



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

CANDIDATE  
NAME

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**HUMAN AND SOCIAL BIOLOGY**

**5096/22**

Paper 2

**May/June 2013**

**2 hours**

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.

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

**DO NOT WRITE IN ANY BARCODES.**

Write your answers in the spaces provided on the question paper.

**Section A**

Answer **all** questions.

You are advised to spend no longer than 1 hour on Section A.

**Section B**

Answer **both** questions.

**Section C**

Answer **either** question **8** or question **9**.

Electronic calculators may be used.

You may lose marks if you do not show your working or if you do not use appropriate units.

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.

This document consists of **22** printed pages and **2** blank pages.

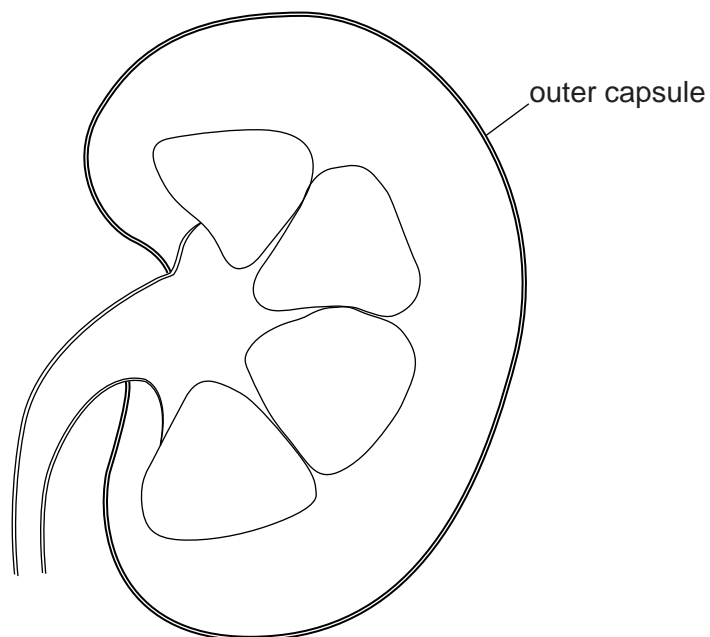


## Section A

Answer **all** the questions in this section.

Write your answers in the spaces provided.

- 1 Fig. 1.1 shows a longitudinal section through a kidney.



**Fig. 1.1**

- (a) (i) Use label lines and the letters **A**, **B**, and **C** to identify the cortex, pelvis and ureter on Fig. 1.1.

- A** cortex  
**B** pelvis  
**C** ureter

[3]

- (ii) Two other tubes are attached to the kidney, but are not shown on Fig. 1.1.

State the names of these two tubes.

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

(b) One function of the kidney is to produce urine.

Table 1.1 gives the concentration of chemicals in plasma and in urine.

**Table 1.1**

chemical	percentage of plasma	percentage of urine
water	90.0	95.0
protein	8.0	0.0
glucose	0.1	0.0
urea	0.03	2.00
sodium ions	0.32	0.35
potassium ions	0.02	0.15

Explain why protein and glucose are absent in the urine.

protein is absent because .....

.....

.....

.....

glucose is absent because .....

.....

.....

.....

[4]

- (c) Urine consists of 95% water.

In an investigation the water gain and water loss of a student were measured for 24 hours.

During this time the student took no exercise.

The results are shown in Table 1.2.

**Table 1.2**

water gain per day/cm <sup>3</sup>		water loss per day/cm <sup>3</sup>	
from drinks	1450	exhaled in breath	400
from food	800	evaporation in sweat	600
from cell respiration	350	in urine	1500
		in faeces	100
total	2600	total	2600

The next day the student was kept on exactly the same diet, but took vigorous exercise at regular intervals.

