



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

CANDIDATE  
NAME

CENTRE  
NUMBER

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**HUMAN AND SOCIAL BIOLOGY**

**5096/23**

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 **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 **20** printed pages.



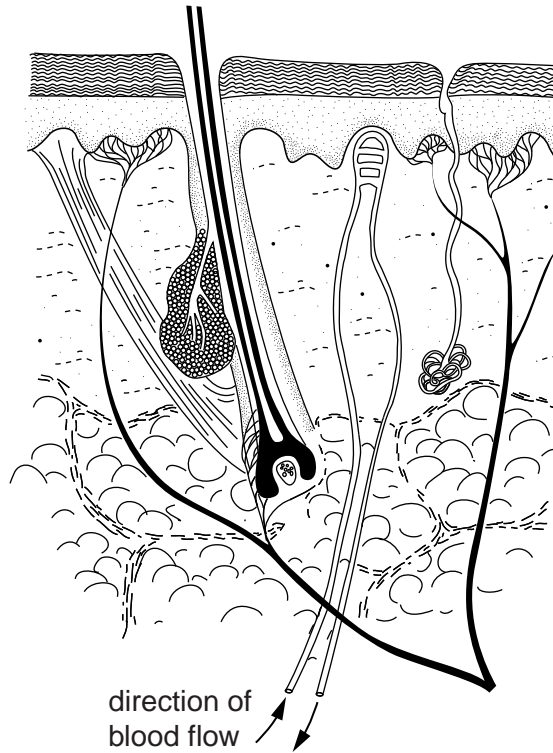
**Section A**

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

Write your answers in the spaces provided.

For  
Examiner's  
Use

- 1 Fig. 1.1 shows a section through the skin.



**Fig. 1.1**

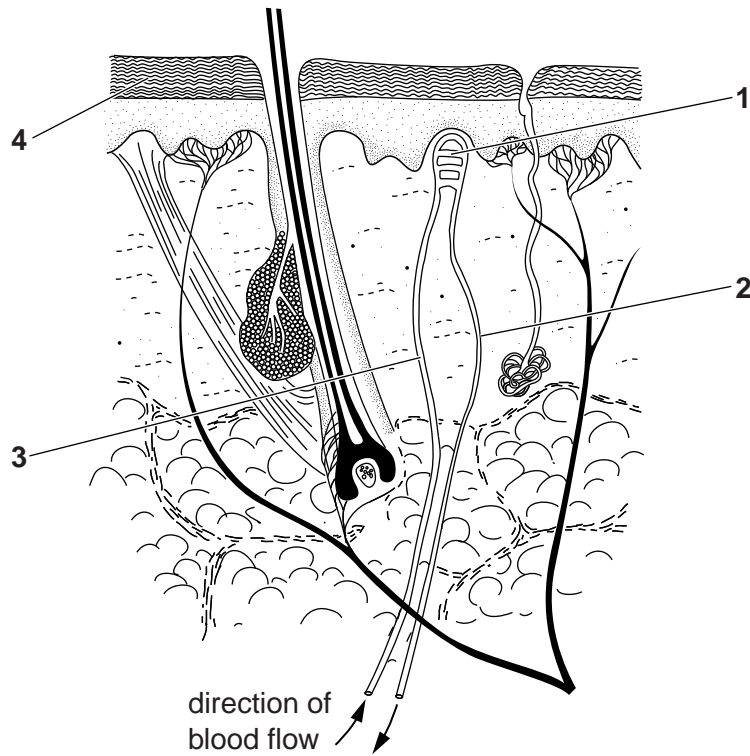
- (a) (i) Use label lines and the letters **A**, **B** and **C** to identify a capillary, a sweat duct and a sweat gland on Fig. 1.1.

- A** capillary  
**B** sweat duct  
**C** sweat gland

[3]

Fig. 1.2 shows the same section through the skin.

For  
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Use



**Fig. 1.2**

- (ii) Using Fig. 1.2, state which part of the skin, 1 to 4, has the highest temperature during exercise.

part ..... [1]

An investigation was carried out to show how changes in environmental conditions affect the volume of sweat produced by a person.

The three environmental conditions changed during the investigation were

- air temperature,
- clothing worn,
- weight carried.

