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| Centre Number | Candidate Number | Name |
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CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY

5090/06

Paper 6 Alternative to Practical

October/November 2003

1 hour

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided at the top of this page.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
The number of marks is given in brackets [] at the end of each question or part question.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

| For Examiner's Use | |
|--------------------|--|
| 1 | |
| 2 | |
| 3 | |
| Total | |

- 1 • Sucrose (cane sugar) does not react with Benedict's solution.
- Sucrose molecules consist of a pair of molecules joined together.
- Sucrose can be split into two smaller molecules by the process of hydrolysis.
- Each of these smaller molecules will react with Benedict's solution.
- Hydrolysis can be carried out by heating a solution of sucrose with dilute hydrochloric acid.
- An enzyme will also carry out the hydrolysis, at a lower temperature.
- Benedict's solution can react only in alkaline solution.
- Sodium hydrogencarbonate can be used to neutralise dilute hydrochloric acid.

You are provided with a solution that contains only sucrose.

(a) Using the above information and your own experience of food testing, describe and explain how you would demonstrate that the solution contained sucrose but did not initially contain glucose. Practical details should be given. Use the following headings.

(i) *to show the absence of glucose in the original solution*

.....

.....

.....[2]

(ii) *hydrolysis of the sucrose solution*

.....

.....

.....

.....[3]

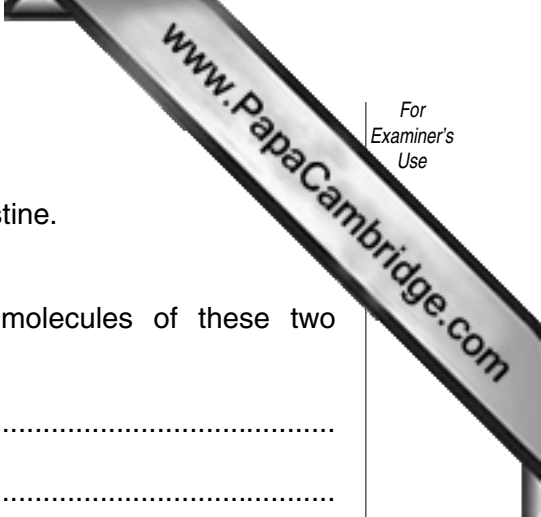
(iii) *the final test to prove the presence of sucrose in the original solution*

.....

.....

.....

.....[3]



- (b)
- Both sucrose and glucose are good sources of energy.
 - The enzyme that digests sucrose is found in the small intestine.
 - There is no enzyme for the digestion of glucose.

What do these facts suggest about the absorption of molecules of these two compounds from the intestine?

.....

.....

.....[2]

[Total : 10]

