

First variant Question Paper



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

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CANDIDATE
NUMBER

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BIOLOGY

0610/03

Paper 3 Extended

October/November 2007

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.

DO NOT WRITE IN ANY BARCODES.

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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1	
2	
3	
4	
5	
6	
Total	

P

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



- 1 Fig. 1.1 shows a diagram of a bacterial cell.

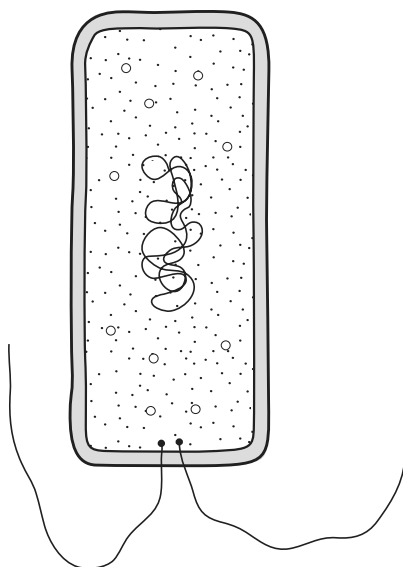


Fig. 1.1

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- (a) (i) State four structural features, present in a photosynthesising plant cell, that make it different from the bacterial cell in Fig. 1.1.

1.
2.
3.
4. [4]

- (ii) State two structural features present in both the bacterial cell in Fig 1.1 and in an animal cell, such as a liver cell.

1.
2. [2]

- (b) Bacteria are examples of microorganisms.

State two different types of food manufactured using microorganisms.

1.
2. [2]

- (c) Many bacterial diseases can no longer be treated with antibiotics. Outline how antibiotic-resistant strains of bacteria can develop.

.....

.....

.....

..... [3]

- (d) Explain why bacteria, in particular, are very useful organisms in the process of genetic engineering.

.....

.....

..... [2]

[Total: 13]

- 2 Fig. 2.1 shows a reflex arc involving a finger and a muscle in the arm.

