

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

**HUMAN AND SOCIAL BIOLOGY**

**5096/02**

Paper 2

October/November 2005

**2 hours**

Additional Materials: Answer Paper to be available on request

**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.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

**Section A**

Answer **all** questions.  
Write your answers in the spaces provided on the question paper.  
You are advised to spend no longer than 1 hour on Section **A**.

**Section B**

Answer **all** the questions, including questions 8, 9 and 10 **Either** or 10 **Or**.  
Write your answers to questions 8, 9 and 10 on the answer paper provided.  
At the end of the examination,

1. fasten all your work securely together;
2. write an E (for Either) or an O (for Or) next to the number 10 in the grid below to indicate which question you have answered.

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

For Examiner's Use	
<b>Section A</b>	
<b>Section B</b>	/
<b>8</b>	
<b>9</b>	
<b>10</b>	
<b>TOTAL</b>	

Section A

Answer all questions.

Write your answers in the spaces provided.

- 1 (a) Different receptors detect different stimuli. Below is a list of stimuli and beside it a list of receptors. Draw a line from each stimulus to the most appropriate receptor. One has been done for you.

stimulus	site of receptor
sound energy	nose
chemical	retina
temperature change	inner ear
light energy	skin
touch	tongue

[4]

Fig. 1.1 shows recordings of nerve impulses taken from the neurone serving the same touch receptor in two different situations.

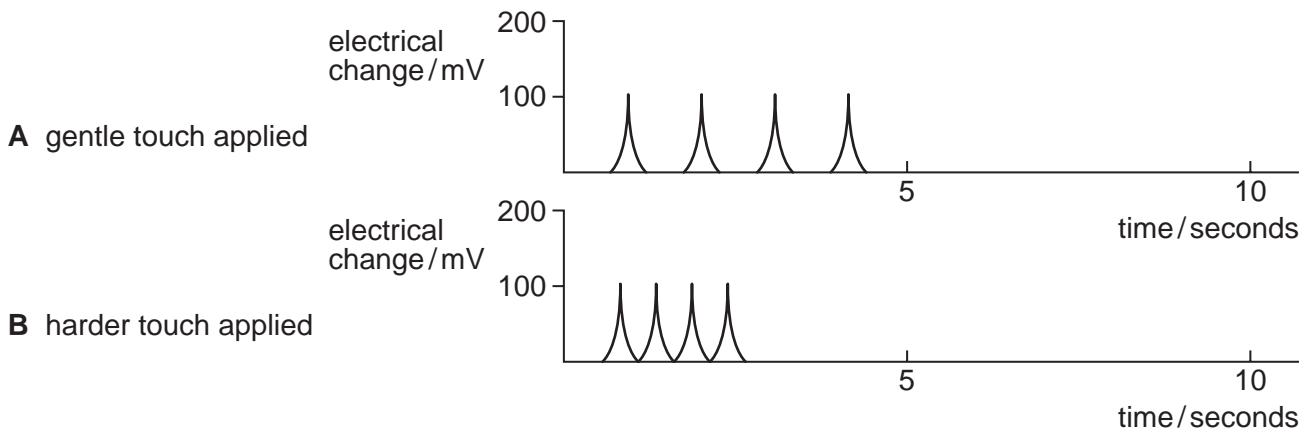


Fig. 1.1

- (b) In what way are the impulses in the two recordings

(i) different, .....[1]

(ii) similar? .....[1]

(c) Name the type of neurone to which the recording apparatus would have been attached to the axon.

.....

(d) Fig. 1.2 shows two types of neurone.