2 Fig. 2.1 and Fig. 2.2 show apparatus that is used for collecting animal specimens for ecological studies.

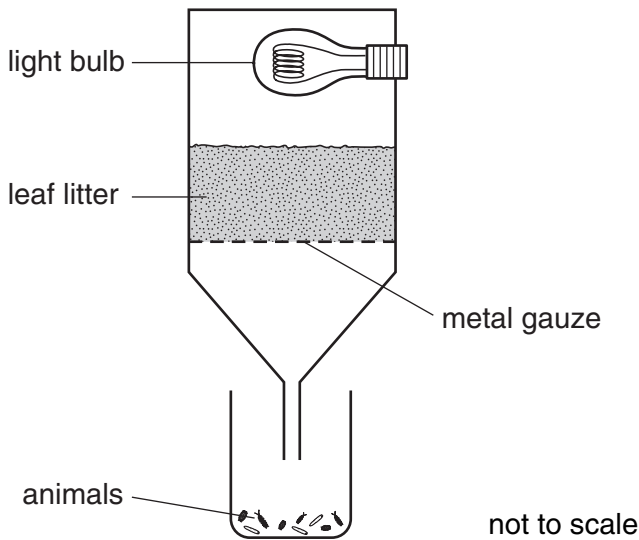


Fig. 2.1
a Tulgren funnel

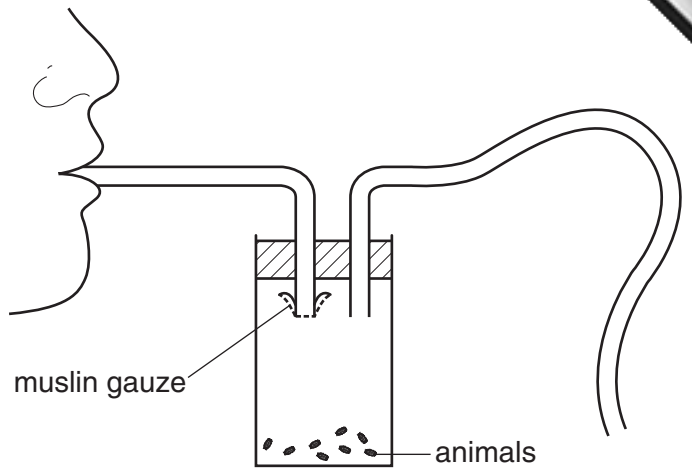
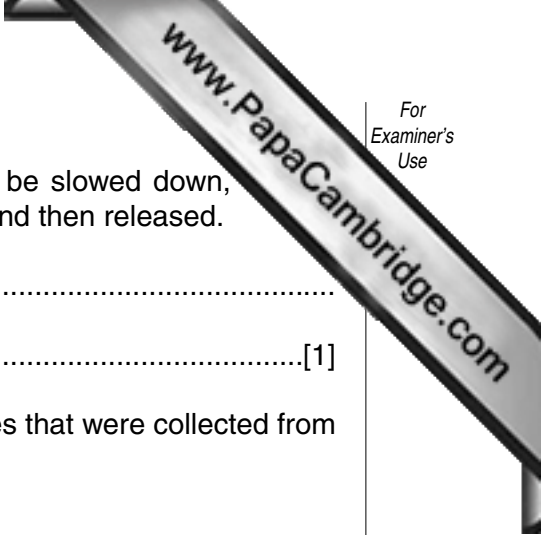


Fig. 2.2
a pooter

- The apparatus shown in Fig. 2.1 is used for collecting animals that live in leaf litter.
- The apparatus shown in Fig. 2.2 is used for collecting animals that live on the leaves of a tree. When the branches are beaten with a stick, the animals fall on to a sheet held underneath. The pooter is then used to collect the smaller specimens by sucking them up into the apparatus.

- (a) (i) What is the purpose of the metal gauze shown in Fig. 2.1?
[1]
- (ii) What is the purpose of the muslin gauze shown in Fig. 2.2?
[1]
- (b) (i) Name two stimuli to which the animals may have responded in Fig. 2.1.
1.
2.[2]
- (ii) Suggest two ways in which these responses by the animals might be of benefit to them in their normal way of life in the leaf litter.
1.
2.[2]
- (iii) Suggest two advantages of collecting animals with the pooter, rather than picking them up with forceps.
1.
2.



- (iv) Suggest how the animals collected in the pooter could be slowed down, being harmed, so that they could be removed for study and then released.

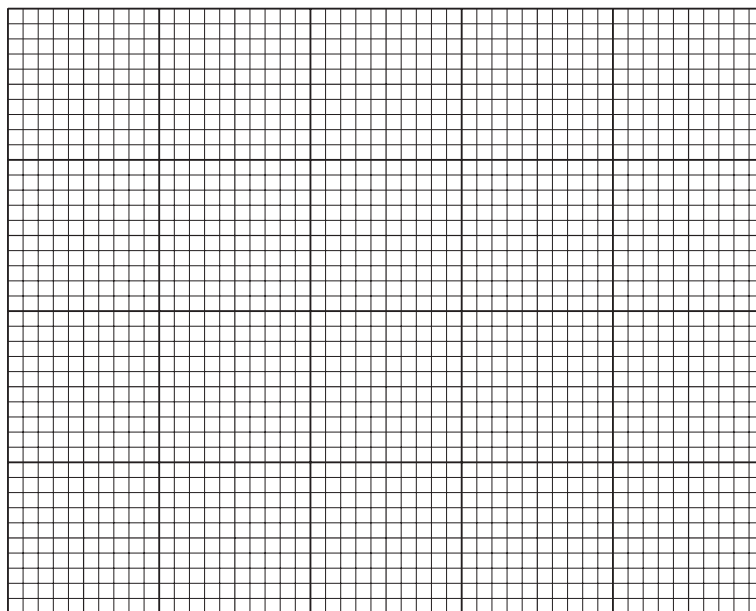
.....
[1]