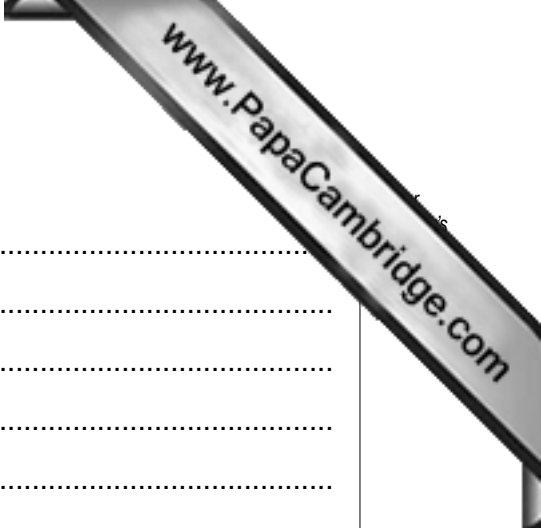
- (i) Predict whether the figures for water would increase, decrease or stay approximately the same when the results from day 2 were compared to day 1.

**Write your answers in Table 1.3 by placing one tick in each row.**

**Table 1.3**

water	day 2		
	increase	decrease	stay the same
cell respiration			
exhaled in breath			
in sweat			
in urine			

[4]



(ii) Explain the reasons for each of your answers.

cell respiration .....

.....

exhaled in breath .....

.....

in sweat .....

.....

in urine .....

.....

[4]

(d) The body uses a hormone to regulate its water content.

Name this hormone and outline how it acts on the kidney if the water content of the blood becomes too low.

name .....

action .....

.....

.....

.....

[3]

[Total: 20]

2 The names of some specialised cells are listed below, each with an identifying letter.

<b>D</b>	bone cell	<b>J</b>	neurone
<b>E</b>	cell in retina	<b>K</b>	red blood cell
<b>F</b>	green leaf cell	<b>L</b>	sperm cell
<b>G</b>	liver cell	<b>M</b>	white blood cell
<b>H</b>	lymphocyte		

Table 2.1 shows seven functions carried out by specialised cells.

Complete Table 2.1 by writing the letter of the cell that is responsible for carrying out each function in the appropriate box.

You may use each letter once, more than once, or not at all. Write only **one** letter in each box.

**Table 2.1**

cell function	letter of cell type responsible
antibody formation	
glucose production	
glycogen formation	
oxygen transport	
phagocytosis	
transformation of light energy into nerve impulses	
transport of haploid nucleus	

[7]

[Total: 7]

3 Fig. 3.1 shows a section through the heart of a fetus.

P is a blood vessel.

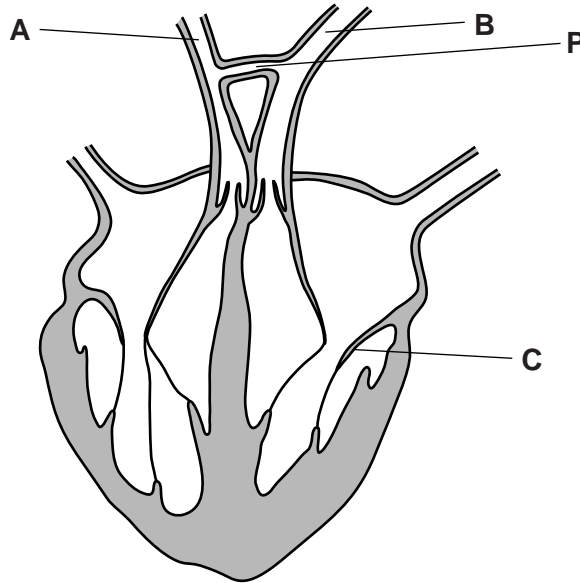


Fig. 3.1

(a) Use the terms aorta, bicuspid valve and pulmonary artery to identify the structures labelled A, B and C in Fig. 3.1.

- A .....
- B .....
- C .....

[3]

(b) In a fetus, the blood vessel labelled P is present as a connecting vessel. Soon after birth this vessel closes up. This does not happen in some people and the vessel remains open. This has serious consequences for the people affected.

Suggest why.

.....

.....

.....

.....

.....

.....

.....