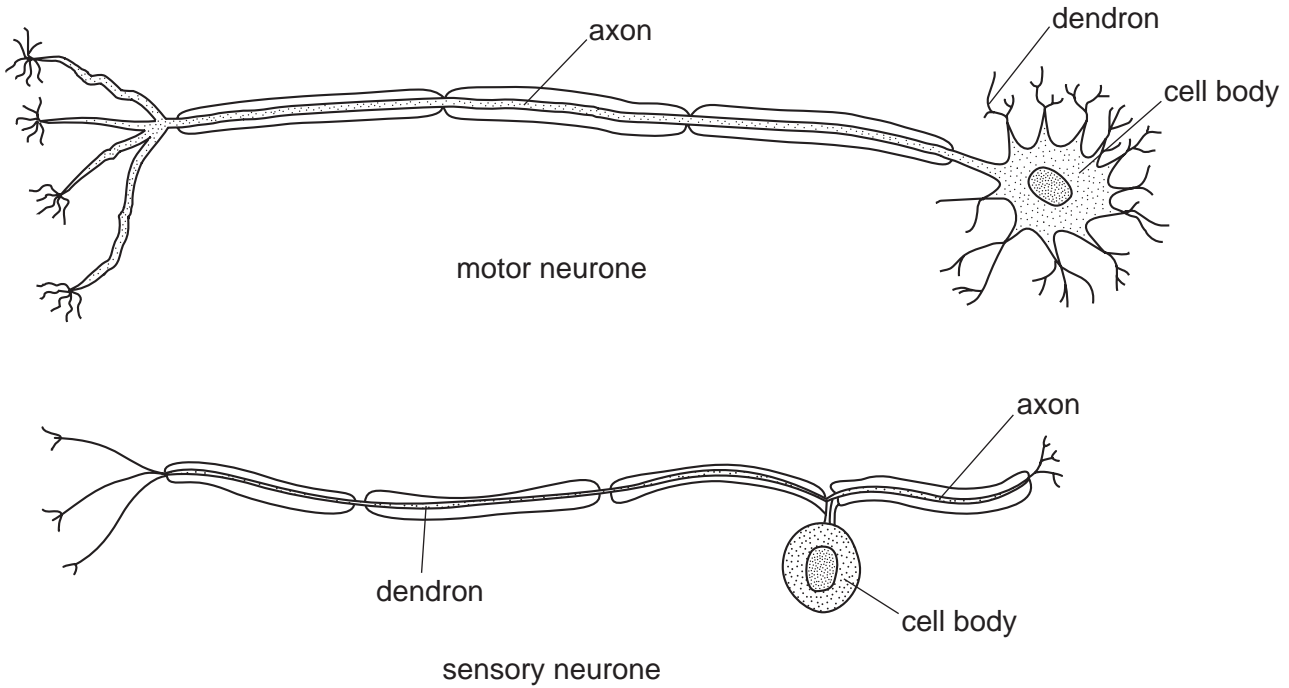


Fig. 1.2

(i) Using only information from Fig. 1.2, state two features that are present in both neurones.

1. ....

2. .... [2]

(ii) State two ways in which the motor neurone differs from the sensory neurone.

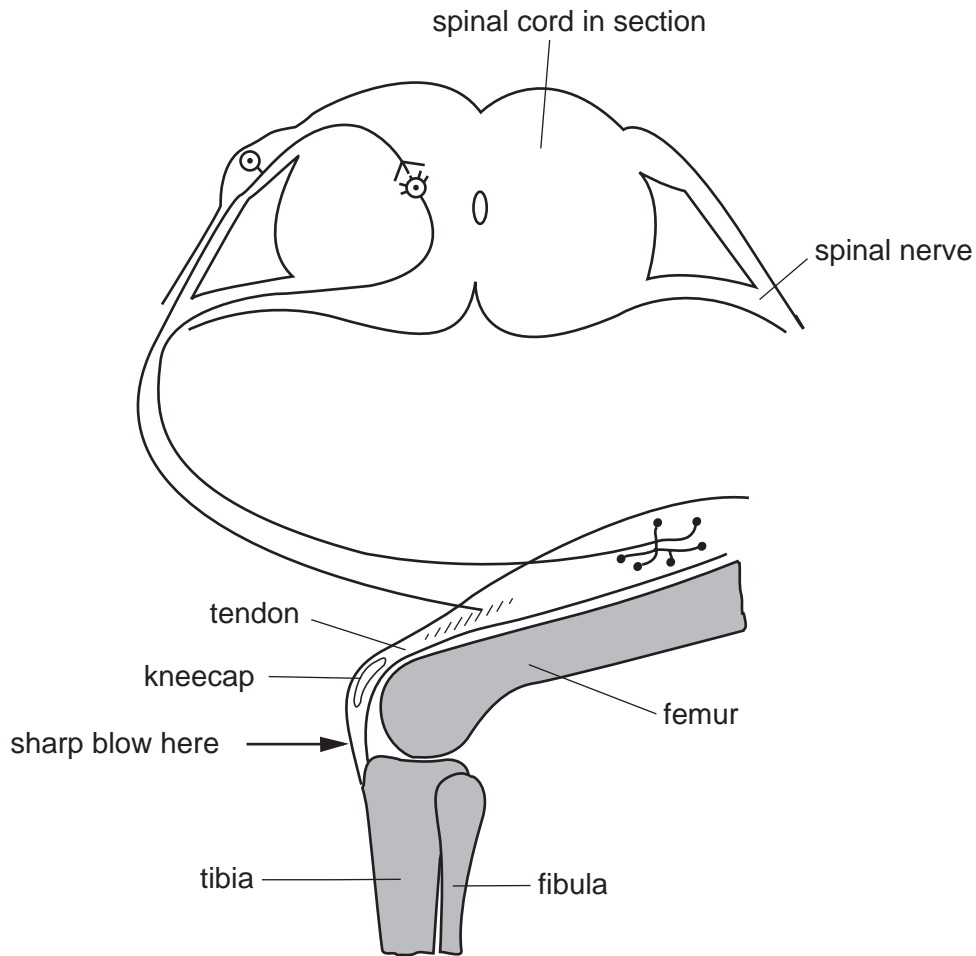
1. ....