- (c) Table 2.1 records the numbers of individuals of several species that were collected from a large, deciduous tree.

Table 2.1

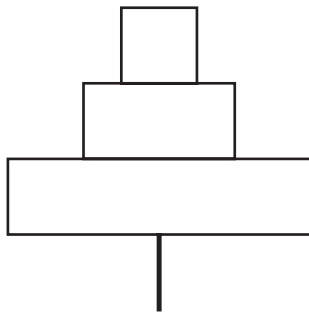
| animal | feature | number |
|--------------|---------------------------|--------|
| moths | nectar-sucking mouthparts | 15 |
| small bees | nectar-sucking mouthparts | 6 |
| shield-bugs | sap-sucking mouthparts | 17 |
| ladybirds | biting jaws | 9 |
| caterpillars | chewing mouthparts | 22 |
| spiders | poison jaws | 11 |
| aphids | sap-sucking mouthparts | 35 |

On the grid below, construct a bar chart of the information from Table 2.1 in such a way that the height of the columns is greatest on the left and decreases to the right.



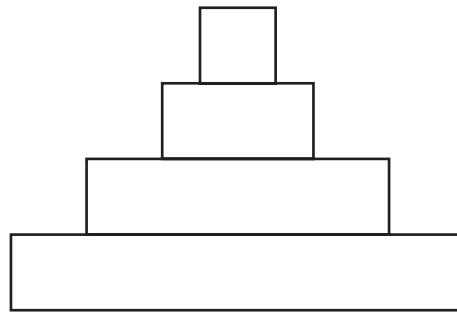
[4]

(d) Fig. 2.3 shows a pyramid of numbers and Fig. 2.4 shows a pyramid of biomass based on the deciduous tree that was investigated.



pyramid of numbers

Fig. 2.3



pyramid of biomass

Fig. 2.4

(i) Explain the difference in appearance of the two pyramids.

.....

[1]

On the pyramid of biomass, Fig. 2.4, write

- (ii) the letter **A** in the level that represents herbivores; [1]
- (iii) the letter **S** in the level that represents producers. [1]

(e) Mosquitoes were also found on the tree. Suggest a reason for their presence.

