

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

May/June 2006

**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.  
You may use a pencil for any diagrams or graphs.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.  
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.

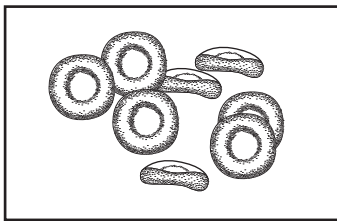
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This document consists of **13** printed pages and **3** blank pages.

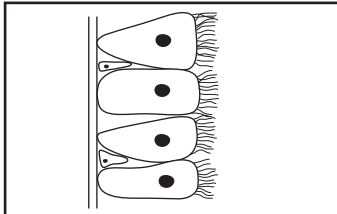
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**Question 1 starts on page 3**

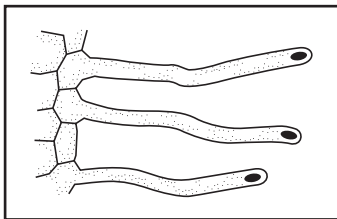
1 (a) Draw a straight line to match the diagram of each tissue with its function. The first has been completed for you.



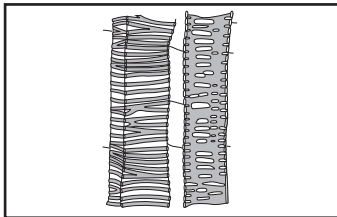
absorbs water and minerals from soil for the plant



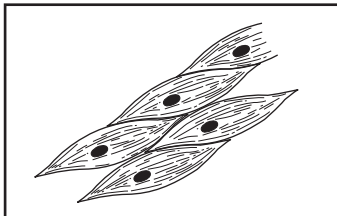
carries oxygen around the body of mammals



contracts to cause movement within animals



moves dust and bacteria up the bronchi of a mammal



transports water and minerals through the stem of a plant

(not drawn to same scale)

[4]

(b) Explain why a leaf is described as an organ, not a tissue.

.....

.....

.....

.....

.....

[3]

[Total: 7]

2 (a) Annelids and nematodes are both worm-like animals.

State two features that distinguish annelids from nematodes.

1. ....

.....

2. ....

..... [2]

(b) Fungi are a difficult group to classify because they have features found in both animals and plants.

State one 'animal feature' and one 'plant feature' that fungi possess.

'animal feature' .....

.....

'plant feature' .....

..... [2]

(c) (i) Draw a large, labelled diagram to show **two** features present in most viruses.

[3]

(ii) Outline how the human immunodeficiency virus (HIV) affects the immune system.

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

[Total: 10]

- 3 Ahmed entered a very dark room. His irises responded by changing the pupil size and gradually he could see shapes of objects in the room. Dust in the air made him sneeze. Suddenly the door slammed shut, causing his heart beat to speed up. He switched on the light to find the door and he grabbed the door handle.....

- (a) Complete the table by stating two voluntary actions and two involuntary actions described in the text above.

voluntary actions	involuntary actions
1. ..... .....	1. ..... .....
2. ..... .....	2. ..... .....

[4]

- (b) Actions are caused by the stimulation of effectors.

- (i) Name the two different types of effector in the body.

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

- (ii) State the type of neurone that stimulates effectors.

..... [1]

(c) Plants also respond to stimuli such as light.

(i) State the name of the response of plants to light.

..... [1]

Ahmed was provided with several young plant shoots and a sample of auxin.

(ii) Describe an experiment he could carry out to show that auxin causes bending of a shoot.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

(iii) Explain the mechanism that results in a shoot bending towards light.

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

(d) Synthetic plant hormones behave in a similar way to auxins. Describe how synthetic plant hormones are effective as weedkillers.

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

[Total: 17]

4 Insulin is a hormone produced to control blood glucose levels. Diabetics do not have a natural ability to control these levels.

(a) Define the term *hormone*.

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

(b) With reference to the pancreas and the liver, describe the role of insulin in controlling blood glucose levels.

.....  
.....  
.....  
.....  
.....  
..... [4]

(c)

- Insulin is a protein.
- Diabetics can control their blood glucose levels artificially by injecting insulin.
- Many medicines are swallowed as tablets.

Explain what would happen to the insulin in the stomach if it was swallowed as a tablet.

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



(d) An alternative treatment to injecting insulin is being developed. The insulin is inhaled into the lungs as a spray. It is then absorbed into the bloodstream.

(i) Suggest the path the spray would take from the mouth to enter the alveoli.

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

(ii) Suggest the process by which the insulin would pass from the alveoli into the bloodstream.

..... [1]

(iii) State three features of the alveoli that might help the insulin to pass into the blood stream efficiently.

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

[Total: 15]

5 Crop production in many areas of the world needs the application of large volumes of water. However, when the water evaporates from the soil, traces of salts are left behind. After several years, the soil becomes too salty for most plants to grow in it.

(a) (i) State three functions of water in plants.