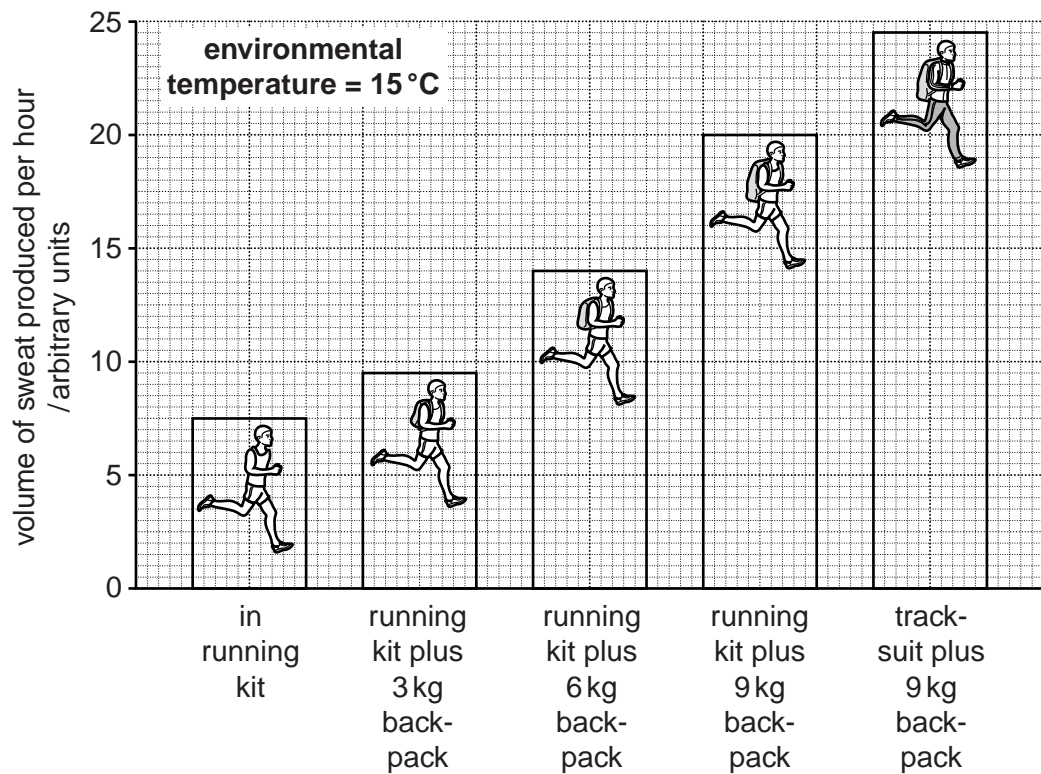
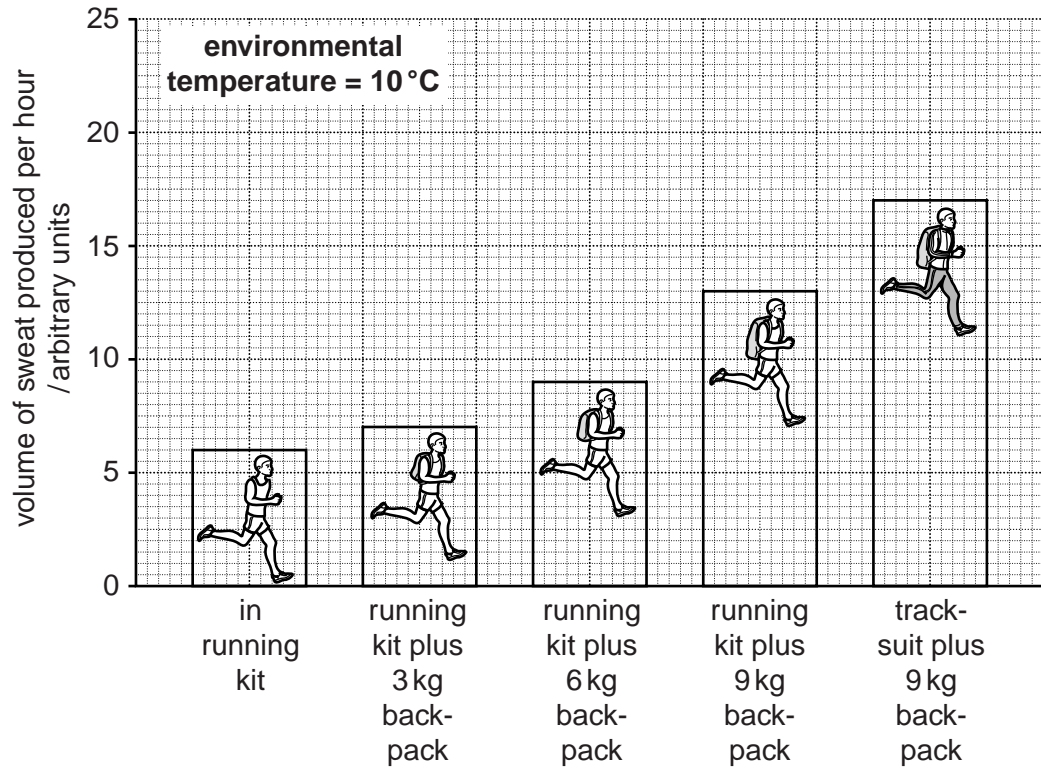


