Cambridge Assessment International Education

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BIOLOGY **0610/31**

Paper 3 Theory (Core) **May/June 2023**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- 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 **20** pages. Any blank pages are indicated.

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1 **(a)** Describe the meaning of the term species.

View solution

.....

.....

..... [2]

(b) Fig. 1.1 is a photograph of *Lithobius forficatus*, a species of myriapod.

View solution



Fig. 1.1

(i) State the genus of the organism shown in Fig. 1.1.

..... [1]

(ii) State **one** feature **visible** in Fig. 1.1 that identifies the organism as:

a myriapod .....

an arthropod. .....
[2]

(iii) State the names of **two** groups of arthropods, other than myriapods.

1 .....

2 .....
[2]

(iv) State **two** features of plant cells that would be **absent** in the cells of the organism shown in Fig. 1.1.

1 .....

2 .....
[2]

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(c) Adaptive features enable organisms to survive in their environment.

Fig. 1.2 is a photograph of another species of arthropod. Some of its adaptive features are visible in Fig. 1.2.

View solution



Fig. 1.2

(i) State **one** adaptive feature visible in Fig. 1.2 that reduces water loss when the organism is on land.

..... [1]

(ii) State the name of the kingdom that the organism in Fig. 1.2 belongs to.

..... [1]

[Total: 11]

View solution

2 **(a)** Fig. 2.1 is a diagram of a human tooth.

View solution

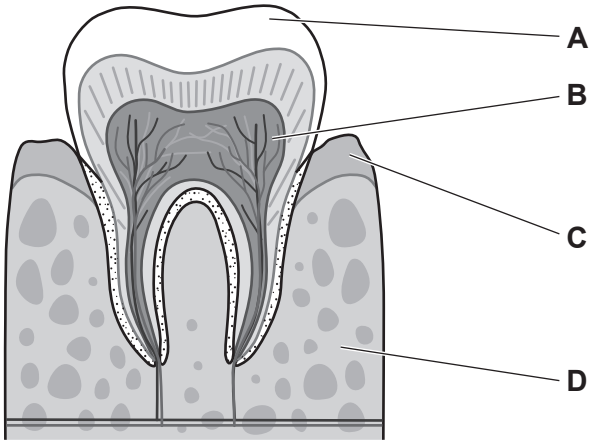

Fig. 2.1

The boxes on the left contain the letters identifying the parts in Fig. 2.1.

The boxes on the right contain the names of some parts shown in Fig. 2.1.

Draw lines to link each letter to its correct name.

Draw **four** lines.

letter in Fig. 2.1	**name**
	bone
A	
	dentine
B	
	enamel
C	
	gum
D	
	pulp

[4]

(b) Complete the sentences to describe the role of teeth in digestion.

View solution

The teeth are needed for ..... digestion.

They break down food into smaller ..... .

This increases the ..... area of the food for the action of biological catalysts called ..... .

These biological catalysts are needed for ..... digestion.

[5]

(c) State the names of **two** different types of human teeth.

View solution

1 .....

2 .....

[2]

[Total: 11]