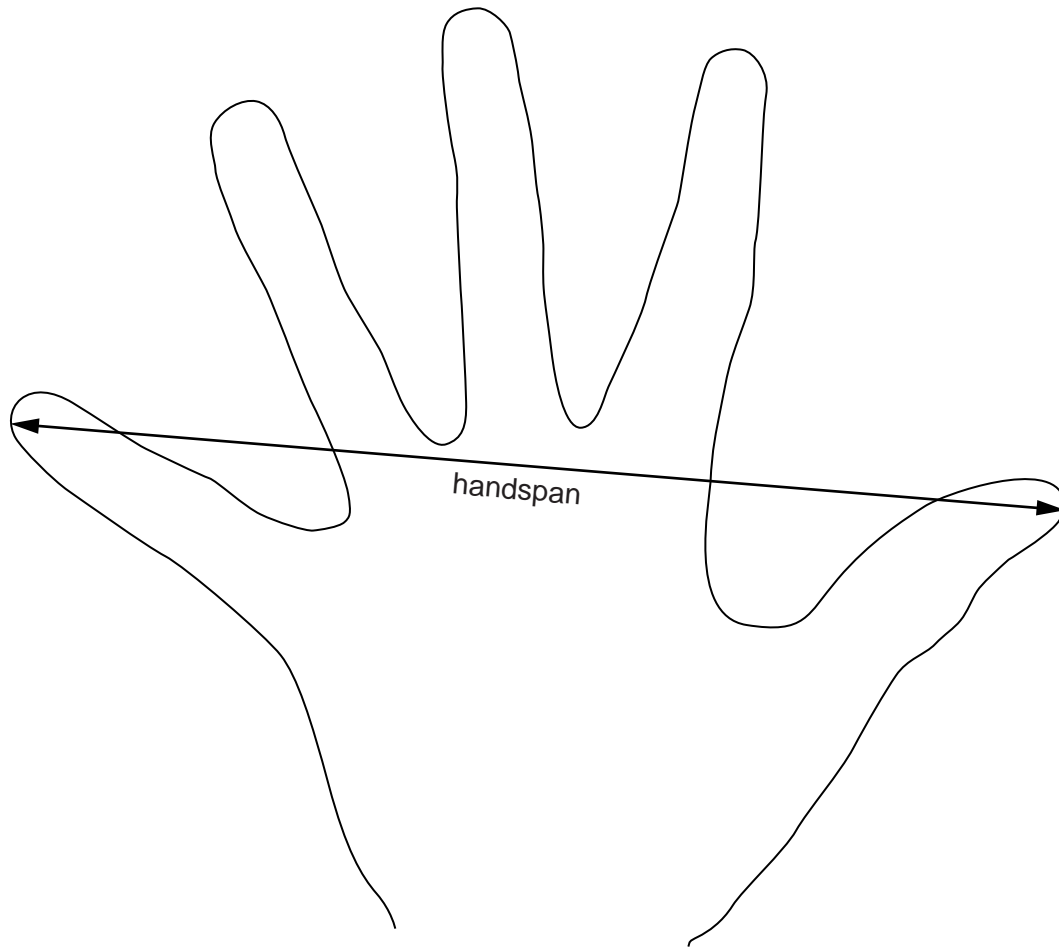
[3]

[Total: 6]





- 4 Fig. 4.1 shows the hand-span of a person. The hand-span is the distance between the little finger and the thumb when the hand is stretched out.



**Fig. 4.1**

A group of students measured their hand-spans and the results are shown in Table 4.1.

Table 4.1

hand-span/mm	number of students	percentage frequency
160 – 169	4	2.7
170 – 179	12	8.0
180 – 189	26	17.3
190 – 199	45	
200 – 209	37	25.0
210 – 219	20	13.3
220 – 229	6	4.0
total =		100.0

(a) State the range of hand-span measurements.

..... mm [1]

(b) (i) Calculate the number of students who took part in this investigation.

