test are shown in Table 1.1 and the conclusions from the Benedict's test are shown in Table 1.2.

**Table 1.1**

**Table 1.2**

	colour after biuret test
tube contents	purple
beaker contents	blue

	conclusion after Benedict's test
tube contents	reducing sugar present
beaker contents	reducing sugar present

- (i) Suggest an explanation for the result of the biuret test on the contents of the beaker.

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

- (ii) What colour would have been observed in the Benedict's test for reducing sugar?

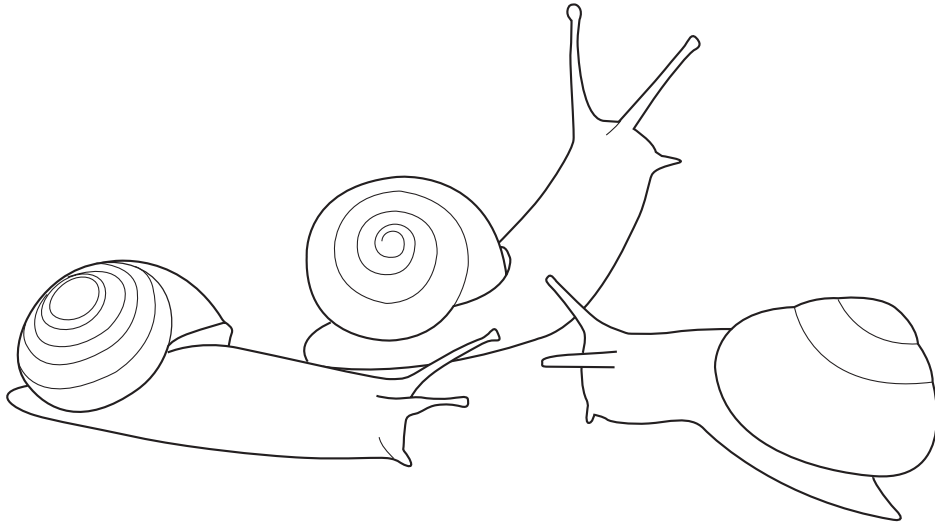
.....[1]

- (iii) Suggest an explanation for the presence of reducing sugar in the beaker after one hour, when none was present in the original mixture of active yeast and sucrose.

.....  
 .....  
 .....  
 .....[3]

[Total : 10]

- 2 Fig. 2.1 shows a group of invertebrates found living on the land. Other members of the same group occur in aquatic habitats, both freshwater and saltwater.



**Fig. 2.1**

- (a) Make a large, clear drawing of one of these invertebrates to show the main features that enable you to classify it. Label **two** of these distinguishing features.

[5]

- (b) Name the group to which these invertebrates belong.

.....[1]

[Total : 6]

- 3 (a) Fig. 3.1 shows a bean seedling with its root system. When transplanting young seedlings, care has to be taken of the delicate root system.

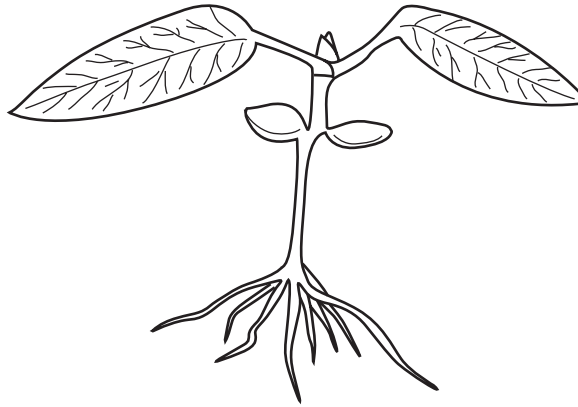


Fig. 3.1

- (i) Describe the appearance, shortly after transplanting, of a similar seedling whose roots had been damaged;

.....  
.....

whose roots had **not** been damaged.

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

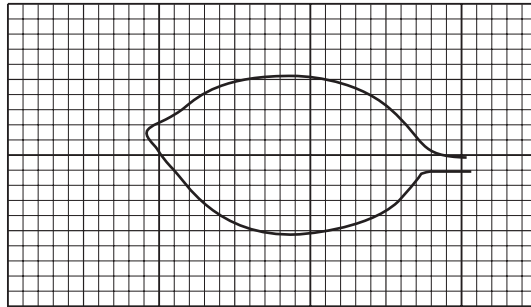
- (ii) State two visible reasons for identifying the young seedling shown in Fig. 3.1 as a dicotyledon.