2. .... [2]

(e) Explain how a neurone differs from a nerve. ....

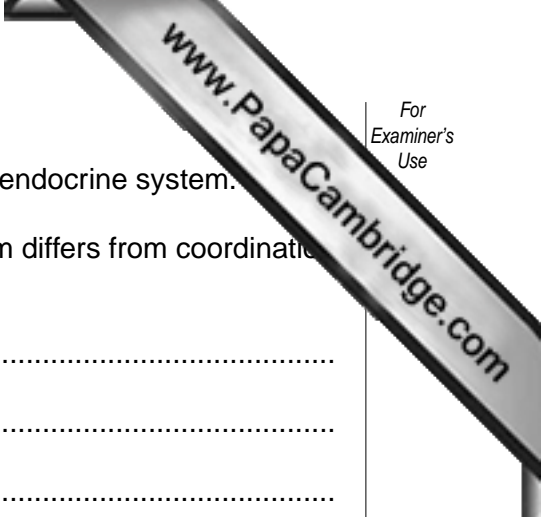
..... [1]

Neurones are arranged in circuits to connect receptors with effectors, such as muscles and glands. These circuits run through the central nervous system. Fig. 1.3 shows a cross-section of the spinal cord and the circuit responsible for the knee-jerk reaction.



**Fig. 1.3**

- (f) Label, on Fig. 1.3,
- (i) the **axon** of each neurone shown, [2]
  - (ii) the effector. [1]
- (g) Why are such circuits called reflex arcs? .....
- .....[1]



(h) The body is coordinated by both the nervous system and the endocrine system.

State four ways in which coordination by the endocrine system differs from coordination carried out by the nervous system.

- 1. ....  
.....
  - 2. ....  
.....
  - 3. ....  
.....
  - 4. ....  
.....
- .....[4]

[Total: 20]

- 2 An investigation was carried out into the nutrient and energy values of a bowl of cereal and a bowl of milk in the diet of a child. The results shown in Fig. 2.1 are given as percentages of the requirement of the child for each component.

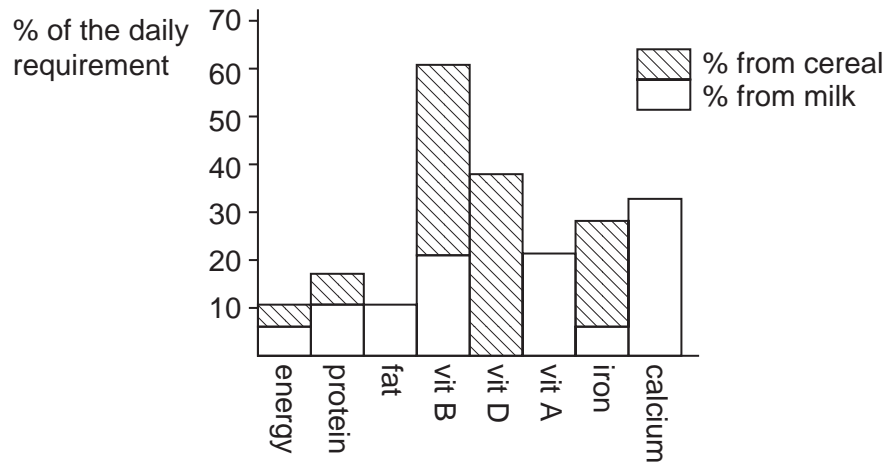


Fig. 2.1

Using the information in Fig. 2.1

- (a) State which substance the child receives in the largest percentage.

