



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

CANDIDATE  
NAME

CENTRE  
NUMBER

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**HUMAN AND SOCIAL BIOLOGY**

**5096/21**

Paper 2

**October/November 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 **9** or question **10**.

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.

Write your answers in the spaces provided.

For  
Examiner's  
Use

- 1 Fig. 1.1 shows a vertical section of the stomach, together with the parts of the alimentary canal leading into and out of it.

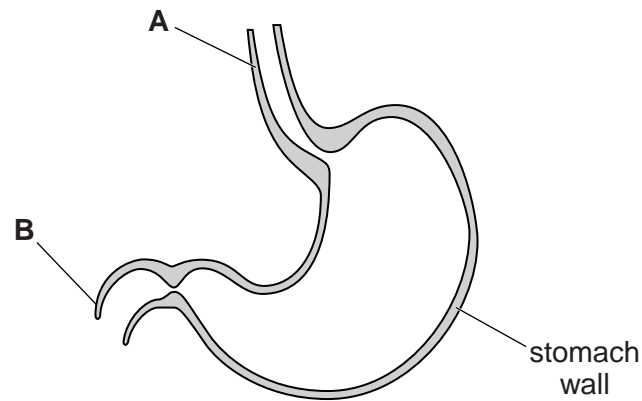


Fig. 1.1

- (a) Name the parts **A** and **B**.

**A** .....

**B** ..... [2]

The stomach is a bag-like structure with very muscular walls.

- (b) Explain the role of the muscles in the stomach wall.

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

- (c) Pepsin is a substance produced in the stomach. An investigation was carried out into the action of pepsin on proteins.

10 cm<sup>3</sup> of a cloudy egg white suspension, the protein, was placed into each of four test-tubes.

Other substances were added as shown in Table 1.1.

The test-tubes were kept in a water-bath at 37 °C for ten minutes.

**Table 1.1**

test-tube	volume / cm <sup>3</sup>			
	egg white suspension	hydrochloric acid	pepsin	water
<b>1</b>	10	2	3	0
<b>2</b>	10	0	3	2
<b>3</b>	10	2	0	3
<b>4</b>	10	0	0	5

- (i) Explain why water was added to test-tubes **2**, **3** and **4**.

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

At the beginning of the investigation the contents of all the test-tubes were cloudy. At the end only test-tube **1** had become clear.

- (ii) Describe and explain the processes and conditions that cause the change in appearance of test-tube **1**.

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 .....  
 ..... [5]

- (iii) Explain why there was no change in test-tubes **2**, **3** and **4**.

test-tube **2** .....

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.....

test-tube **3** .....

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test-tube **4** .....

.....

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[3]

- (iv) Suggest how you would extend this investigation to find out more about the effect of factors on the action of pepsin.

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..... [4]

- (d) Food leaves the stomach and passes along the rest of the alimentary canal.

Substances are mixed with food immediately after leaving the stomach.

Name the **two** organs that make these substances.

.....

..... [2]

[Total: 20]

**Please turn over for Question 2.**

- 2 A student was asked to perform an experiment to investigate the working of the human eye.

The student was told to look at a diagram of a dot and a plus sign on a piece of paper positioned on a wall at eye-level as shown in Fig. 2.1.

For  
Examiner's  
Use



**Fig. 2.1**

The student was also given a card to hold over one eye at a time.

The student positioned herself 30 cm away from the paper so that both symbols were clearly visible to each eye.

The student then followed the instructions listed in the left-hand column of Table 2.1.

**Table 2.1**

instruction	result
use the right eye only to look directly at the dot	the student could not see the + sign
use the right eye only to look directly at the + sign	the student could see both the dot and the + sign
use the left eye only to look directly at the + sign	the student could not see the dot
use the left eye only to look directly at the dot	the student could see both the dot and the + sign

The results of each action are given in the right-hand column of Table 2.1.

- (a)** What can you conclude from these results?

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..... [3]

(b) Explain the advantages of having two eyes.

For  
Examiner's  
Use

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..... [3]

[Total: 6]

- 3 The proportion of energy supplied by three nutrients in two different meals are shown in the pie charts in Fig. 3.1 and Fig. 3.2.