Fig. 1.3

At rest at 15 °C the person's rate of sweat production was 2 arbitrary units per hour.

Fig. 1.3 gives information about the rate of sweat production by the person when carrying out the same amount of exercise under different conditions.

For  
Examiner's  
Use

**(b) Using the information given so far, including the information in Fig. 1.3 and Fig. 1.2,**

**(i)** calculate the increase in rate of sweat production between being at rest and in exercising in running kit at 15 °C,

answer ..... /arbitrary units per hour [1]

**(ii)** describe the changes that occur in the person's skin between being at rest and exercising,

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

**(iii)** explain why the changes you have described are necessary.

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

(c) (i) Using only information from Fig. 1.3 on page 4, state **four** conclusions that can be made from the results of the investigation into the rate of sweat production in different conditions.

1 .....

.....

2 .....

.....

3 .....

.....

4 .....

.....

[4]

(ii) Select **two** of your conclusions above and give an explanation for each of them.

State the number of your conclusion before you give the explanation.

conclusion number .....

explanation .....

.....

.....

.....

conclusion number .....

explanation .....

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.....

.....

[4]

[Total: 20]

2 The names of some biological processes are listed below, each with an identifying letter.

- |                             |                      |
|-----------------------------|----------------------|
| <b>A</b> assimilation       | <b>E</b> excretion   |
| <b>B</b> chemical digestion | <b>F</b> ingestion   |
| <b>C</b> egestion           | <b>G</b> respiration |
| <b>D</b> emulsification     |                      |

Table 2.1 contains the descriptions of five processes carried out in the body.

Complete Table 2.1 by placing the letter that identifies the name of each process in the box next to its description.

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

**Table 2.1**

description of process	letter representing the name of the process
fat globules broken down into small droplets	
glucose broken down to release energy	
large molecules broken down into smaller ones by enzymes	
liver cells using glucose to form glycogen	
passing fibre out of the body	

[5]

[Total: 5]

3 During exercise the heart rate increases.

(a) Explain fully why this increase is necessary.

.....

.....

.....

.....

.....

..... [3]

Table 3.1 gives information that is printed on exercise machines in fitness centres.

**Table 3.1**

age/years	recommended maximum heart rate during exercise on this machine /beats per minute
20	160
30	152
40	144
50	136
60	128
70	120
80	112

(b) (i) People are recommended **not** to exercise so that their heart rates are higher than these figures.

Suggest why this advice is given.

.....

.....

.....

..... [2]



- (ii) The heart rates given in Table 3.1 are 80% of the maximum heart rate for each age group.

Calculate the maximum heart rate that could be achieved in exercise by people aged 20 years.