..... [1]

- (b) Name the **vitamin** that is provided entirely by the

(i) milk .....

(ii) cereal. .... [2]

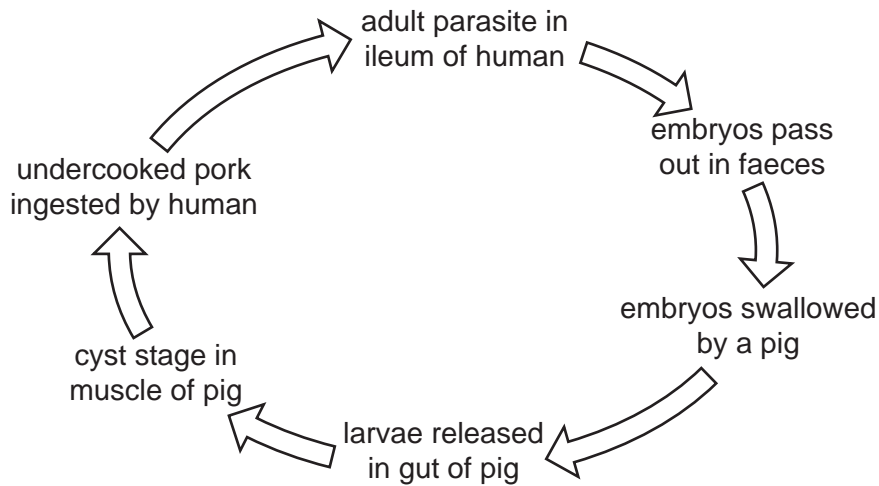
- (c) Name the **mineral** that is supplied

(i) entirely by the milk .....

(ii) mainly by the cereal. .... [2]

[Total: 5]

3 Fig. 3.1 shows the life cycle of a parasite.



**Fig. 3.1**

**(a)** Using the information in Fig. 3.1

**(i)** suggest two ways to reduce the spread of this parasite,

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

**(ii)** suggest how you would detect infection by this parasite of,

1. a human .....
  2. a pig. ....
- [2]

**(b)** The adult parasite is several metres long, but has no gut. Suggest how it obtains the nutrients it needs.

.....  
.....

[2]

[Total: 6]

4 Fig. 4.1 shows three hollow cubes to represent organisms of different sizes.

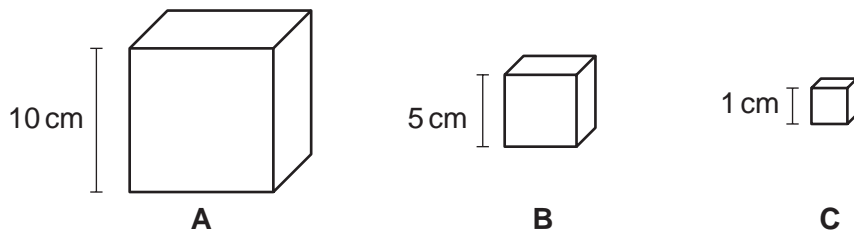


Fig. 4.1

(a) Complete the table below by calculating the ratio of surface area : volume for cubes **B** and **C**.

cube	<b>A</b>	<b>B</b>	<b>C</b>
side length/cm	10	5.0	1.0
surface area/cm <sup>2</sup>	600	150	6.0
volume/cm <sup>3</sup>	1000	125	1.0
ratio of surface area : volume	0.6		

[2]

(b) State what happens to the ratio of surface area:volume as the cubes get smaller.

.....[1]

(c) Heat loss from a body is dependent on its surface area:volume ratio. The three cubes **A**, **B** and **C** were each filled with boiling water. The temperature of the water inside each of the cubes was measured for 15 minutes. Fig. 4.2 shows the results.