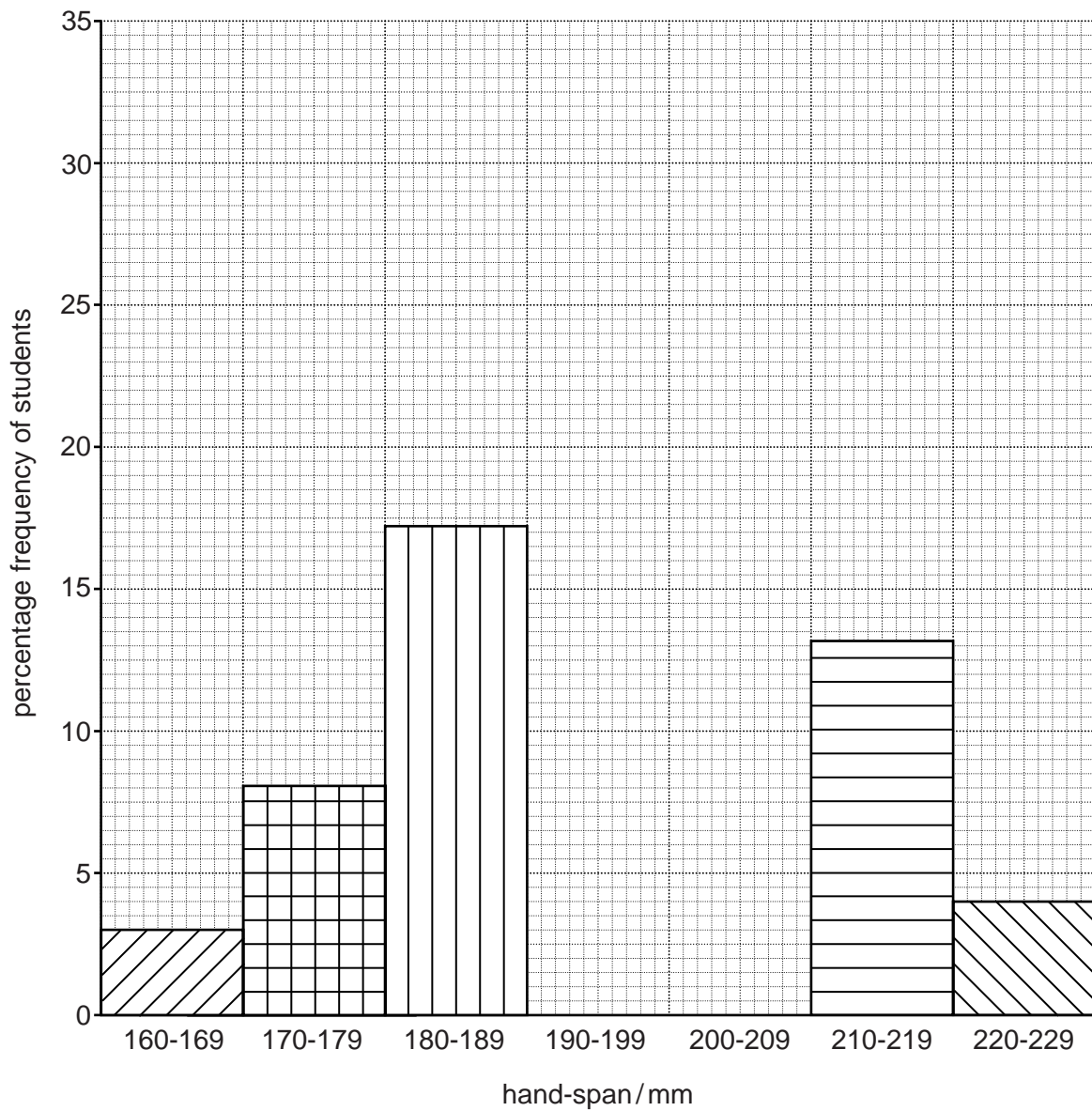
answer = ..... students [1]

(ii) Calculate the frequency of the students who had a hand-span between 190 and 199mm.

Show your working.

