Location Entry Codes

UNIVERSITY of CAMBRIDGE
International Examinations

As part of CIE's continual commitment to maintaining best practice in assessment, CIE has begun to use different variants of some question papers for our most popular assessments with extremely large and widespread candidature, The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise. All versions of the paper give assessment of equal standard.

The content assessed by the examination papers and the type of questions are unchanged.

This change means that for this component there are now two variant Question Papers, Mark Schemes and Principal Examiner's Reports where previously there was only one. For any individual country, it is intended that only one variant is used. This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiner's Reports.

Question Paper	Mark Scheme	Principal Examiner's Report
Introduction	Introduction	Introduction
First variant Question Paper	First variant Mark Scheme	First variant Principal Examiner's Report
Second variant Question Paper	Second variant Mark Scheme	Second variant Principal Examiner's Report

Who can I contact for further information on these changes?
Please direct any questions about this to CIE's Customer Services team at: international@cie.org.uk

First variant Question Paper

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

2377791016

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.

For Examiner's Use	
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3	
4	
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6	
Total	

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

UNIVERSITY of CAMBRIDGE International Examinations

For Examiner's Use

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

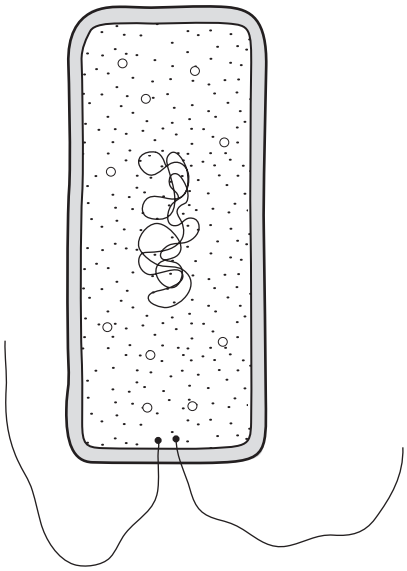

Fig. 1.1

(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]

For Examiner's Use

(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.

.....

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..... [2]

[Total: 13]