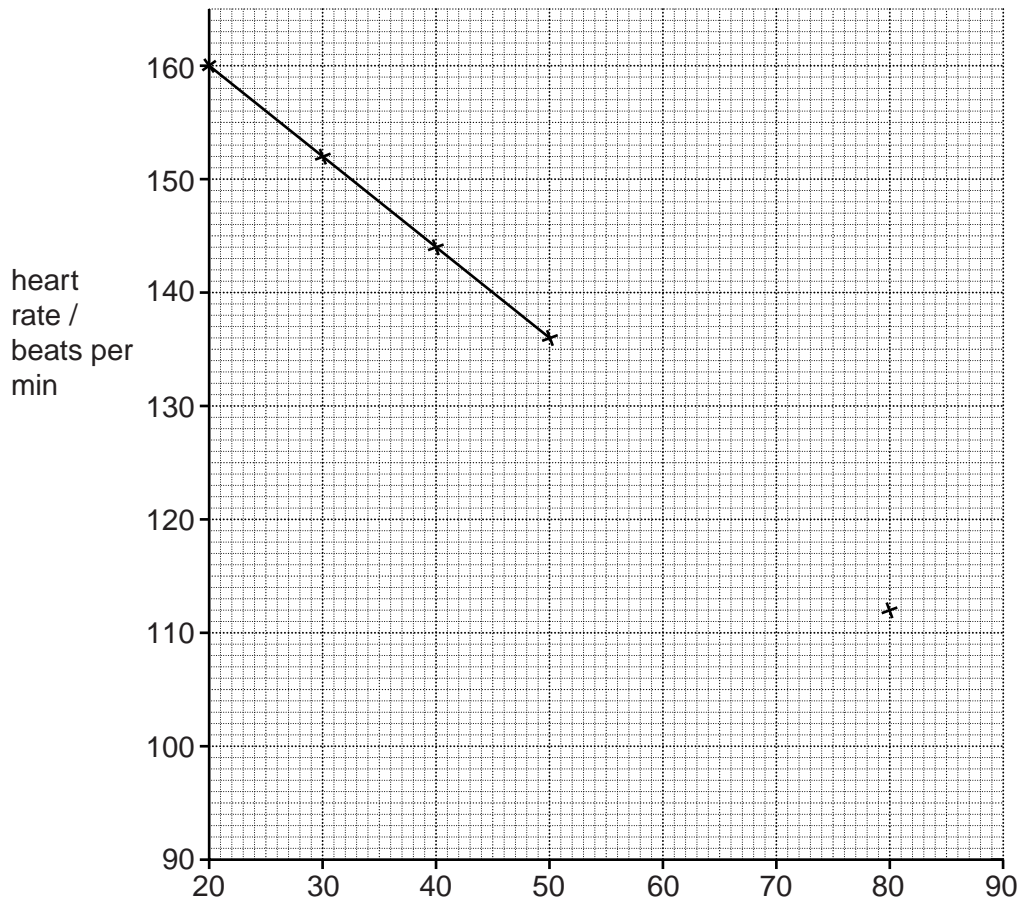
Show your working.

answer ..... /beats per min [2]

- (c) Some of the information in Table 3.1 has been entered on Fig. 3.1.

- (i) Complete Fig. 3.1 by

- labelling the x-axis,
- inserting the data for people aged 60 and 70 years and completing the line.



[2]

Fig. 3.1

- (ii) Predict the heart rate that would be printed on the exercise machine for people aged 90 years.

For  
Examiner's  
Use

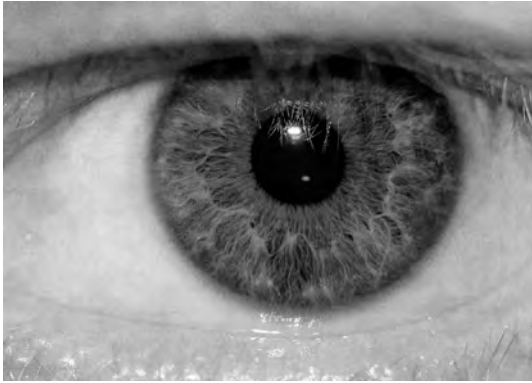
answer ..... /beats per min [1]

- (iii) Use Fig. 3.1 and Table 3.1 to describe the relationship between age and heart rate.