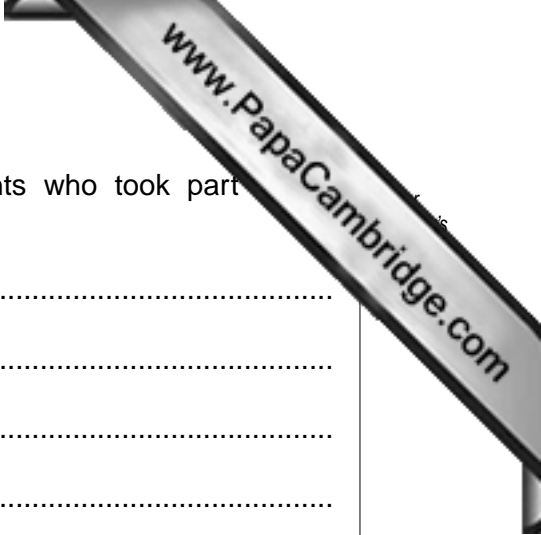
answer = ..... % [2]

Fig. 4.2 shows the histogram that the students drew using their results.



**Fig. 4.2**

- (c) Using the information in Table 4.1, complete Fig. 4.2 by inserting the two missing results. [2]



(d) Suggest four reasons why the hand-spans of the students who took part in the investigation varied so much.

reason 1 .....

.....

reason 2 .....

.....

reason 3 .....

.....

reason 4 .....

.....

[4]

[Total: 10]

5 (a) Define a *hormone*.

.....

.....

.....

..... [2]

When a meal is eaten the stomach produces gastric juice.

The production of gastric juice is controlled by both nervous and hormonal stimulation of glands in the stomach wall.

Fig. 5.1 shows the volumes of gastric juice produced in response to nervous stimulation (curve Y) and to hormonal stimulation (curve Z).

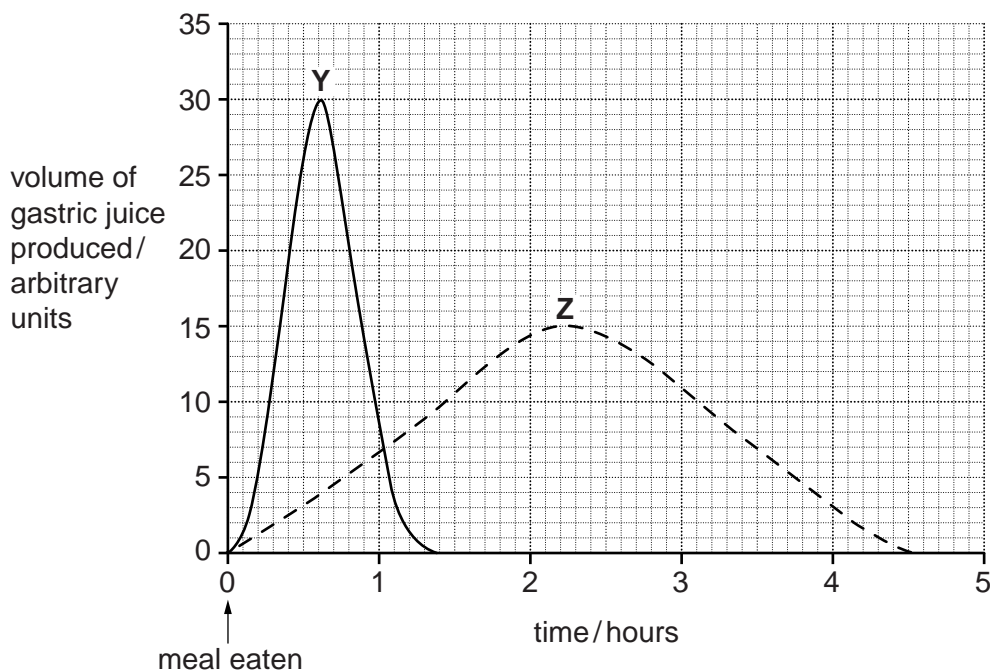


Fig. 5.1

(b) (i) Using Fig. 5.1, describe the differences in the production of gastric juice in response to nervous and to hormonal stimulation.

.....

.....

.....