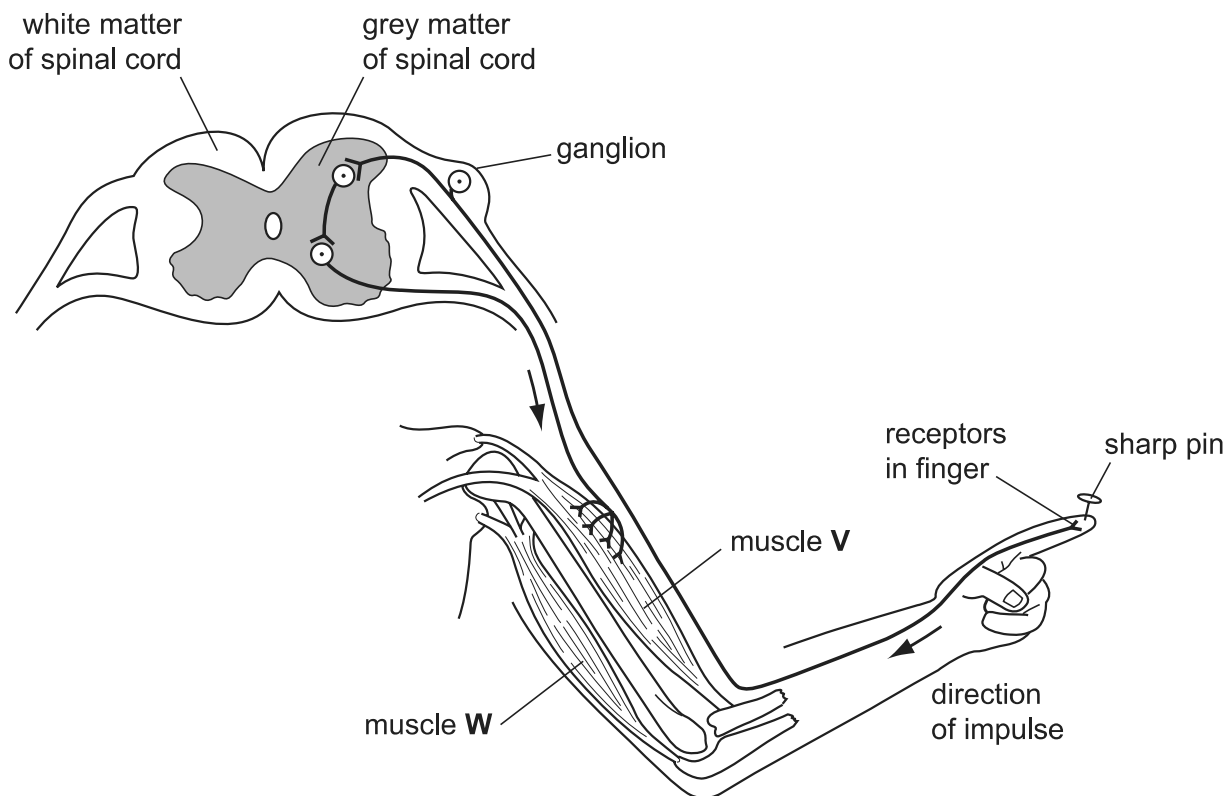


Fig. 2.1

- (a) State two stimuli that can be detected by receptors in the finger.

1.
2. [2]

- (b) Using labels from Fig. 2.1, state the site of the cell body of

1. a sensory neurone,
2. a relay neurone. [2]

- (c) (i) In what form are impulses transmitted in the nervous system?

..... [1]

- (ii) State the structure, present in many mammalian neurones, which reduces leakage of the impulse.

..... [1]

- (iii) The impulse takes 0.02 seconds to pass from the finger to the spinal cord, a distance of 1.5 metres. Calculate the speed of the impulse. Show your working.

Speed [2]

- (iv) Although the total distance the impulse travels in the reflex arc is less than 3 metres, the time taken is more than 0.04 seconds. Suggest why the time taken is more than expected.

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

- (d) (i) Describe what would happen to the muscle and the arm when muscle V receives the nerve impulse.

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

- (ii) Explain how muscle V would return to its original position.

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

[Total: 13]

- 3 (a) Define the term *excretion*.

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.....

.....

.....

..... [3]

- (b) Fig. 3.1 shows a section through a kidney.

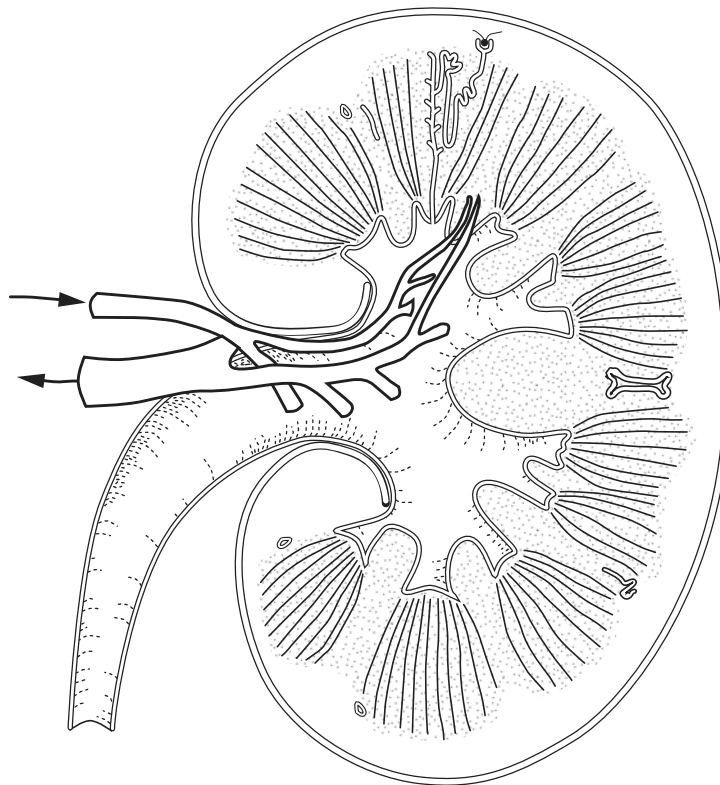


Fig. 3.1

- (i) Using label lines and the letters given, label the following on Fig. 3.1.