For Examiner's Use

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

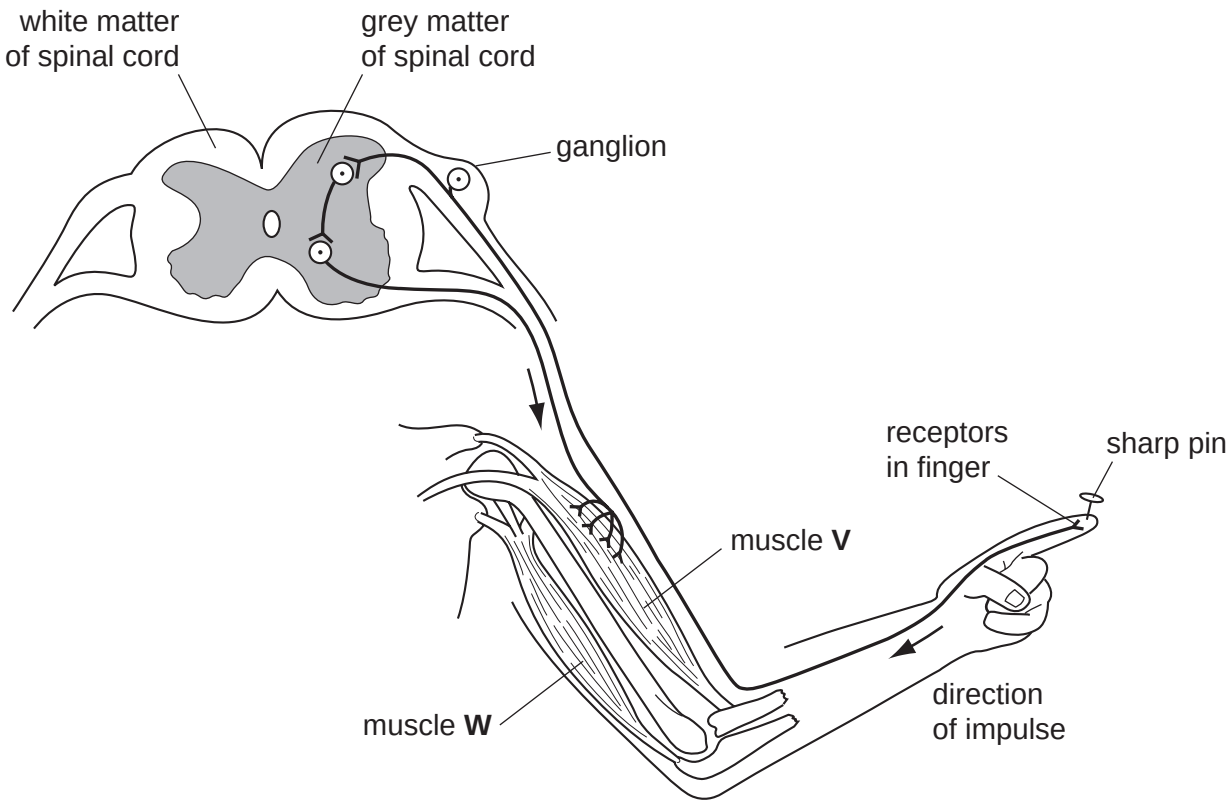

Fig. 2.1

(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]

For Examiner's Use

(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]

For Examiner's Use

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

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..... [3]

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

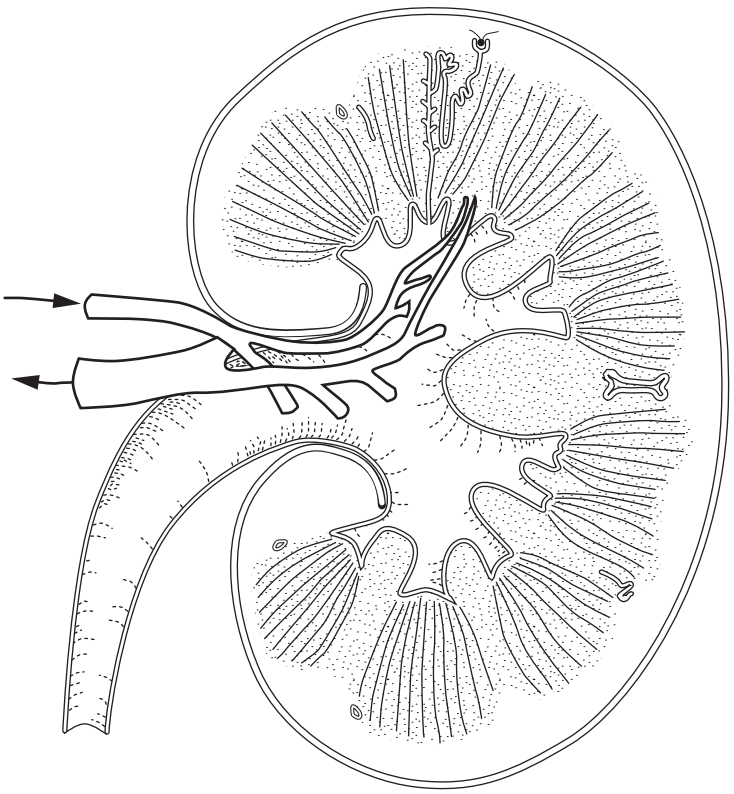

Fig. 3.1

(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]

For Examiner's Use

(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]

