

Centre Number	Candidate Number	Name
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**BIOLOGY**

**0610/03**

Paper 3 Extended

October/November 2004

**1 hour 15 minutes**

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

**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 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.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
<b>Total</b>	

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.

This document consists of **15** printed pages and **1** blank page.



Write your answers in the spaces provided.

1 Fig. 1.1 shows four specialised cells.

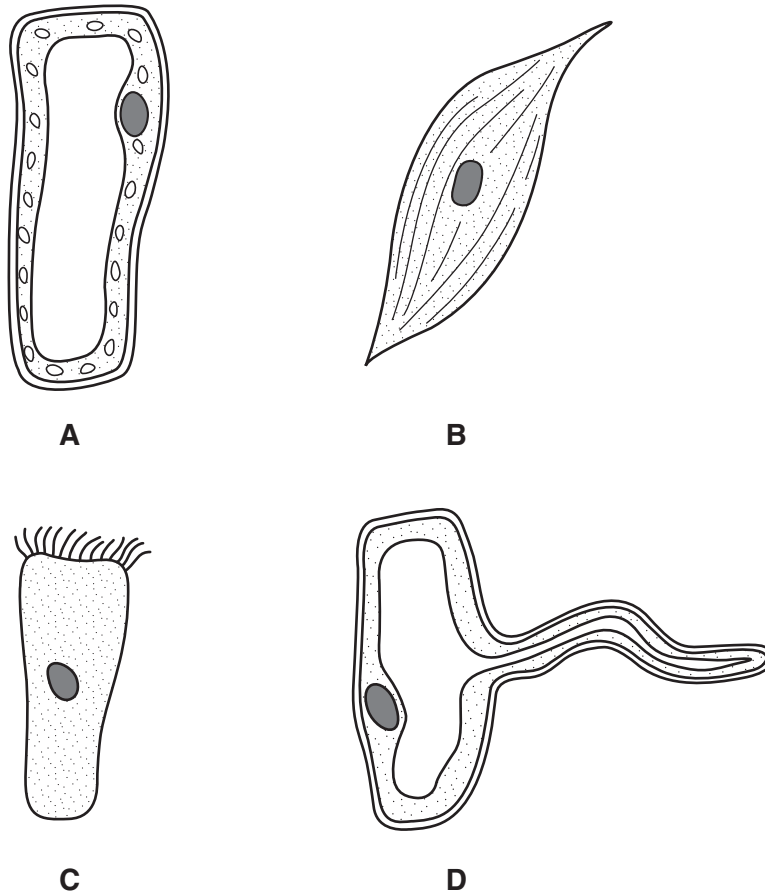


Fig. 1.1

(a) (i) Complete the table, using the letters of the cells, to identify them as animal or plant cells.

	animal	plant
letters		

[1]

(ii) State **one** feature found in all plant cells but not in animal cells.

.....[1]

- (b) For each cell shown in Fig. 1.1, state one feature that makes the cell different from the other three cells. Relate this feature to the function of the cell.

cell	feature	function
<b>A</b>	.....	..... .....
<b>B</b>	.....	..... .....
<b>C</b>	.....	..... .....
<b>D</b>	.....	..... .....

[8]

[Total: 10]

- 2 Fig. 2.1 shows pie charts of the diets of two twelve year old girls, one from Europe and one from Africa.



**Fig. 2.1**

- (a) Using information from Fig. 2.1, complete the table to compare the African diet with that of the European diet.  
In each box, write *more* or *less* or *the same*.

	dairy products	cereals	meat, eggs, fish	sugar, sweets	vegetables, fruit
African diet contains					

[1]

- (b) The daily energy intake is provided mainly by carbohydrates and fats.  
Select **one** of the food groups from Fig. 2.1 that would provide a good source of:
- (i) carbohydrates; .....
- (ii) fats. ....[2]

- (c) With reference to the pie charts:

- (i) suggest why the African girl may not grow as fast as the European girl;  
.....  
.....[1]

- (ii) suggest why the European girl is more likely to suffer from scurvy than the African girl;  
.....  
.....  
.....[2]

(iii) suggest why the European girl is more likely to suffer from constipation and colon cancer than the African girl.

.....