3 Fig. 3.1 is a photomicrograph of a sample of human blood.

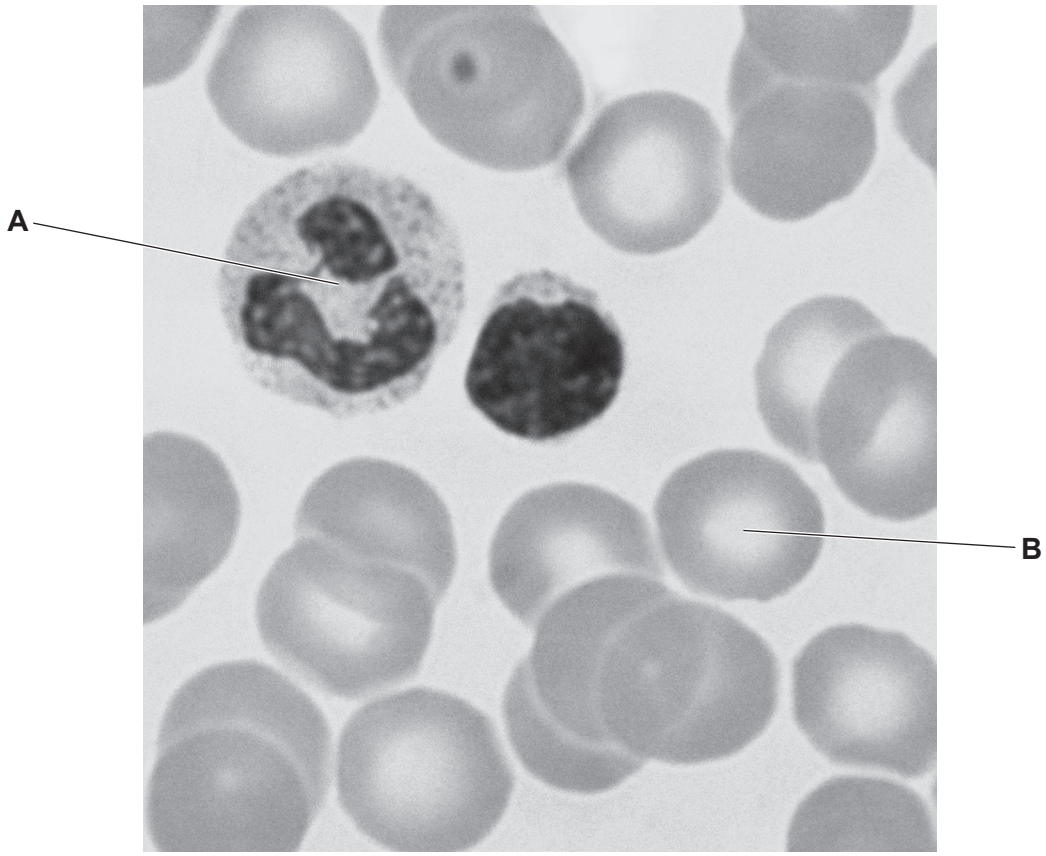

Fig. 3.1

(a) Identify and describe the functions of the cells labelled **A and B** in Fig. 3.1.

View solution

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) Describe how platelets in the blood prevent disease.

View solution

.....

.....

.....

.....

..... [2]

(c) Blood plasma transports many substances including excretory products and hormones.

View solution

(i) Circle the names of **two** excretory products in humans.

amino acids **cellulose** **carbon dioxide** **glucose**

lipase **oxygen** **urea**

[2]

(ii) State the names of **two** hormones that are produced by the reproductive organs.

View solution

1 .....

2 .....

[2]

[Total: 10]

4 **(a)** Fig. 4.1 is a diagram of a cross-section of a root.

View solution

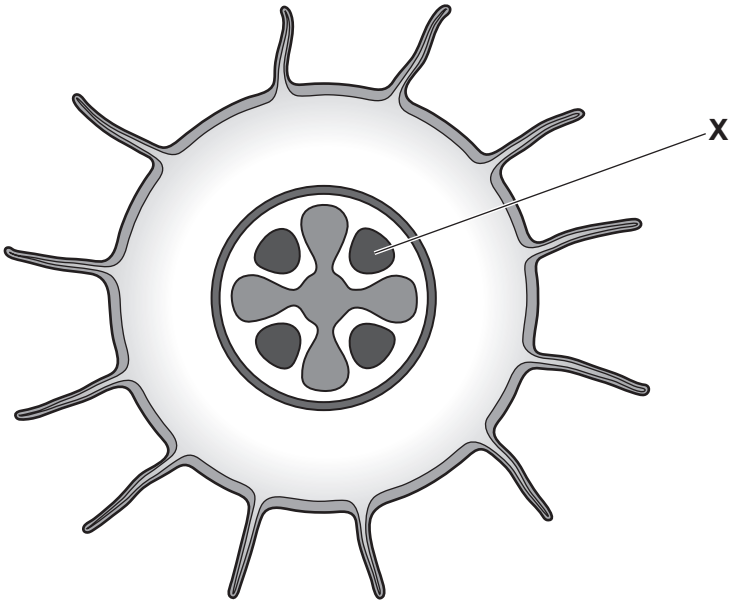

Fig. 4.1

(i) (Circle) **two** substances transported by the part labelled **X** in Fig. 4.1.

amino acids **cellulose** **fatty acids** **glucose**

glycogen **starch** **sucrose**

[2]

(ii) Label the part of the root in Fig. 4.1 that absorbs mineral ions from the soil with a label line and the correct name. [2]

(b) Mineral ions are absorbed by active transport and are transported with water in the xylem.

View solution

(i) Describe what is meant by the term active transport.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) State **one** function of xylem other than transport.