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

For Examiner's Use

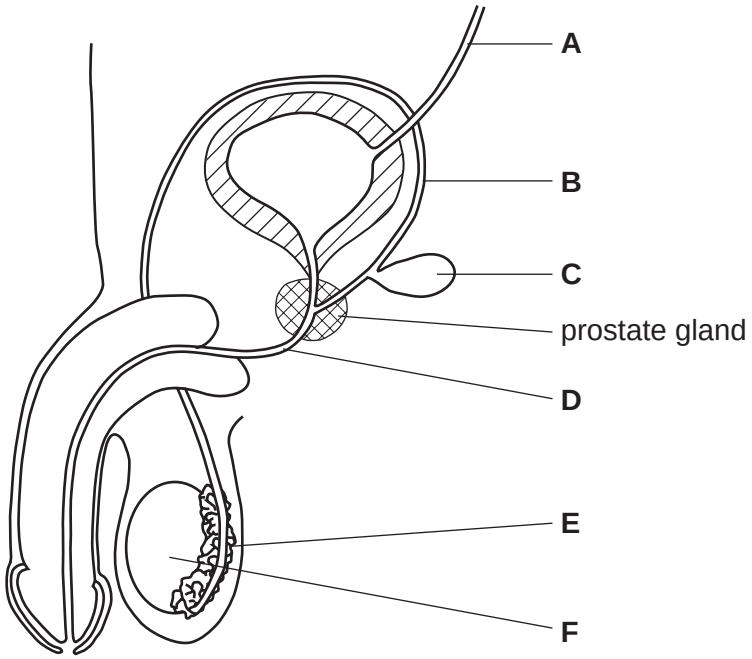

Fig. 4.1

(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]

For Examiner's Use

(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

1. fertility drugs,

2. chemical methods of birth control.

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..... [6]

[Total: 16]

For Examiner's Use

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

For Examiner's Use

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.

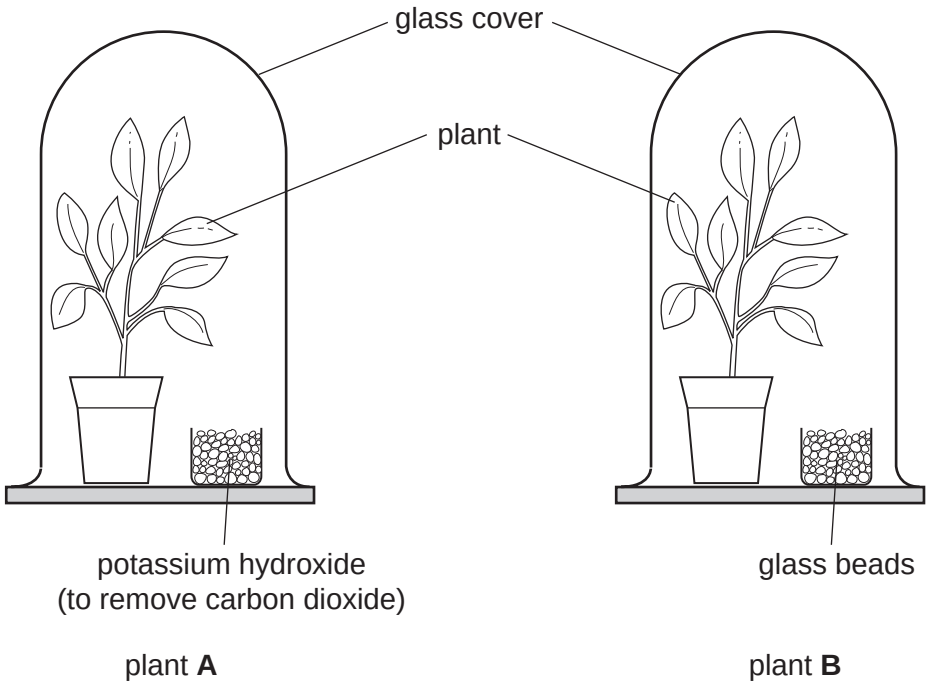

Fig. 5.1

For Examiner's Use

(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]

For Examiner's Use

(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.

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.....

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..... [3]

[Total: 15]

For Examiner's Use

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.