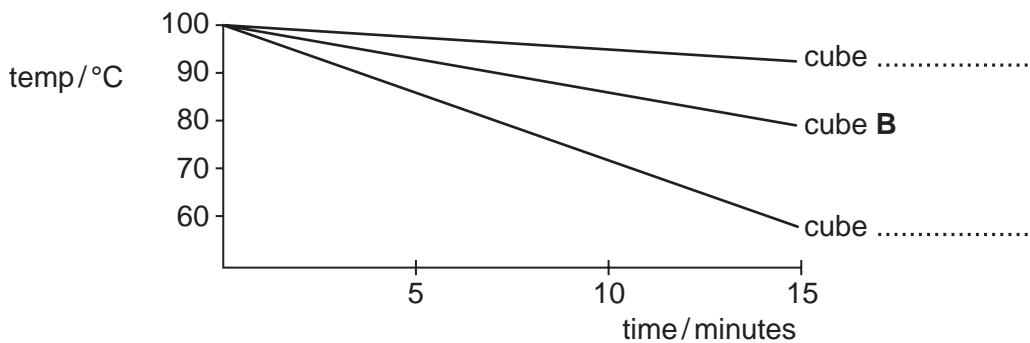


Fig. 4.2

The line for cube **B** is labelled. Label on Fig. 4.2 the lines for cubes **A** and **C**. [1]

[Total: 4]



- 5 Fig. 5.1 shows the female and male reproductive systems and associated organs in view.



**Fig. 5.1**

(a) Show on each drawing using a label line and the letter **M**, where meiosis occurs. [2]

(b) Show on each drawing using a label line and the letter **U** where urine is stored. [2]

(c) State the functions of the **urethra** in

1. females, .....

.....

2. males. ....

.....[3]

(d) Explain why the testes of the male are found outside the main body cavity.

.....

.....

.....[2]

[Total: 9]

- 6 Albinism is a rare condition in humans, where the body fails to produce any melanin pigment. Pigmentation is controlled by a pair of alleles, **R** and **r**, where normal pigmentation (**R**) is dominant over albino, no pigment (**r**). Fig. 6.1 traces the inheritance of albinism through three generations in two families linked by marriage.

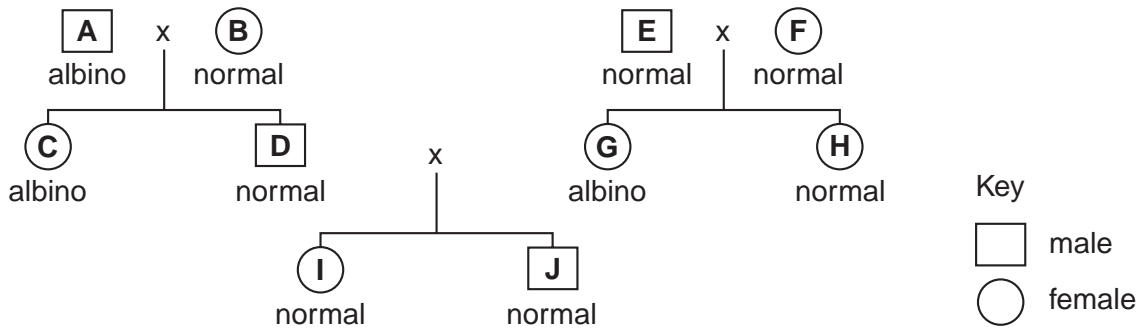


Fig. 6.1

- (a) Using **R** and **r**, what are the genotypes of **A**, **B**, **E** and **F** in Fig. 6.1?

**A** = .....

**B** = .....

**E** = .....

**F** = .....

[4]

- (b) Show, using a genetic diagram, the possible genotypes of the offspring, if **E** and **F** have any more children.

*space for genetic diagram*

[2]

7 Fig. 7.1 shows the life cycle of the anopheline mosquito.

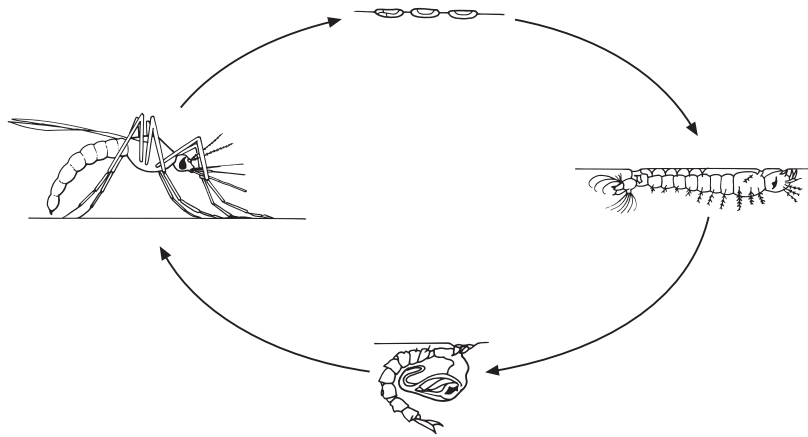


Fig. 7.1

(a) The larval stage can be killed using a bacterium.