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

(ii) With reference to the water potential gradient, explain why plants may die when grown in salty soil.

.....

.....

.....

..... [3]

(b) Some plants are able to pump salts out of their roots.

(i) Name the process plants could use to pump salts out of their roots.

..... [1]

(ii) Suggest how the process named in (i) could affect the rate of growth of the plants if the process was operating all the time.

.....

.....

..... [2]

(iii) Plants need mineral salts for normal, healthy growth. Complete the table by naming two minerals that plants need and stating their functions.

mineral	name	function
1	.....	.....
2	.....	.....

[4]

(c) An article in a school science magazine stated, 'Many plants contain genes which enable them to pump salts out of their roots. These genes can be made more active by genetic engineering, enabling the plants to remove salts before the plants are damaged.'

Explain whether you think that the process described in the article above **is** an example of genetic engineering.

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

(d) Some scientists believe that washing the salts out of the soil using even more water is a better alternative to genetic engineering.

State two problems that could be caused by washing the soil with extra water.

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

[Total:18]

6 Fig. 6.1 shows population pyramids for a developing country and a developed country.



Fig. 6.1

(a) Describe how the percentage of people in the population varies with age in

(i) a developing country,

.....  
 .....

(ii) a developed country.

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

(b) These countries have a similar population size.  
 Compare the two pyramids. State **one** difference between the populations

(i) at under 15,

.....  
 .....

(ii) over 65.

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

- (c) The pyramids can also be used to compare proportions of males and females in a population.

State one way in which these pyramids are similar for people who live more than 65 years.

..... [1]

- (d) With reference to **X** and **Y** chromosomes, explain the expected ratio of males to females at birth.

[4]

(e) Fig. 6.2 shows survival curves for developing and developed countries, based on samples of 10 000 people. The graph can be used to estimate the average life expectancy, defined as the age at which 50% of people in the sample are still alive.

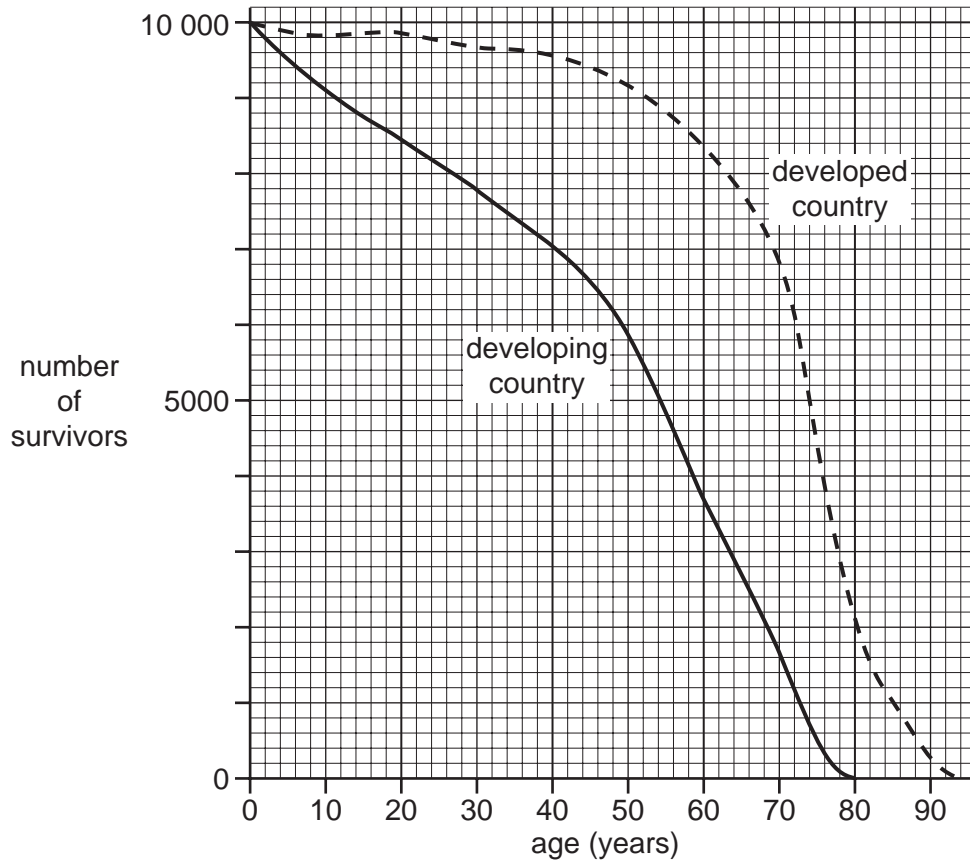


Fig. 6.2

(i) Using Fig. 6.2, estimate the average life expectancy for people in a developing country and a developed country. Write your answers in the table.

	average life expectancy
developing country	
developed country	

[1]

(ii) Suggest two reasons for the difference in life expectancy.

1. ....
2. ....

[2]

[Total:13]



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