For Examiner's Use

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..... [4]

[Total: 11]

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Second variant Question Paper

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

1850128832

BIOLOGY **0610/03**

Paper 3 Extended **October/November 2007**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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For Examiner's Use	
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For Examiner's Use

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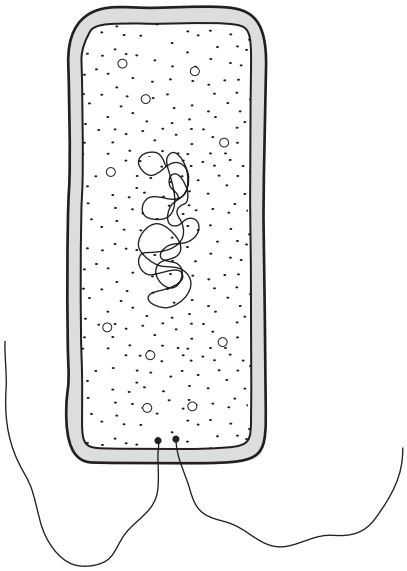

Fig. 1.1

(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]

For Examiner's Use

(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.

.....

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..... [2]

[Total: 13]

For Examiner's Use

2 Fig. 2.1 shows the position of some of the teeth and salivary glands associated with the digestion of food in the mouth.

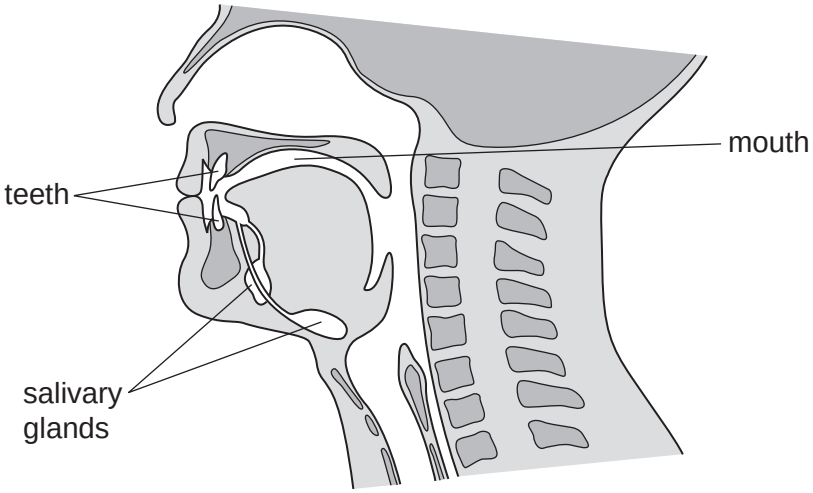

Fig. 2.1

(a) (i) Describe the role of the salivary glands in the digestion of food in the mouth.

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..... [3]

(ii) Describe the **physical** changes to food that are brought about by the action of the molar teeth.

Explain how these changes help digestion.

Description .....

.....

Explanation .....

.....

..... [3]

For Examiner's Use

(b) Humans who have a diet rich in sugar often suffer from tooth decay.

Explain how tooth decay is brought about.

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..... [3]

(c) Scientists have found evidence that fluoride in the diet helps to reduce tooth decay.

Explain how fluoride may help to reduce tooth decay.

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..... [1]

(d) In some parts of the world, fluoride is added to the drinking water supply.

Outline why some people are opposed to this.

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.....

.....

..... [3]

[Total: 13]

For Examiner's Use

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

.....

.....

.....

..... [3]