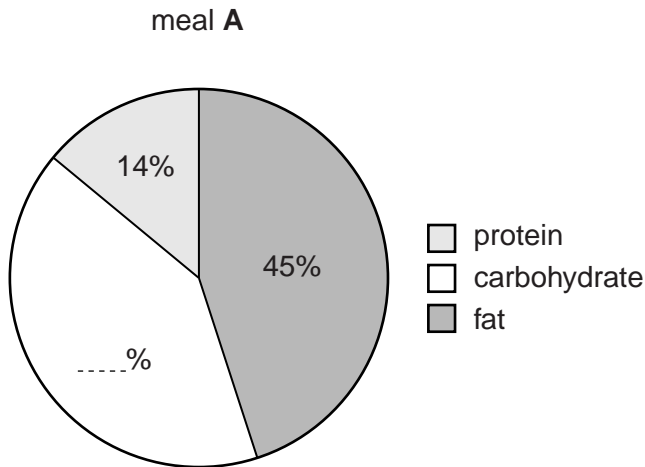


Fig. 3.1

Fig. 3.2

- (a) Calculate the percentage energy from carbohydrate for the two meals.

Write your answers in the spaces provided on the pie charts.

[1]

In a healthy diet at least 50% of the energy should be provided by carbohydrate, 10 to 20% by protein and 15 to 30% by fats.

- (b) State which you consider to be the more healthy option, meal A or meal B. Explain your reasoning.

meal .....

reasoning .....

.....

.....

..... [2]

- (c) Another component of the human diet is fibre. Cellulose is a carbohydrate and a main source of fibre in the diet.

- (i) The energy values for fibre are never included in the energy content for human foods.

Suggest why.

.....

..... [1]

- (ii) State **two other** components of the human diet that do **not** provide energy.

1 .....

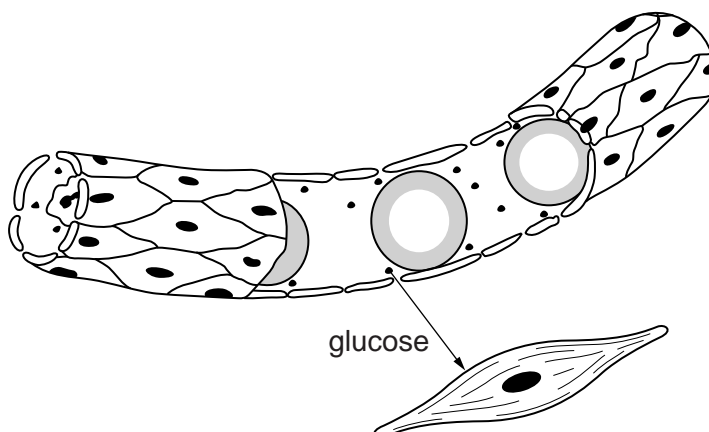
2 ..... [2]

[Total: 6]



- 4 Fig. 4.1 shows a muscle cell next to a capillary. Glucose passes out of the blood and into the cell to be used in respiration.

For  
Examiner's  
Use



**Fig. 4.1**

- (a) Explain how glucose moves from the capillary into the muscle cell.

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..... [2]

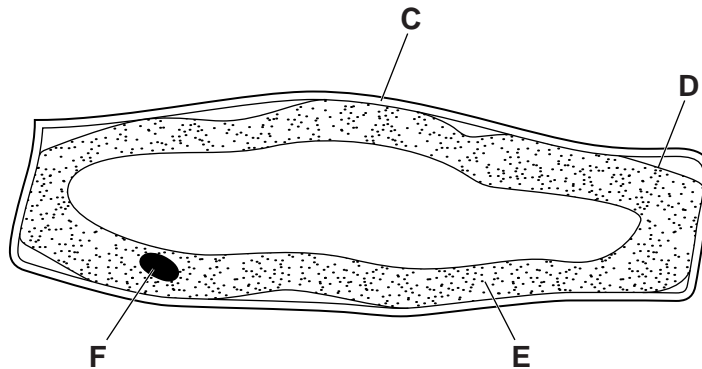
- (b) Complete the word equation for aerobic respiration.

glucose + .....  $\longrightarrow$  ..... + ..... [3]

[Total: 5]

- 5 A student placed a piece of epidermis from a plant into a sugar solution and then mounted it on a microscope slide.

The student looked down the microscope and drew one of the cells. This is shown in Fig. 5.1.