1. ....  
2. ....[2]

Question 3 continues on the next page.

Seedlings were grown in two plots, one in full sun and the other in shade.

- (b) One leaf was removed from a plant growing in the shade, placed on a piece of graph paper and an outline of this leaf drawn, as shown in Fig. 3.2.



**Fig. 3.2**

Explain how you would determine the area of this leaf.

.....

.....

.....

.....[2]

Table 3.1 shows the leaf area of seedlings from both plots.

**Table 3.1**

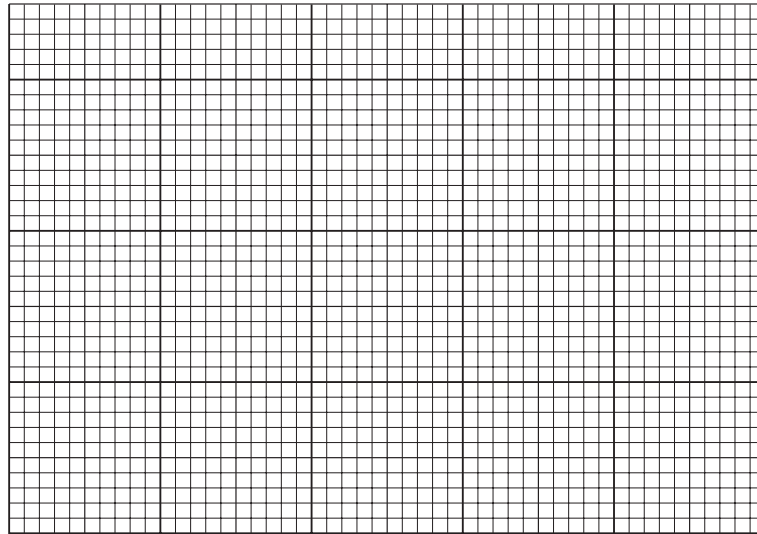
leaf area in cm <sup>2</sup> for leaves from plot in shade	leaf area in cm <sup>2</sup> for leaves from plot in full sun
6.0, 4.5, 4.3, 5.0, 5.5, 5.4, 4.9, 5.2, 5.6, 4.6, 4.4, 5.1, 4.5, 5.4	3.5, 2.8, 3.1, 3.4, 2.7, 4.2, 3.6, 3.6, 3.3, 3.1, 2.9, 4.5, 3.8, 3.9

- (c) (i) Arrange these two sets of leaf area data into classes, using the tally chart below. One entry has been completed for you.

class size in cm <sup>2</sup>	leaf area in cm <sup>2</sup> from shaded plot	leaf area in cm <sup>2</sup> from sunlit plot
2.5 – 2.9		
3.0 – 3.4		
3.5 – 3.9		
4.0 – 4.4	//	
4.5 – 4.9		
5.0 – 5.4		
5.5 – 5.9		
6.0 – 6.4		

[2]

- (ii) Draw a histogram to show the range of leaf area in classes from the two plots. Distinguish carefully between the two sets of leaf area data.



[5]

- (d) (i) Plant leaves expand as they grow, increasing in area.

Suggest how you would ensure that the differences in leaf area were due to differences in light intensity at the two plots, given that all other environmental factors were identical.

.....  
.....[1]

- (ii) What advantage is there for the plants in the shade having larger leaves than the plants in full sun?

.....  
.....[1]

[Total : 15]

4 Fig. 4.1 shows an apparatus used to measure the volume of air in lungs.

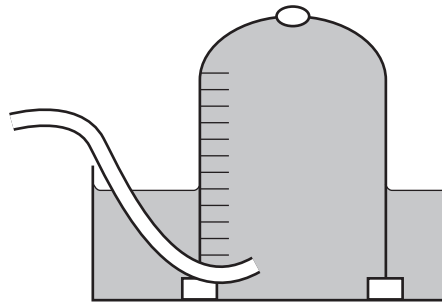


Fig. 4.1

(a) Describe how this apparatus could be used to measure the lung volume of a student.

.....  
.....  
.....  
.....  
.....[3]

(b) It is found that the lung volumes of different students of the same age vary.

Suggest three factors that may influence the lung volumes of such individuals.

1. ....  
2. ....  
3. ....[3]



(c) It is known that exhaled air contains more carbon dioxide than inhaled air.

Describe an experiment that would show this statement is correct. You may find it helpful to include a diagram in your answer.

.....

.....

.....

.....

.....

.....[3]

[Total : 9]





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