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

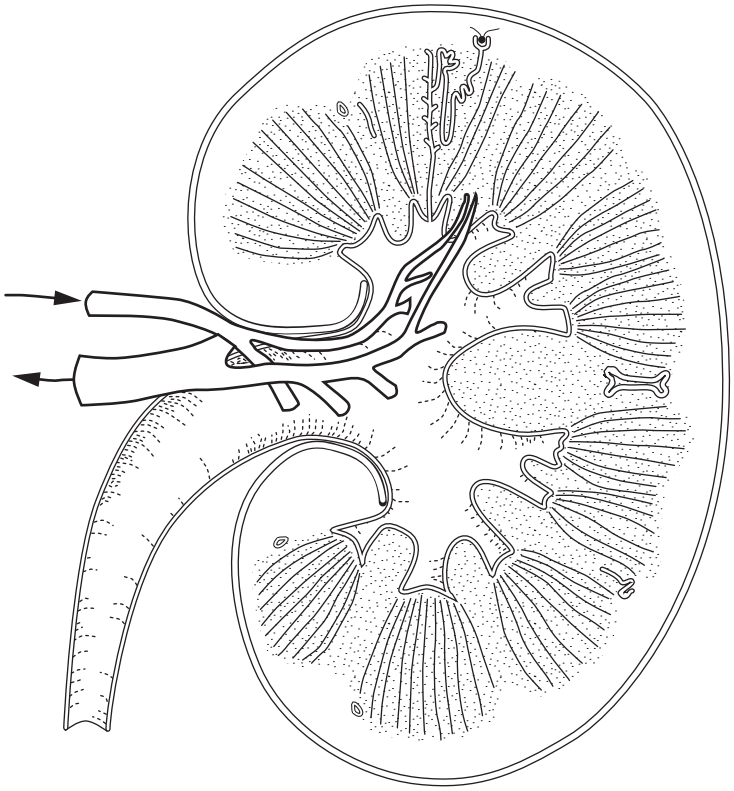

Fig. 3.1

(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]

For Examiner's Use

(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]

For Examiner's Use

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

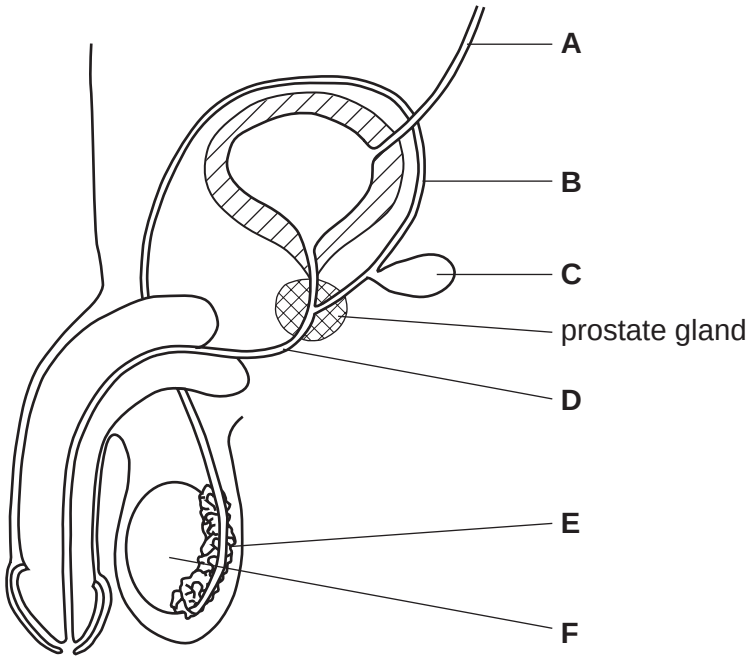

Fig. 4.1

(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]

For Examiner's Use

(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

1. fertility drugs,

2. chemical methods of birth control.

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.....

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.....

.....

..... [6]

[Total: 16]

For Examiner's Use

For Examiner's Use

5 **(a)** State the role of gaseous exchange surfaces.

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..... [1]

(b) Fig. 5.1 shows a section through the skin of an earthworm. The skin acts as the earthworm's gaseous exchange surface.