**Fig. 5.1**

- (a) Name the parts labelled **C** to **F** on Fig. 5.1.

**C** .....

**D** .....

**E** .....

**F** .....

[4]

- (b) Explain what happened to the cell when it was placed into the sugar solution.

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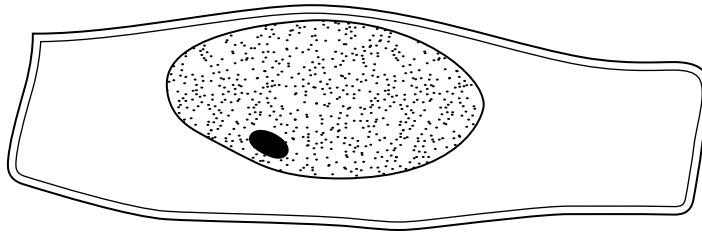
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..... [3]

The student then placed a different sugar solution onto the cells.

Fig. 5.2 shows the appearance of the same cell after five minutes.

For  
Examiner's  
Use



**Fig. 5.2**

**(c)** Explain what happened to the plant cell when the second sugar solution was used.

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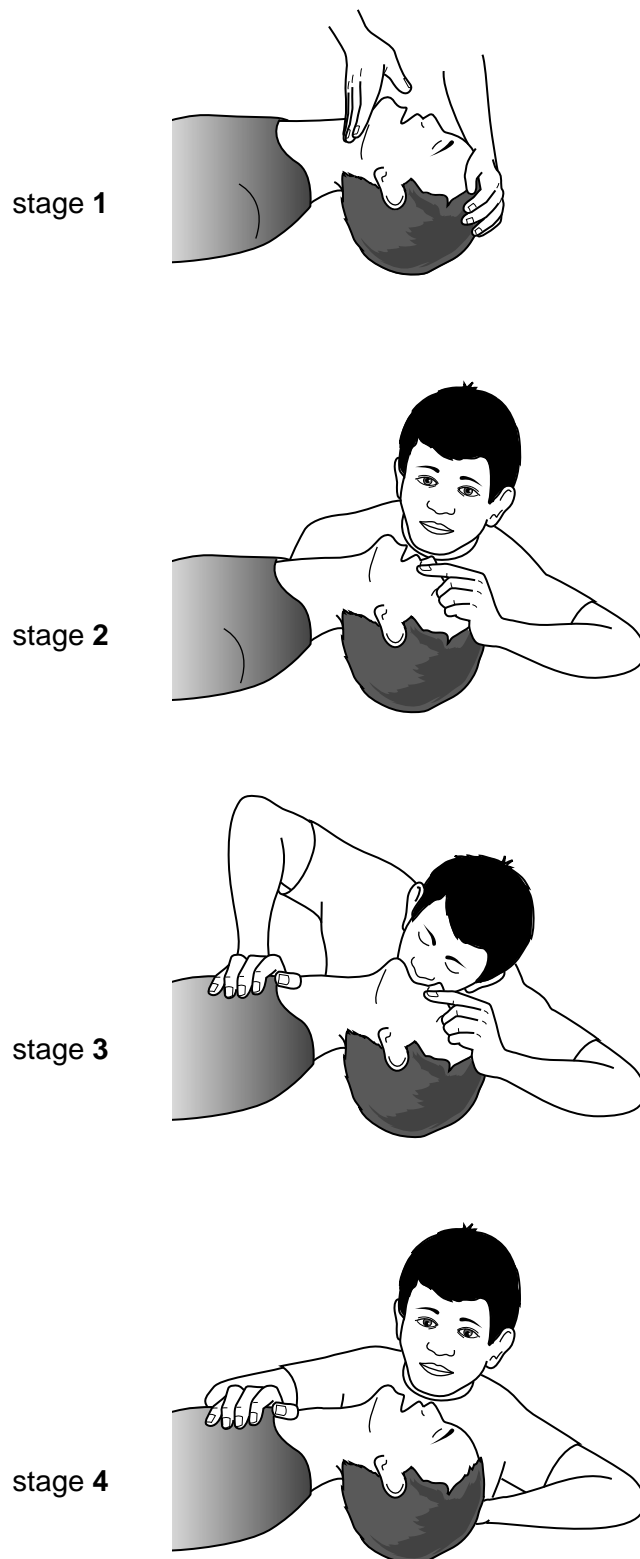
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..... [3]

[Total: 10]

6 Fig. 6.1 shows the four stages in mouth-to-mouth resuscitation.

For  
Examiner's  
Use



**Fig. 6.1**

Explain why each stage shown in Fig. 6.1 is important in mouth-to-mouth resuscitation.

