

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

Centre Number	Candidate Number

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

**BIOLOGY**

**0610/6**

PAPER 6 Alternative to Practical

**OCTOBER/NOVEMBER 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	
1	
2	
3	
4	
TOTAL	

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



- 1 (a) Fig. 1.1 shows a potato plant and one tuber and one flower are shown in detail.



**Fig. 1.1**

- (i) Make large, labelled drawings of the tuber and the flower shown in detail.

(ii) State the type of reproduction carried out by the tuber and the flower.

tuber .....

flower .....

[1]

(b) Humans use the potato tubers as a source of food. The main food component is a complex carbohydrate, starch.

Fig. 1.2 shows some starch grains found inside the cells of tubers.

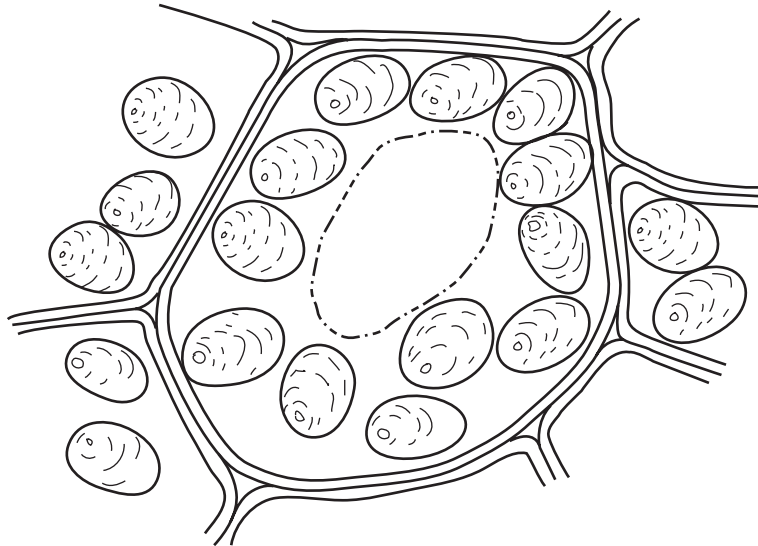


Fig. 1.2

(i) Determine the length of one starch grain in **mm**, given that the cells are magnified 860 times.  
Show your working.

length of starch grain ..... mm

[2]

(ii) Name the metabolic process by which plants make carbohydrate.

.....[1]

(iii) Describe an experiment you could carry out to show the formation of starch in a green plant.

.....

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.....

.....[4]

[Total : 12]

2 Ascorbic acid (vitamin C) is found in fresh fruits and vegetables. The amount in a known quantity of fruit juice can be determined by decolourising a blue dye, DCPIP.

(a) Students were provided with 0.1% ascorbic acid solution (0.1 g ascorbic acid in 100 cm<sup>3</sup> water) and 0.1% freshly prepared DCPIP solution.

1 cm<sup>3</sup> DCPIP was placed in a clean test-tube. The ascorbic acid was added, using a graduated pipette, until the blue colour disappeared.

The test was carried out five times and the results are shown in Table 2.1.

**Table 2.1**

test	volume of ascorbic acid (cm <sup>3</sup> )
1	1.5
2	1.0
3	1.1
4	0.9
5	1.0
average	

(i) Complete Table 2.1 by calculating the average (mean) value of the data. [1]

(ii) Examine the data in Table 2.1.

Suggest a more reliable average value, stating a reason for your answer.

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

- (b) The test was repeated on a range of different fruit juices using 1 cm<sup>3</sup> of DCPIP each time.

Fig. 2.1 shows the results of these tests. Each graduated pipette originally contained 1 cm<sup>3</sup> of a different fruit juice.

