Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

0001578421

BIOLOGY **5090/21**

Paper 2 Theory **May/June 2020**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Section A: answer **all** questions.
- Section B: answer **all** questions.
- Section C: answer **either** Question 8 **or** Question 9.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Blank pages are indicated.

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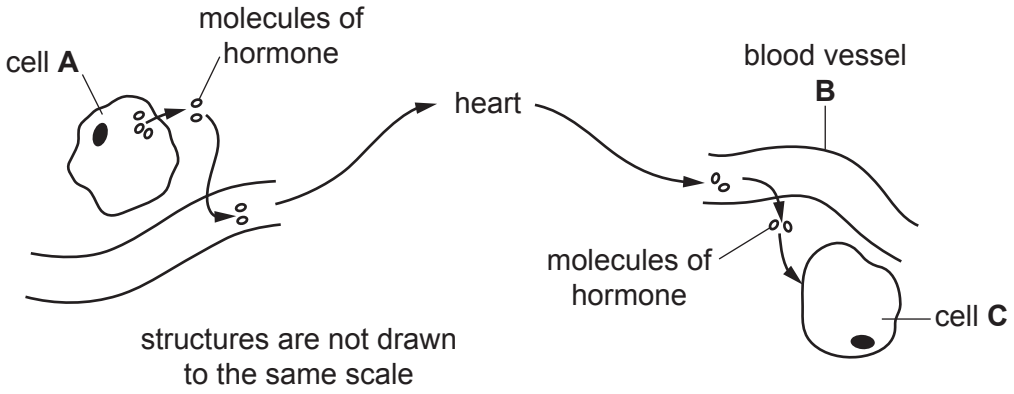
Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 The diagram shows the pathway taken by a hormone from cell **A** where it is produced to cell **C** that it affects.



(a) **(i)** Identify the type of blood vessel **B**. ..... [1]

(ii) Explain the ways in which this type of blood vessel is adapted for the transport of hormone molecules.

.....

.....

.....

.....

..... [4]

(iii) State how molecules of the hormone are transported through blood vessel **B**.

.....

..... [2]

(b) For a **named** hormone, identify the gland containing cell **A**, an organ containing cell **C** and a function or effect of the hormone you have named.

- named hormone .....
- the gland containing cell **A** .....
- an organ containing cell **C** .....
- a function or effect of the named hormone

.....

.....
[4]

(c) Cell **C** is one of a number of similar cells making up an organ.

State the name given to organs affected by hormones.

..... [1]

[Total: 12]

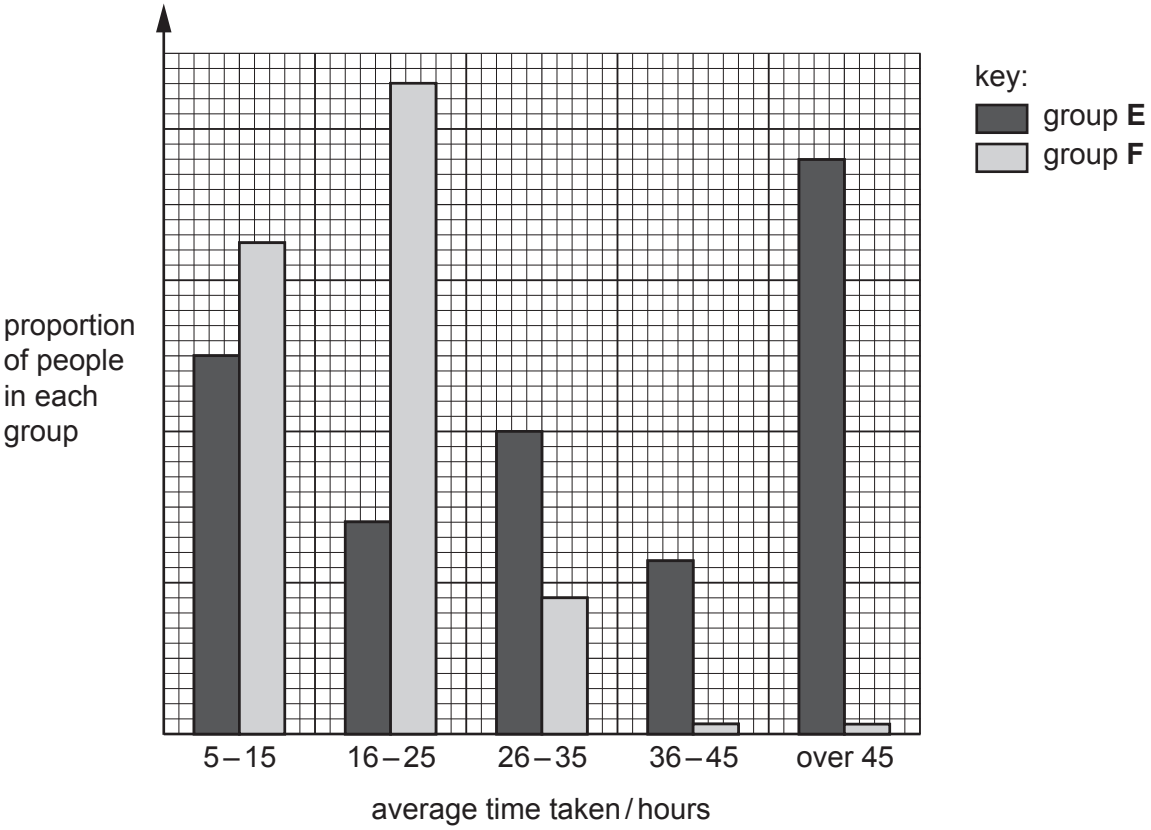
2 **(a)** **(i)** Name a substance in a healthy diet, a lack of which leads to soft bones in a child.