F where filtration occurs,

R the renal artery,

U where urine passes to the bladder.

[3]

(ii) Describe the process of filtration in the kidney.

.....

.....

.....

..... [3]

(iii) Name the processes resulting in the reabsorption of

1. glucose,
2. water. [3]

[Total: 12]

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- 4 Fig. 4.1 shows a diagram of a section through the male reproductive organs.

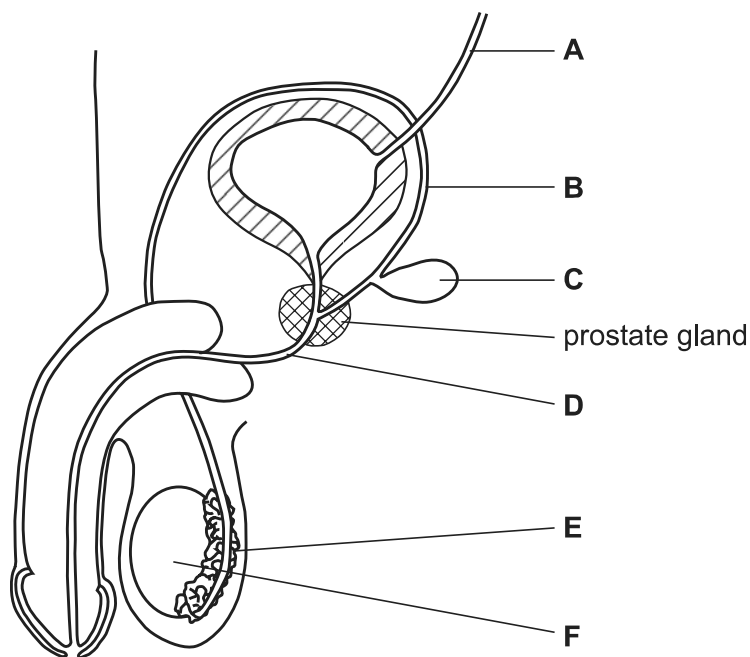


Fig. 4.1

- (a) Complete the table by using the labels from Fig. 4.1 to identify each of the structures described. The first has been done for you.

description of structure	label letter
carries both urine and semen	D
where sperm are stored before ejaculation	
is cut or tied during a vasectomy	
produces fluid for sperm to swim in	
where meiosis occurs	

[4]

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(b) In older men the prostate gland often enlarges, reducing the diameter of tube **D**.

(i) State the name of tube **D**.

..... [1]

(ii) Suggest and explain why a reduction in the diameter of this tube may cause a problem.

.....

 [2]

(c) Some processes in the body involve the deliberate narrowing of structures.

Outline **one** situation in the body where there is a mechanism to reduce the diameter of a structure for a particular purpose.

State the effect of this reduction in diameter.

.....

 [3]

- (d) Hormones can be used as a birth control mechanism and also to increase fertility. Describe the use of **named** hormones in

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1. fertility drugs,

2. chemical methods of birth control.

.....

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.....

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.....

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..... [6]

[Total: 16]

- 5 An experiment was carried out to find out if carbon dioxide is needed for photosynthesis.

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Stage 1.	Two plants, A and B , of the same size and species were kept in a dark place for 48 hours.
Stage 2.	A leaf from each plant was then tested for the presence of starch using iodine solution, to show that destarching was complete.
Stage 3.	Both plants were placed in sealed glass containers, for 24 hours, as shown in Fig. 5.1. Plant A was in the presence of potassium hydroxide beads (which absorb carbon dioxide). Plant B was in the presence of glass beads. All other conditions needed for photosynthesis were provided for both plants.
Stage 4.	After 24 hours a leaf from each plant was tested for the presence of starch.