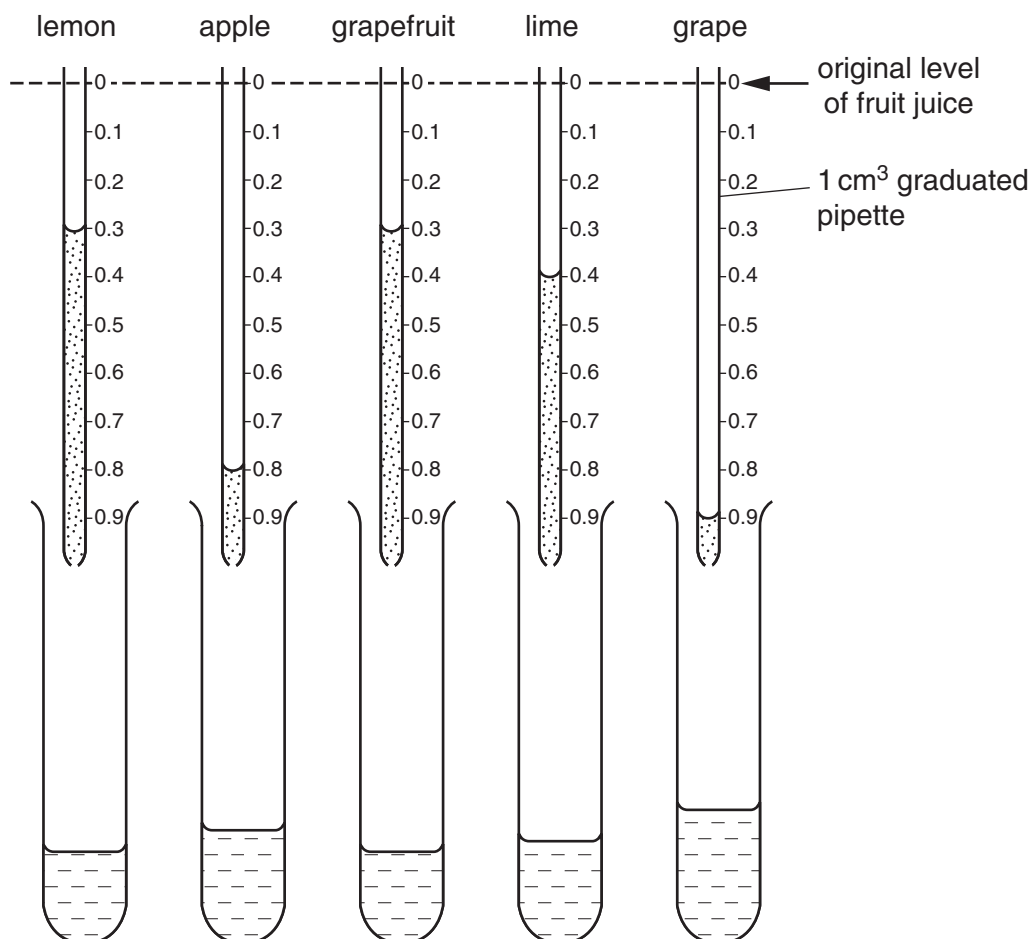


Fig. 2.1

In Table 2.2,

- (i) record the volumes of fruit juices used;
- (ii) calculate and record the amount of ascorbic acid in each fruit juice using the formula

$$\frac{n}{p} = \text{concentration of ascorbic acid in a fruit juice in g per cm}^3$$

where,

$n$  = volume of ascorbic acid from (a)(ii);

$p$  = volume of fruit juice needed to decolourise DCPIP.

**Table 2.2**

type of juice	lemon	apple	grapefruit	lime	grape
volume of juice used to decolourise DCPIP = $p \text{ cm}^3$					
$\frac{n}{p}$ = g of ascorbic acid					

[5]

(iii) On the grid, show your results in an appropriate form to compare the ascorbic acid content of the five fruit juices.

[4]

(c) The concentration of ascorbic acid (vitamin C) is highest in **fresh** fruit juices.

Describe a simple investigation you could carry out to show the effect of storage on the ascorbic acid content of one of the five fruit juices.

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[3]

[Total : 15]

3 If your teeth are not cared for and cleaned regularly, plaque may build up.

(a) Fig. 3.1 shows, in outline, some human front teeth.

Carefully shade in the areas where plaque would be found.

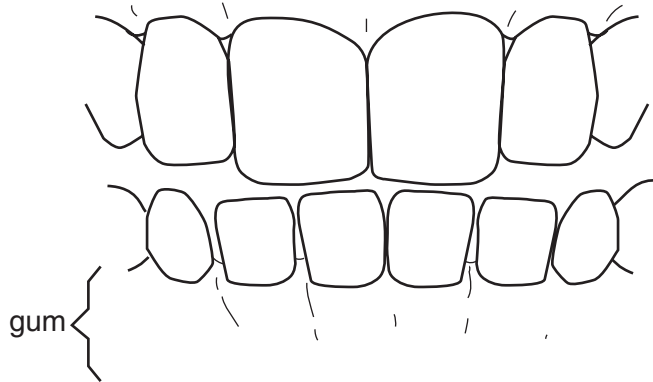


Fig. 3.1

[2]

(b) Plaque is acidic and can damage the enamel of the teeth.