..... [1]

(ii) Name a food that contains this substance.

..... [1]

(b) Two groups of people (**E** and **F**) eat different types of diet. The graph shows the average time taken for food to pass through the alimentary canal for these two groups.



(i) Name the process that causes food to pass through the alimentary canal.

..... [1]

(ii) Suggest how the diets of the two groups of people may be different and give reasons for your answer.

.....

.....

.....

..... [3]

(c) Suggest reasons why it may be a **disadvantage** for food to pass through the alimentary canal too quickly.

.....

.....

..... [2]

[Total: 8]

3 The photograph shows an insect called a leafhopper. When it feeds, its mouthparts penetrate the xylem of the plant on which it lives.

Leafhoppers carry disease-causing bacteria from plant to plant.

(a) **(i)** State the term used for a disease-causing organism.

..... [1]

(ii) State the term used for an animal, such as an insect, that carries disease-causing organisms.

..... [1]

(b) The bacteria carried by the leafhopper reproduce inside the plant stem and block the xylem.

(i) Suggest and explain why this can cause the leaves of the plant to wilt.

.....

.....

.....

..... [4]

(ii) The leaves of plants affected by these bacteria may also develop white patches. Suggest reasons for this.

.....

.....

..... [2]

(iii) Suggest an explanation for the fact that the fruits of plants affected by these bacteria are small and poorly developed.

.....

.....

.....

.....

..... [4]

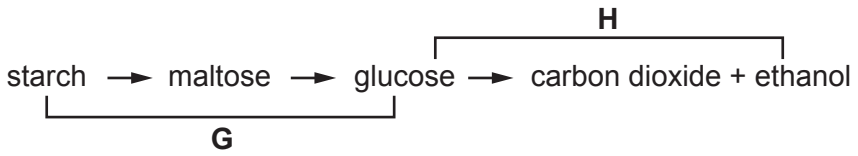
[Total: 12]

4 **(a)** Explain the importance of the production of carbon dioxide in bread-making.

.....

..... [1]

(b) The diagram shows a flow chart for some of the chemical reactions that occur during bread-making.



Name the processes occurring at **G** and **H**.

G .....

H .....

[3]

(c) Explain what is causing the changes at **G**.

.....

.....

..... [3]

(d) **(i)** State the name of the microorganism used in bread-making and the group of organisms to which it belongs.

name .....

group .....

[2]

(ii) State **two** characteristics of organisms in this group.

1 .....

2 .....

[2]

[Total: 11]

5 **(a)** The passage describes the nucleus of a cell with missing words replaced by the letters **J**, **K**, **L** and **M**. Read the passage, then select words from the list below the passage to replace letters **J**, **K**, **L** and **M**.

> In the nucleus of a body cell from a person with Down's syndrome, there are **J** thread-like structures called **K**. These are made up of many units called **L** that instruct the cell to produce a particular **M**.

carbohydrate	**chromosomes**	**DNA**
fat	**forty-seven**	**genes**
protein	**twenty-four**	**twenty-three**

J .....

K .....

L .....

M .....

[4]

(b) When suddenly exposed to bright light, some people automatically sneeze. This is known as the photic sneeze reflex.

The photic sneeze reflex is the result of the possession of a dominant allele **A**. Use a genetic diagram to show how parents, both with the photic sneeze reflex, can have a child who is **not** affected by the photic sneeze reflex.

[3]

[Total: 7]

Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

6 **(a)** Suggest why a car driver who is driving under the influence of alcohol or heroin is more likely to have an accident than a driver who is free of these drugs.

.....

.....

.....

..... [3]

(b) Describe other harmful effects of these drugs on people who use them for long periods of time.

alcohol .....

.....

.....

.....

.....

heroin .....

.....

.....

.....

.....

[7]

[Total: 10]

7 **(a)** Describe how changes in gene structure may be caused.

.....

.....

.....

..... [3]

(b) Explain how changes in gene structure may eventually lead to the evolution of a species.

.....

.....

.....

.....

.....

.....

.....

..... [7]

[Total: 10]

Section C

Answer **either** Question 8 **or** Question 9.

Write your answers in the spaces provided.

8 **(a)** List the structures within a plant leaf that **do not** possess chloroplasts.

.....

.....

.....

..... [4]

(b) Explain the importance to a plant of

(i) guard cells

.....

.....

.....

.....

..... [4]

(ii) root hair cells.

.....

.....

..... [2]

[Total: 10]

9 **(a)** Describe the similarities and differences in the **functions** of a motor and a sensory neurone.

similarities .....

.....

.....

differences .....

.....

.....
[5]

(b) Describe the functions of the following parts of the brain.

(i) the cerebrum

.....

.....

.....

.....

..... [3]

(ii) the hypothalamus

.....

.....

.....

..... [2]

[Total: 10]

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