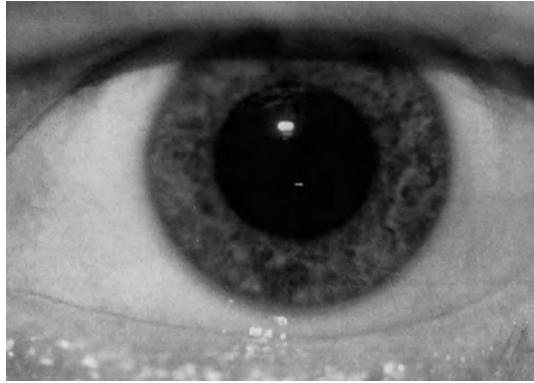
.....  
.....  
.....  
..... [2]

[Total: 12]

- 4 (a) Fig. 4.1 shows a student's eye in normal conditions and Fig. 4.2 shows how the eye has changed after a particular event.



**Fig. 4.1**



**Fig. 4.2**

(i) State the visible change in the eye. ....  
 ..... [1]

(ii) Suggest what event caused this change. ....  
 ..... [1]

(iii) Explain what happened within the eye to bring about this change.  
 .....  
 .....  
 .....  
 ..... [2]

(b) Outline how the lens in the eye changes when looking at an object close to it.  
 .....  
 .....  
 .....  
 ..... [2]

[Total: 6]

5 (a) Complete Table 5.1 by stating the way in which expired air differs from inspired air.

**Table 5.1**

feature	way in which expired air differs from inspired air
carbon dioxide	
oxygen	
temperature	

[3]

An investigation was carried out to find the effect on breathing when inspired air contains different concentrations of carbon dioxide. Table 5.2 shows the results.

**Table 5.2**

concentration of carbon dioxide in inspired air/%	volume of each breath/cm <sup>3</sup>	rate of breathing/ number of breaths per minute	volume of air breathed in per minute/dm <sup>3</sup>
0.04	500	10	5.0
1.00	750	15	11.3
3.00	1300	18	23.4
5.00	2500	25	62.5

(b) State **two** effects caused by increasing the concentration of carbon dioxide in the inspired air as shown in Table 5.2.

effect 1 .....

.....

effect 2 .....

.....

[2]

[Total: 5]



**Section B**

Answer **both** questions in this section.

Write your answers in the spaces provided.

For  
Examiner's  
Use

7 (a) State the seven characteristics of living organisms.

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..... [7]

(b) (i) All living organisms use enzymes to control their metabolism.

Define the term *enzyme*.

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

(ii) Describe the effect that changing the temperature and the pH have on enzyme activity.

temperature .....

.....  
.....  
.....  
.....

pH .....

.....  
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.....

[6]

[Total: 15]

8 (a) Outline the process by which plants produce carbohydrates.

For  
Examiner's  
Use

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[4]

(b) One carbohydrate plants produce is starch.

Describe how starch is digested in the alimentary canal.  
In your answer, name the regions of the canal where starch is digested, the enzymes produced and their actions.

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[9]

(c) State **two** ways by which the products of this digestion are absorbed by the villi.

1 .....

2 .....

[2]

[Total: 15]

*For  
Examiner's  
Use*



**Section C**

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

Write your answers in the spaces provided.

*For  
Examiner's  
Use*

**9 (a) (i)** State the components of blood.

.....  
.....  
.....  
..... [4]

**(ii)** Outline the functions of each of the components you have stated.

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..... [8]

(b) The flow of blood in the circulatory system is controlled by valves at certain points.

Describe where these valves are located in the circulatory system.

*For  
Examiner's  
Use*

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..... [3]

[Total: 15]

10 (a) (i) Outline the cause of dental decay (dental caries).

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

(ii) Describe how teeth need to be cleaned and cared for in order to prevent dental decay.

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

(b) Sterilisation, antiseptics and disinfectants are used to control the spread of disease.

(i) Define the term *sterilisation* and give an example of its use.

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

(ii) Distinguish between an antiseptic and a disinfectant.

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

(c) Antibiotics are also used to control the spread of disease.

(i) Define an antibiotic and name an example.

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

(ii) The overuse of antibiotics for treating minor infections can have dangerous consequences for people who are treated for very serious infections in the future.

Suggest why.

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..... [3]

[Total: 15]

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