A sample of plaque was removed from the teeth and the pH determined using a pH meter.

Fig. 3.2 shows the dial on the pH meter.

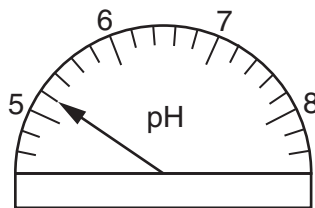


Fig. 3.2

(i) What is the pH reading? .....

[1]

(ii) Suggest an alternative way by which you could determine the pH of a similar sample of plaque and the observation you would expect to make.

.....

.....

.....

.....[2]



(c) Bacteria play an active part in causing tooth decay and in the formation of plaque.

Suggest **one** way in which you could show that these bacteria are living organisms.

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.....[3]

[Total : 8]

4 Figs. 4.1 and 4.2 show two samples of human blood cells as seen using a light microscope.

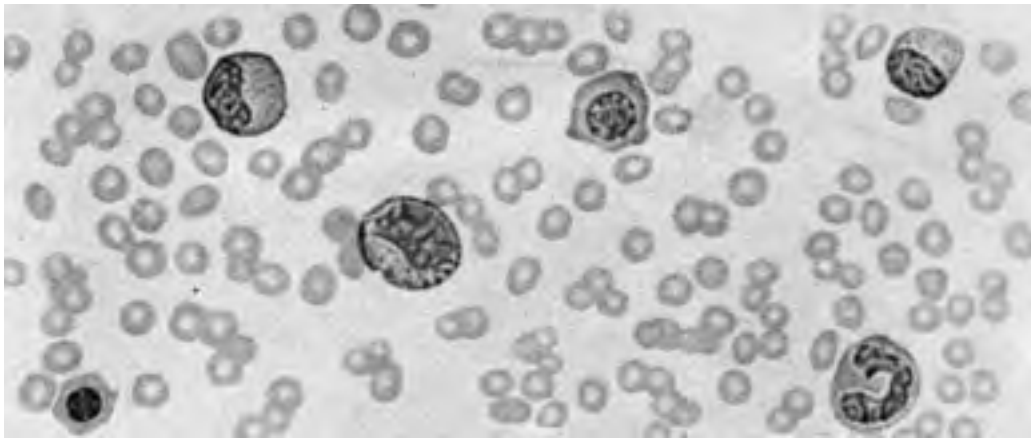


Fig. 4.1

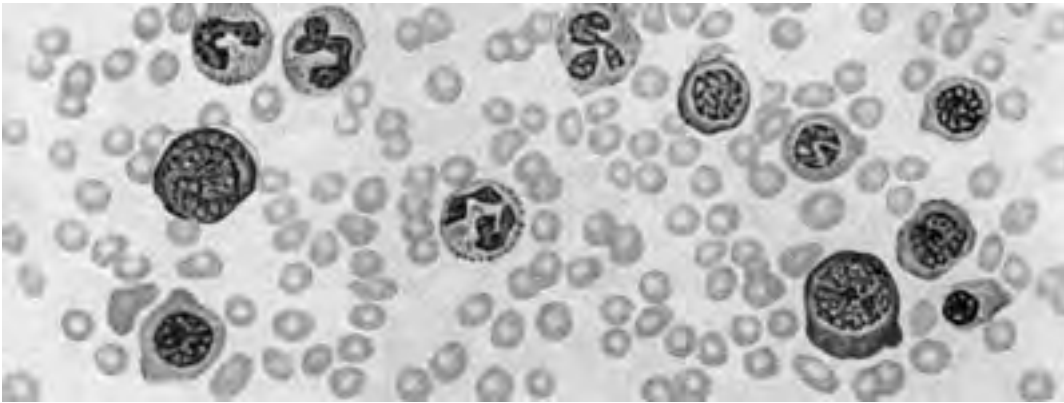


Fig. 4.2

(a) State how you would determine the ratio of red blood cells to white blood cells.

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

(b) (i) Describe **three** differences between the samples shown in Figs. 4.1 and 4.2.

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

(ii) Suggest an explanation for these differences.

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

[Total : 5]



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