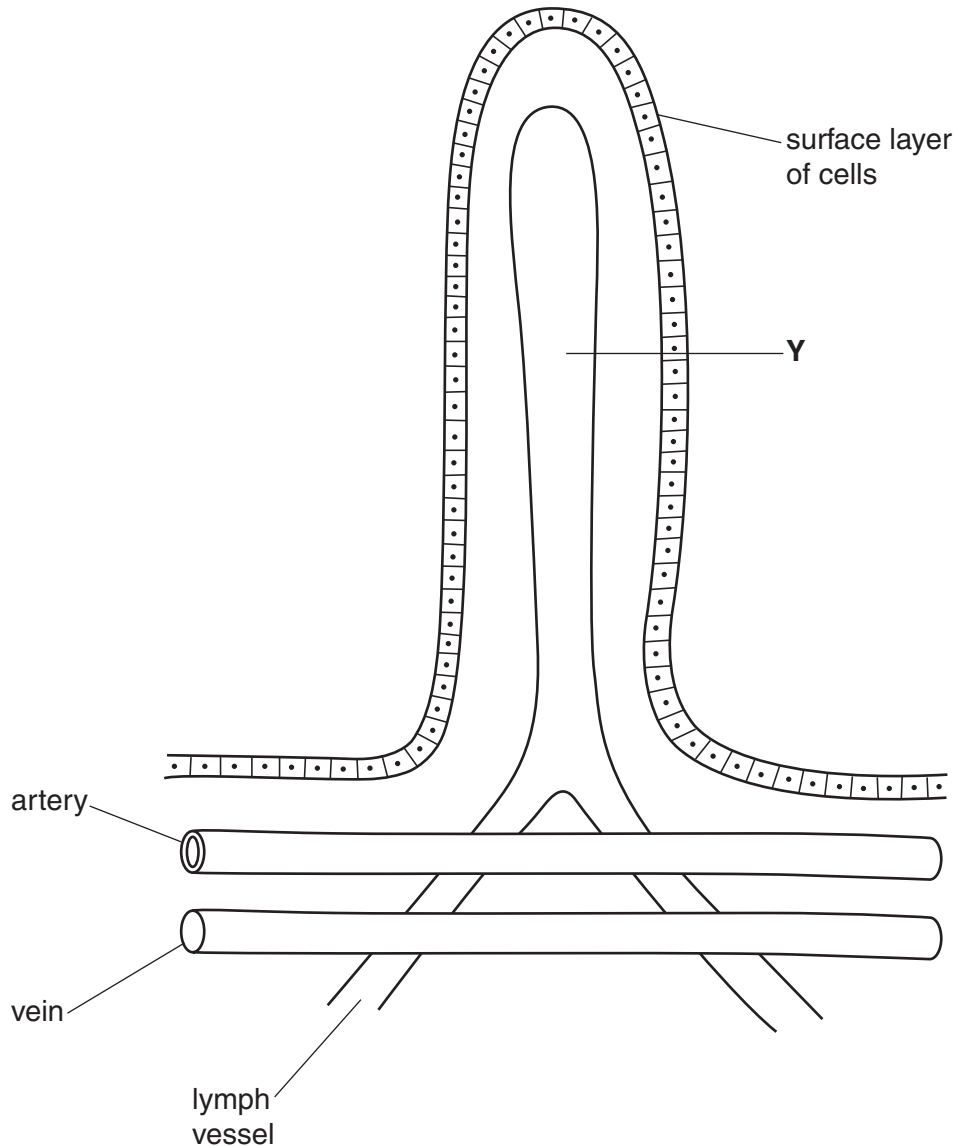
.....

.....

.....[3]

[Total: 9]

- 3 Fig. 3.1 shows a section through a villus in the small intestine. The blood capillaries are **not** shown.



**Fig. 3.1**

- (a) (i) On Fig. 3.1, draw a capillary inside the villus and link it with the appropriate blood vessels. Draw an arrow to show the direction of blood flow in the capillary. [2]
- (ii) Name the first organ to which blood flows from the small intestine.  
 .....[1]
- (b) Name **one** substance that could be present in the blood:
- (i) at a higher concentration in the vein than in the artery; .....[1]
- (ii) at a lower concentration in the vein than in the artery. ....[1]

(c) The cells of the surface layer of the villus are involved in absorption.  
State two features of these cells that improve absorption.

1. ....

2. ....[2]

(d) (i) Name structure Y. ....[1]

(ii) Describe the role of structure Y in the absorption of materials from the small intestine.

.....

.....

.....[2]

(e) Outline the functions of the lymphatic system, other than absorption from the small intestine.

.....

.....

.....