For  
Examiner's  
Use

stage 1 .....

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stage 2 .....

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stage 3 .....

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stage 4 .....

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[8]

[Total: 8]

For  
Examiner's  
Use

**7** Alcohol (ethanol) can have a number of effects on the body.

(i) the nervous system including the brain,

..... [7]

(ii) the liver.

For  
Examiner's  
Use

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..... [4]

(b) Explain the possible consequences to an unborn child if a pregnant woman drinks excessive quantities of alcohol.

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..... [4]

[Total: 15]

- 8 Blood consists of different sorts of cells, together with platelets, suspended in a liquid called plasma.

(a) Name the different types of cells in blood **and** state their functions.

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..... [5]

(b) Platelets are involved in the early stages of healing when the body is wounded.

Outline the action of platelets in this process.

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..... [5]



(c) State the functions of plasma.

For  
Examiner's  
Use

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..... [5]

[Total: 15]

Answer **either** question 9 **or** question 10.

**9** The arm consists of bone, muscle, cartilage and fibrous tissues.

[3]

[8]

- (c) Tendons and ligaments are composed of different types of fibrous tissue.

Explain how tendons and ligaments differ in their composition and function.

For  
Examiner's  
Use

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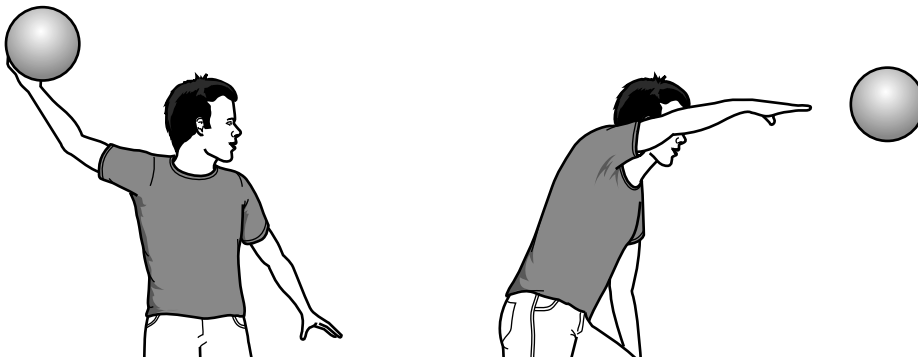
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..... [4]

[Total: 15]

- 10 (a) A person throwing a ball moves their arm in an arc as shown in Fig. 10.1.

For  
Examiner's  
Use



**Fig. 10.1**

Explain how the muscles of the arm cause this movement.

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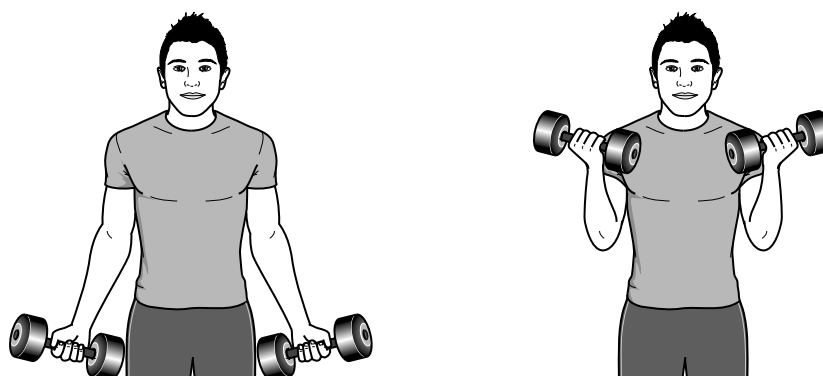
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..... [5]

- A person touching a very hot object withdraws their hand very quickly.



Explain how each of these movements is controlled by the nervous system.

- ..... [5]

- (ii) Withdrawal of the hand from a hot object.

For  
Examiner's  
Use

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..... [5]

[Total: 15]

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