..... [2]

(ii) Suggest why gastric juice stops being produced 4.5 hours after the meal has been eaten.

.....

..... [1]



(c) The secretion of gastric juice is an example of a simple reflex.

The taste buds in the mouth are the receptors and the glands in the stomach are the effectors in this reflex.

Outline the reflex that occurs when gastric juice is produced.

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[4]

(d) Explain how a nerve impulse is passed from one nerve cell to another.

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.....

[3]

[Total: 12]

**Please turn over for Section B.**

## Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

- 6 (a) The names of some biological groups are listed below, each with an identifying letter.

<b>N</b> bacteria	<b>R</b> insects
<b>P</b> flatworms	<b>S</b> protozoa
<b>Q</b> fungi	<b>T</b> viruses

Table 6.1 lists some identifying features of biological organisms and particles.

Complete Table 6.1 by writing the letter of the group in the box next to its identifying feature.

Place only **one** letter in each box. **Use each letter once.**

**Table 6.1**

identifying feature	letter of group characterised by this feature
body is segmented	
can reproduce by binary fission	
can reproduce sexually and asexually	
cells have no nucleus	
consists of hyphae	
only reproduces inside a living cell	

[3]

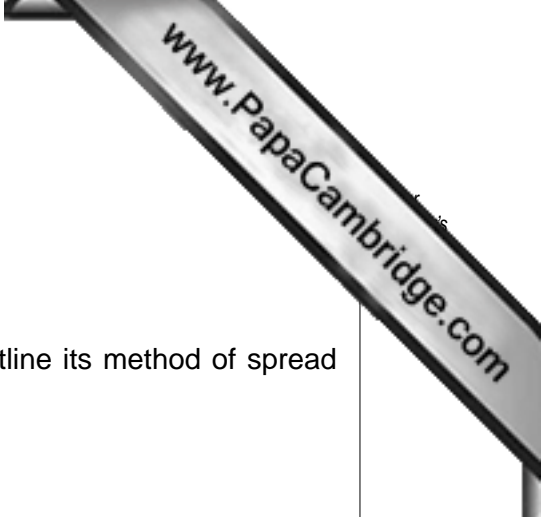
- (b) One function of blood is to defend the body against disease-causing organisms.

Outline **three** ways in which it does this.

- 1 .....
- .....
- 2 .....
- .....
- 3 .....
- .....

[3]





(c) Three human diseases are listed:

- cholera
- influenza
- tuberculosis (TB)

For each disease name the type of agent that causes it, outline its method of spread and state **one** method that is used to control its spread.

**cholera**

agent .....

method of spread .....

.....

control of spread .....

.....

**influenza**

agent .....

method of spread .....

.....

control of spread .....

.....

**tuberculosis (TB)**

agent .....

method of spread .....

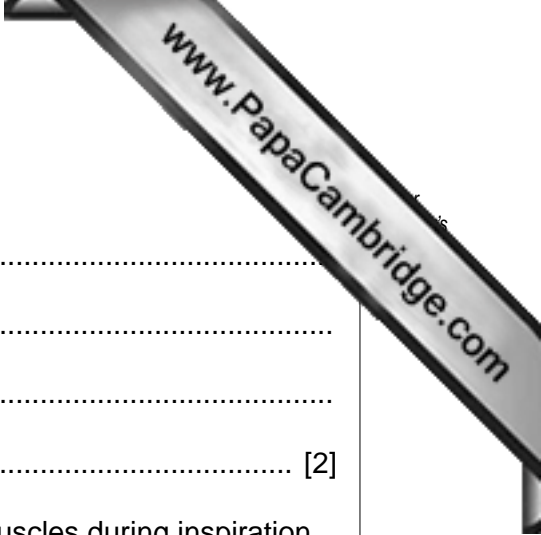
.....

control of spread .....

.....

[9]

[Total: 15]



7 (a) State the difference between breathing and respiration.