.....[3]

[Total: 13]

- 4 West Nile virus was first discovered in the blood of a feverish woman in Uganda's West Nile district in 1937. This virus is an arbovirus, one of a family of more than 500 known viruses transmitted by arthropods such as mosquitoes, ticks and fleas.

West Nile virus is transmitted by mosquitoes while they are feeding on the blood of birds and mammals. It is common in Africa, the Middle East and western Asia. The disease first appeared in America in 1999. Scientists now expect it to affect the whole of America by 2006, spread by the mosquito *Culex pipiens*.

Birds, as well as humans, are affected by the virus.

- (a) Using information from the text, explain how arboviruses are transmitted.

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

- (b) Suggest how blood provides suitable conditions for the reproduction of viruses.

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

- (c) When birds become infected, the virus may spread hundreds of kilometres very rapidly. Suggest **one** reason for this rapid spread of the virus.

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

- (d) The pesticide, DDT, has been used to kill mosquitoes in an effort to reduce the spread of disease. Explain why countries have banned the use of some pesticides, despite their ability to kill mosquitoes.

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

- (e) Mosquitoes are classified as insects, part of the arthropod group. State two external features used in the classification of all arthropods.

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



(f) With reference to the mosquito, explain the binomial system of naming organisms.

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

[Total: 13]

5 In an experiment, pea seeds were germinated on moist cotton wool.

Ten seedlings with straight radicles were selected.

Five of these seedlings were pinned to a vertical piece of cork and enclosed in a transparent cover (apparatus X). The other five were treated in the same way, but the cork was attached to a motor that turned the seedlings four times an hour (apparatus Y).

Both sets were left in the dark for 24 hours. The results are shown in Fig. 5.1.

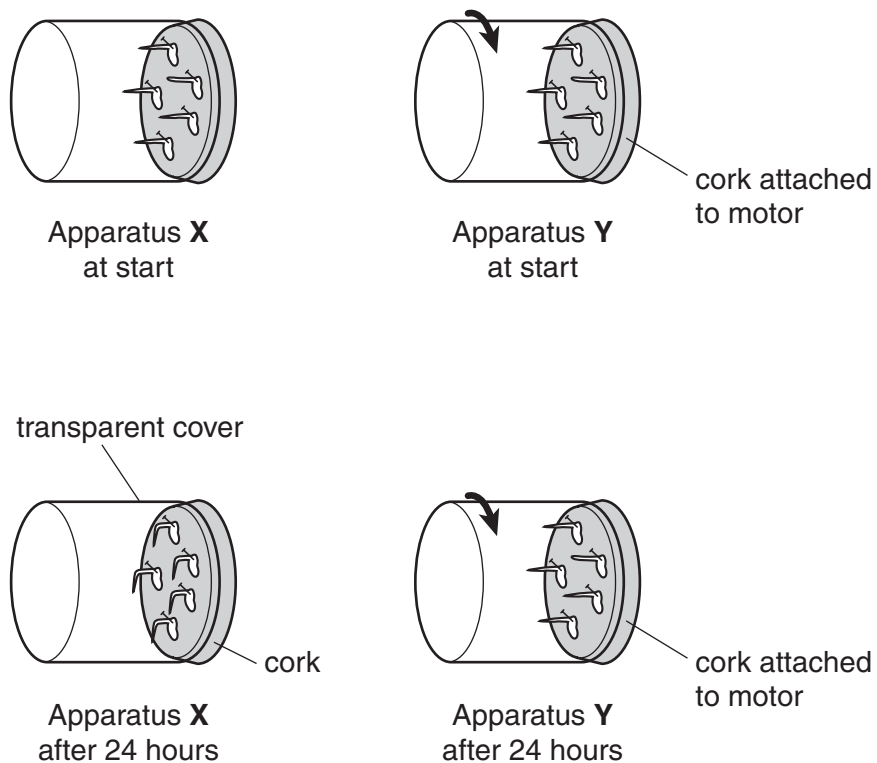


Fig. 5.1

(a) (i) Name the response shown by the seedlings in apparatus X.

.....[2]

(ii) Explain the mechanism that caused the roots in apparatus X to grow downwards.

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

(iii) State two advantages to a plant of this response.

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

**(b) (i)** Explain the purpose of apparatus **Y** in this experiment.

.....[1]

**(ii)** Explain why the experiment was carried out in the dark.

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

**(c)** After obtaining the results, another sample of germinating pea seeds was left in the dark for several days. A further sample was kept in the light. Describe how the plumules of the seedlings kept in the dark would differ from those of the seedlings kept in the light.