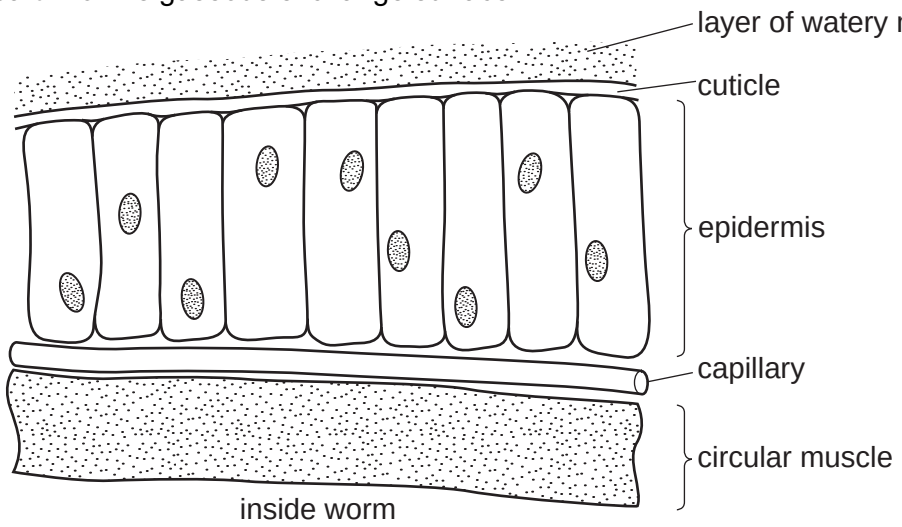

Fig. 5.1

Describe two features, **visible in Fig. 5.1**, which make this surface well adapted for gaseous exchange.

1. .....

.....

2. .....

..... [2]

(c) Pea seeds begin to germinate when soaked in water. When the seeds germinate they respire aerobically, releasing energy.

(i) Suggest why seeds need water to germinate.

.....

..... [1]

(ii) Suggest why the seeds need energy during germination.

.....

..... [1]

For Examiner's Use

(d) Fig. 5.2 shows apparatus that can be used to investigate the uptake of oxygen by germinating pea seeds.

Soda lime absorbs carbon dioxide.

Any changes in gas volumes in the boiling tube containing the peas will result in movement of the oil droplet.

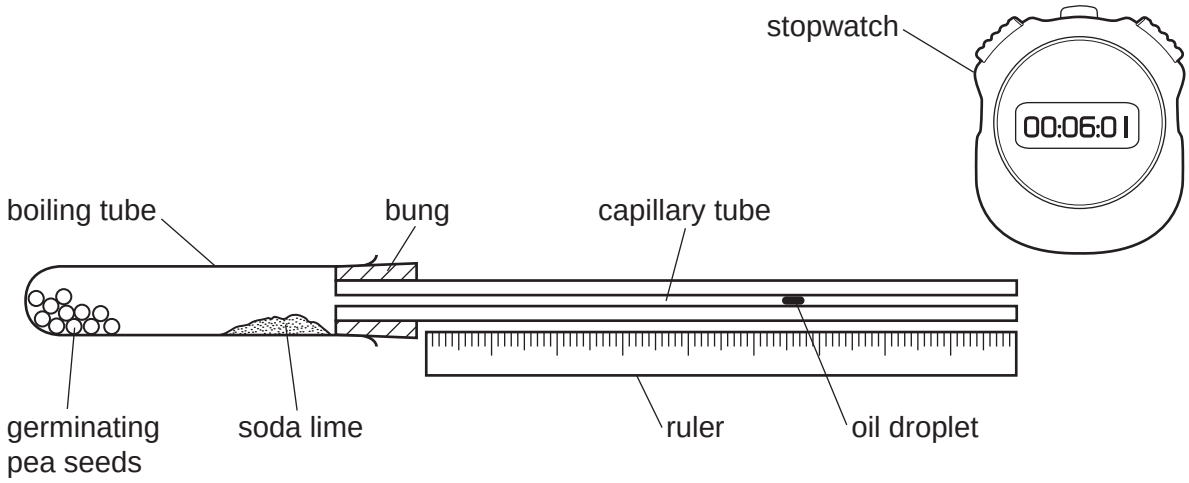

Fig. 5.2

(i) Describe **and** explain what would happen to the position of the oil droplet as the peas respire aerobically.

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..... [3]

For Examiner's Use

(ii) Describe how the apparatus could be used to measure the **rate** of aerobic respiration of the peas at different temperatures.

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..... [5]

(iii) Suggest why temperature affects the rate of respiration.

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..... [2]

[Total: 15]

For Examiner's Use

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.

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trophic level	**organism(s)**
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herbivore	
carnivore	

[3]

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

For Examiner's Use

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..... [4]

[Total: 11]

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