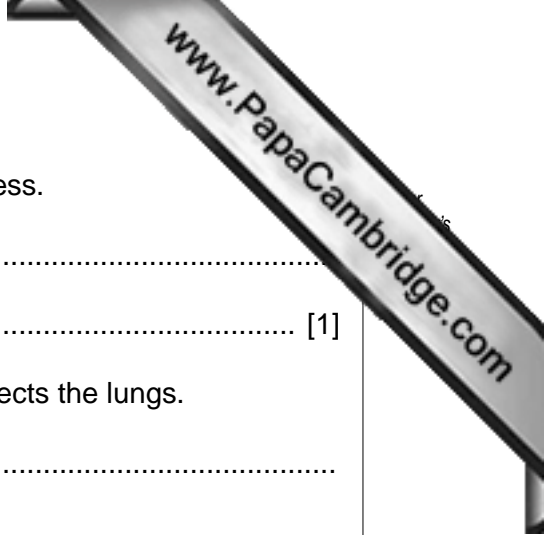
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..... [2]

(b) Describe the actions of the diaphragm, ribs and intercostal muscles during inspiration.

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..... [6]

(c) (i) Outline how the body cleans the inspired air before it reaches the alveoli.

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..... [3]



(ii) State the effect of cigarette smoke on this cleaning process.

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..... [1]

(iii) Describe how long-term exposure to cigarette smoke affects the lungs.

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

[Total: 15]

Section C

Answer **either** question 8 or question 9.

Write your answers in the spaces provided.

8 (a) Fig. 8.1 shows some components of the nitrogen cycle.

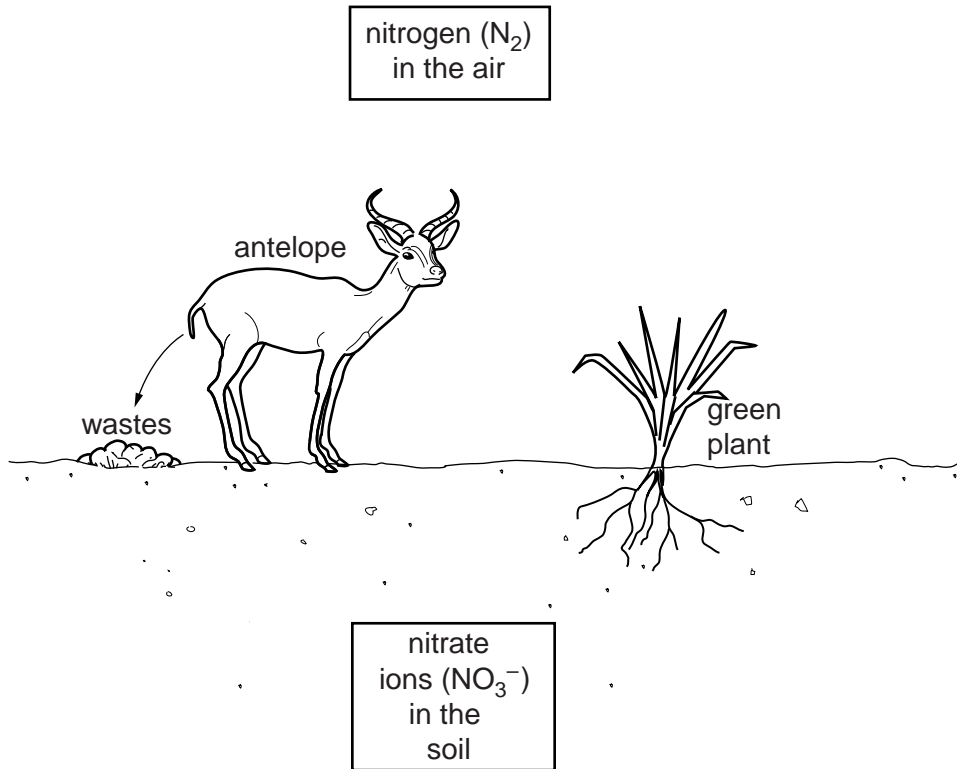


Fig. 8.1

Using the information in Fig. 8.1, describe what happens when nitrogen is cycled between the components shown.

Start your answer with nitrate ions in the soil.

.....

.....

.....