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

[Total: 11]

6 Fig. 6.1 shows a lizard.



**Fig. 6.1**

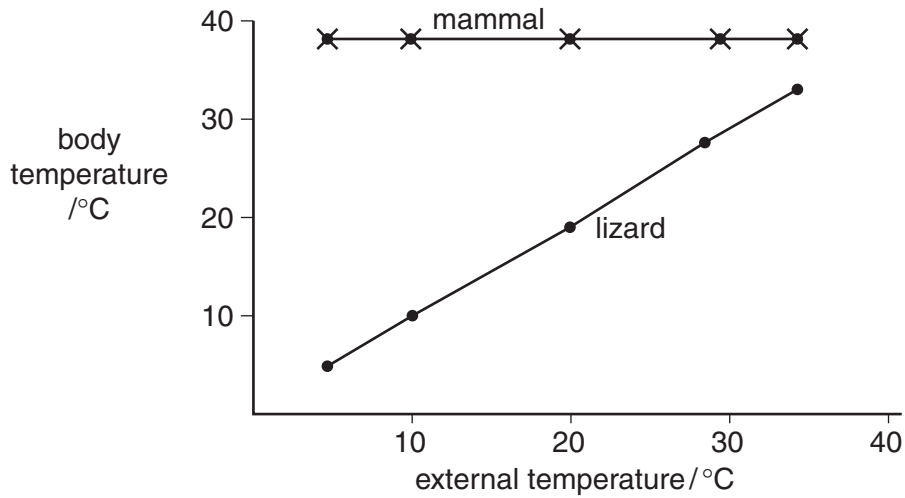
The lizard is observed over a period of two hours.

**(a)** State two observations, other than movement, you could make about the lizard to show that it is a living organism.

1. ....

2. ....[2]

Fig. 6.2 shows the relationship between external and internal temperatures for a lizard and a mammal, such as a cat.



**Fig. 6.2**

(b) Describe what happens to the body temperature of the lizard as the external temperature drops from 20 °C to 10 °C.

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

(c) Describe and explain two mechanisms that help to keep the body temperature of the mammal constant when the external temperature drops from 20 °C to 10 °C.

1. ....  
 .....  
 .....  
 .....  
 .....  
 .....  
 ..... [6]

(d) Suggest why the movement of the lizard becomes slower when the external temperature drops from 20 °C to 10 °C.

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

[Total: 12]

7 Table 7.1 shows data for human life expectancy for six countries.

**Table 7.1**

country	life expectancy for people born in 1982 / years	life expectancy for people born in 1999 / years
<b>A</b>	42	47
<b>B</b>	59	39
<b>C</b>	56	48
<b>D</b>	54	50
<b>E</b>	46	47
<b>F</b>	51	38

(a) Human life expectancy worldwide has increased between 1982 and 1999.

(i) State the countries in Table 7.1 that show this trend.

.....[1]

(ii) Suggest two reasons why life expectancy is increasing worldwide.

1. ....

2. ....[2]

(b) A person suffering from AIDS tends to have a reduced life expectancy.

State the country, from Table 7.1, that has developed the most serious AIDS problem since 1982. Use data from the table to explain your choice.

country .....

explanation .....

.....[2]

(c) HIV, the cause of AIDS, can be transmitted sexually. Many sexually transmitted diseases, such as gonorrhoea, can be treated with antibiotics.

(i) Explain why HIV cannot be controlled with antibiotics.

.....

.....

.....[2]

(ii) Name a type of contraception that is used to prevent the transmission of HIV during sexual intercourse. Explain how it prevents HIV from being transmitted.

type of contraception .....

explanation .....

.....[2]

(iii) Describe **one** other way, other than sexual intercourse, by which HIV can be transmitted.

.....

.....

.....

.....[3]

[Total: 12]

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*Copyright Acknowledgements:*

- Question 2      Fig. 2.1 Cooper, S (1992) British and Mali Diets in *Complete Co-ordinated Science*, Heinemann Educational Publishers Ltd.  
Question 5      Fig. 5.1 Mackean, D J (2002) Klinostat in *IGCSE Biology*, John Murray.  
Question 6      Fig. 6.2 © Soper, R, Green, N P O, Stout, W G and Taylor, D J (1990) *Biological Science Combined Volume*, Cambridge University Press.

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