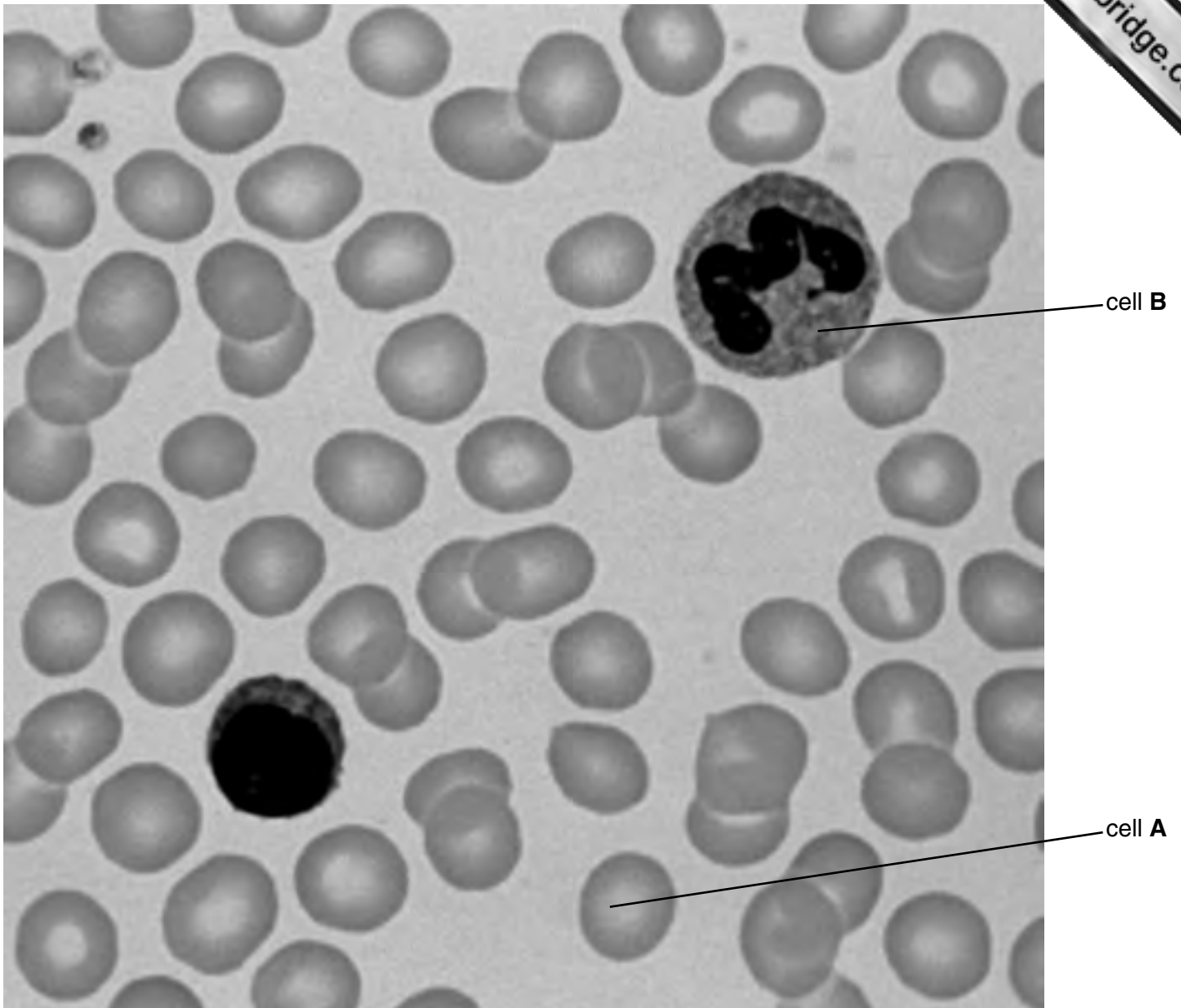
.....

[1]

[Total : 17]

Question 3 continues on the next page.

3 Fig. 3.1 shows some cells seen under a microscope.



magnification = $\times 1000$

Fig. 3.1

(a) (i) Name the tissue from which the cells come.

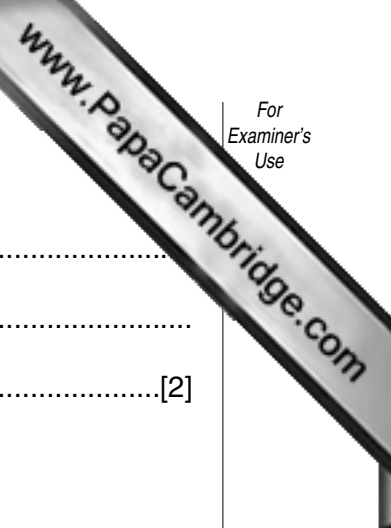
.....[1]

(ii) Name cell A.

.....[1]

(iii) Explain why cell A looks darker at the edges than in the middle.

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



(iv) Explain how the structure of cell **A** is adapted for its function.

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

(b) (i) In the space below, make a large, labelled drawing of cell **B**.

[4]

(ii) Measure across the widest part of cell **B** in Fig. 3.1.

Width of cell B

Measure across the same part of your drawing in (b)(i).

Width of drawing

Calculate the magnification of your drawing compared to the actual size of cell **B** on the slide that was photographed to make Fig. 3.1, using these measurements. Show your working clearly.

Magnification [3]

[Total : 13]

12
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