.....

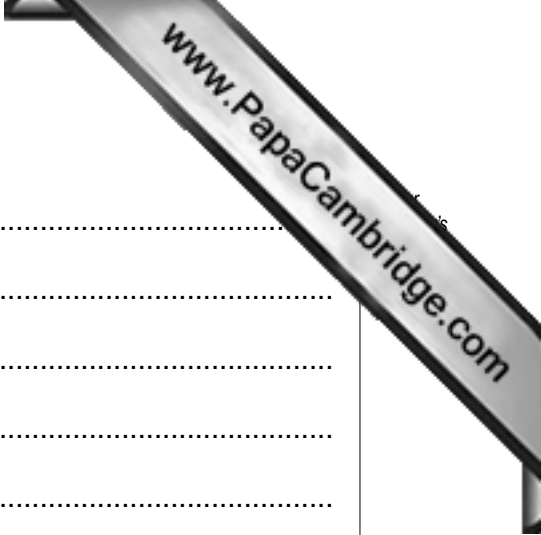
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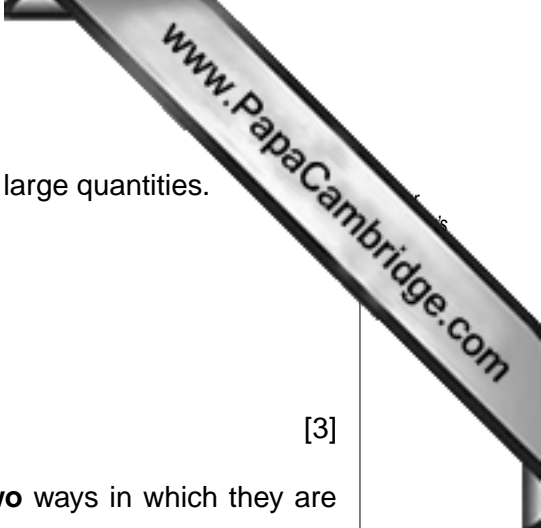
**(b)** Many farmers add chemical fertilisers to their fields to increase crop yields.

These can be present in the water that drains from the fields into rivers.

Describe the undesirable effects that this can have on the organisms in a river.

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..... [7]

[Total: 15]



9 (a) (i) List three nutrient groups that are needed by the body in large quantities.

V .....

W .....

X .....

[3]

(ii) For each of the three groups you have named, state **two** ways in which they are used by the body.

V

use 1 .....

.....

use 2 .....

.....

W

use 1 .....

.....

use 2 .....

.....

X

use 1 .....

.....

use 2 .....

.....

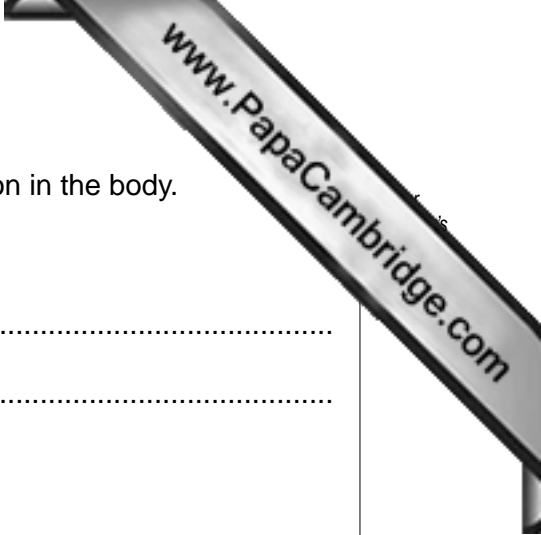
[6]

(b) (i) State **two** types of nutrients that are only needed in small amounts.

nutrient Y .....

nutrient Z .....

[2]



(ii) Name an example of each of these and outline its function in the body.

example of **Y** .....

function .....

.....

example of **Z** .....

function .....

.....

[2]

(c) Water is also needed in the diet.

Describe **two** functions of water in the body.

function 1 .....

.....

function 2 .....

.....

[2]

[Total: 15]

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