(i) Name this bacterium. .... [1]

(ii) Explain why this bacterium does not kill the pupa which lives in the same water.

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

(b) State two other methods of control that are effective against both larvae and pupae.

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

[Total: 5]

## Section B

Answer **all** the questions, including questions 8, 9 and 10 **Either** or 10 **Or**.

Write your answers on the separate answer paper provided.

- 8 (a) Using a table, compare the **structure** of an artery and a vein. [4]

Fig. 8.1 shows how the graph of blood pressure changes as blood flows from the heart to a tissue and back to the heart.

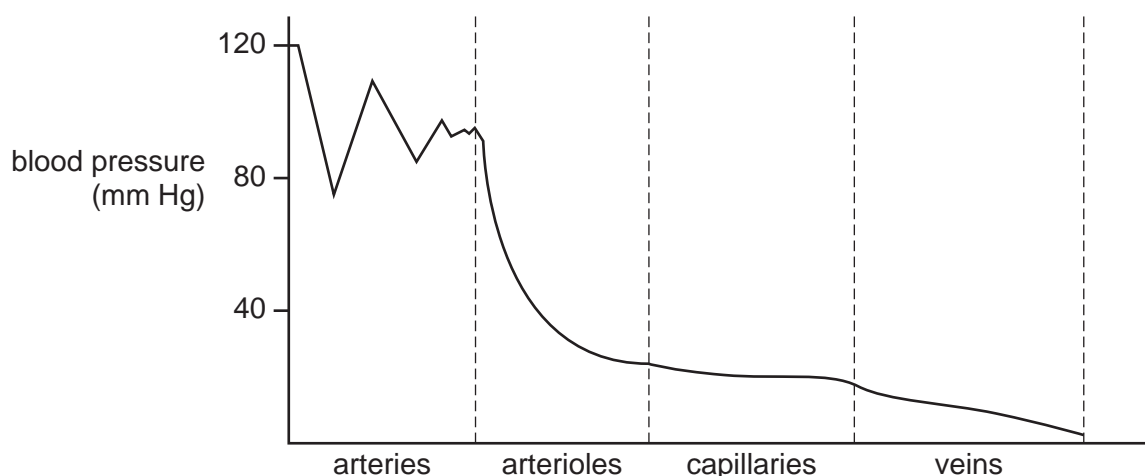


Fig. 8.1

- (b) Explain how
- arteries smooth out the blood pressure changes seen at the start of the graph,
  - veins get the blood, now at low pressure, back to the heart. [6]
- (c) Describe how the arterioles can alter the amount of blood entering the capillaries. [3]
- (d) Explain why the blood-flow in the capillaries is **slow** and at **low pressure**. [2]

[Total: 15]

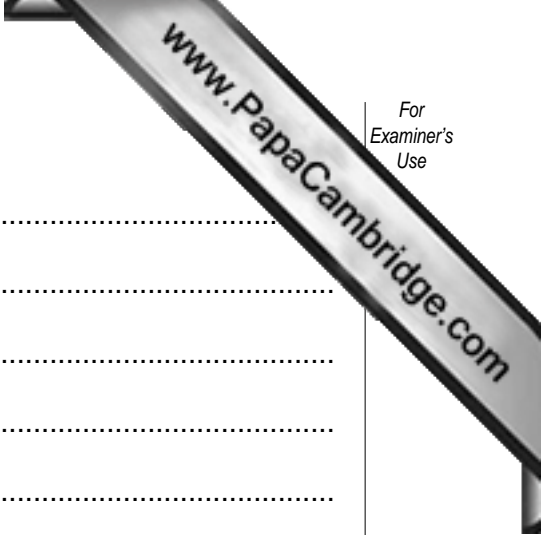
- 9 (a) State **three** ways in which a bacterial cell differs from an animal cell. [3]
- (b) How do bacteria contribute to
- increasing the nitrate levels in the soil,
  - treating sewage before it is discharged into a river? [8]
- (c) Describe how bacteria are removed from river water as it passes through a water treatment plant. [4]

[Total: 15]



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Lined writing area consisting of multiple horizontal dotted lines for text entry.

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