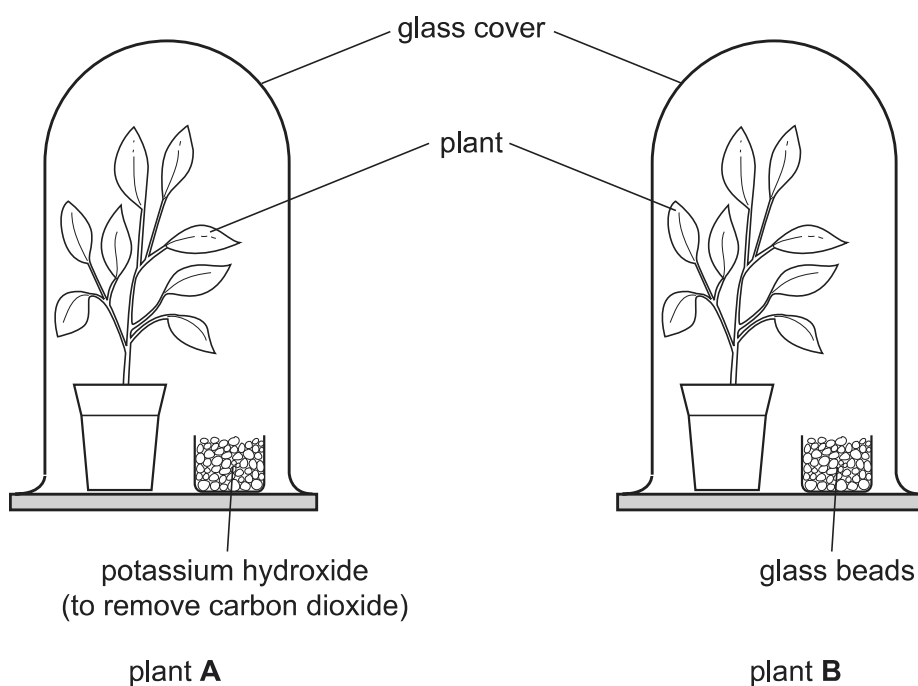


Fig. 5.1

- (a) (i) The stages involved in testing a leaf for starch are shown below. The stages are in the correct sequence, but the reasons are in the wrong order. Use straight lines to match the stages with the correct reasons. One has been done for you.

stage	reason
boil the leaf in water	ethanol (alcohol) is flammable
turn off any naked flames	to test for starch
boil the leaf in ethanol (alcohol)	to break down cell membranes
soak the leaf in water	to remove chlorophyll
add iodine solution to the leaf	to soften the leaf

[4]

- (ii) Explain why chlorophyll is removed from the leaf before testing it for starch.

.....
 [1]

- (b) State two factors, **other than carbon dioxide**, that both plants would need in order to photosynthesise.

1.
 2. [2]

- (c) Plant **B** was used as a control in the experiment. Explain the importance of this control.

.....
 [1]

- (d) Explain why the plants were destarched.

.....
 [1]

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- (e) Complete the table. Use ticks and crosses to show if the starch test for plants **A** and **B** would be positive (✓) or negative (✗) at **stage 2** and **stage 4**. In each case, explain your answer.

stage	leaf from plant	starch test (✓ or ✗)	explanation
2	A and B		
4	A		
	B		

[3]

- (f) In a further experiment, another destarched plant was kept in the dark.

The concentration of carbon dioxide in the container was measured at regular intervals and was found to increase with time.

Explain why the concentration of carbon dioxide increased.

.....

.....

.....

..... [3]

[Total: 15]

- 6 Lake Victoria is the largest tropical lake in the world. Until the 1960s it provided an ecosystem with habitats for 500 species of small cichlid fish. They feed on algae (aquatic plants). Prawns also feed on algae. Nile perch were introduced into the lake. These fish are excellent food for humans, as well as providing sport for tourists. The Nile perch eat cichlids. Deforestation of the lake shore and pollution by humans caused eutrophication and resulted in a huge reduction in cichlid numbers. However, the Nile perch are able to survive in poor quality water, even when the oxygen level is low. As the cichlid population dropped, prawn numbers increased and Nile perch now eat them.

(a) Define the term *ecosystem*.

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

(b) Using information in the text above, state two reasons why Nile perch were introduced into Lake Victoria.

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

(c) Complete the table to identify at which trophic level each of the organisms named in the text are feeding.

	algae	cichlid fish	human	Nile perch	prawn
trophic level	organism(s)				
producer					
herbivore					
carnivore					

[3]

- (d) Explain how eutrophication could have resulted in a reduction in the numbers of cichlid fish.

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.....

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.....

.....

..... [4]

[Total: 11]

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