View solution

..... [1]

(c) Transpiration is the loss of water vapour from leaves.

View solution

State **two** environmental factors that affect the rate of transpiration.

1 .....

2 .....

[2]

[Total: 10]

5 Fig. 5.1 shows a pyramid of numbers for a food chain.

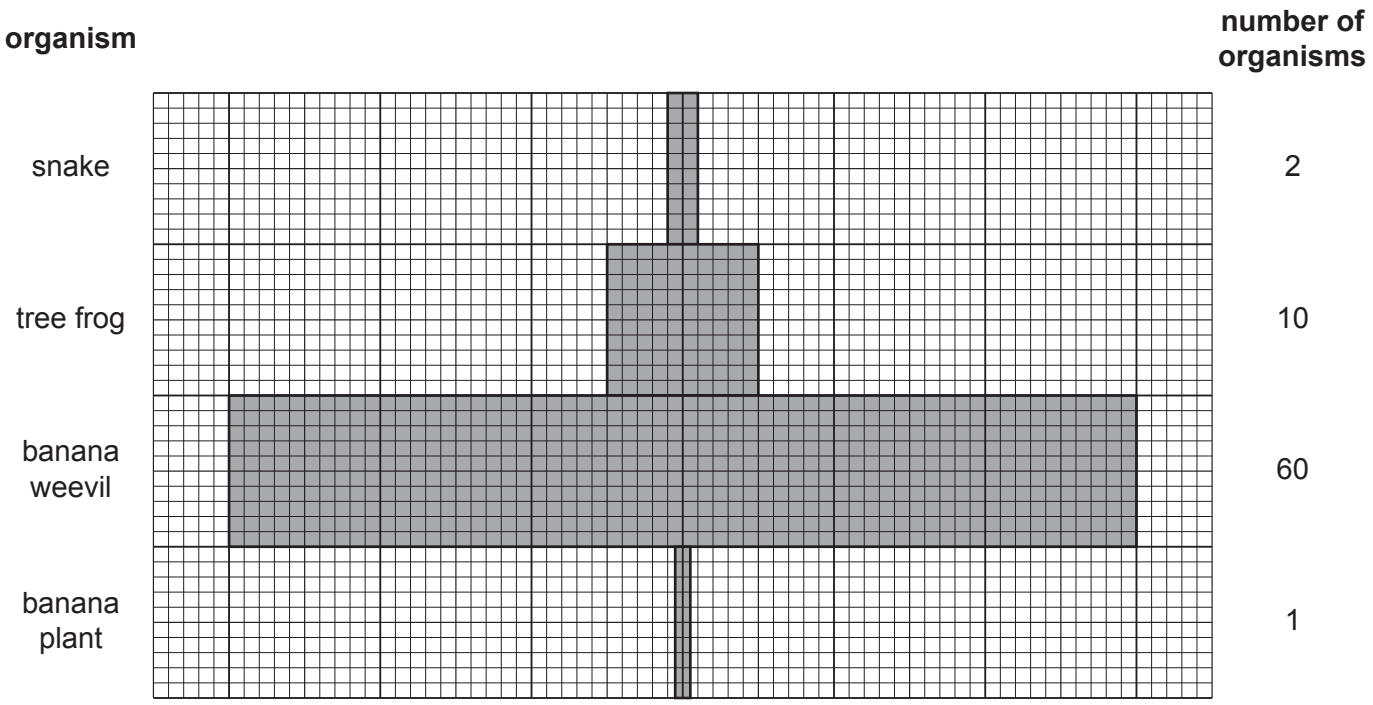

Fig. 5.1

(a) Write the food chain for the pyramid of numbers shown in Fig. 5.1.

View solution

..... [2]

(b) Identify the number of trophic levels in Fig. 5.1.

View solution

..... [1]

(c) The words in the list can be used to describe the organisms shown in Fig. 5.1.

View solution

carnivore **consumer** **decomposer** **herbivore** **producer**

Choose words from the list to describe the:

banana plant .....

tree frog ..... and ..... .

[3]

(d) State **one** advantage of using a pyramid of biomass rather than a pyramid of numbers.

View solution

.....

.....

..... [1]

(e) Describe how plants synthesise carbohydrates.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

View solution

6 **(a)** Fig. 6.1 is a graph that shows the concentration of dissolved oxygen in the water at increasing distances along a river.

View solution

Untreated sewage is released into the river. This is marked on the graph in Fig. 6.1.

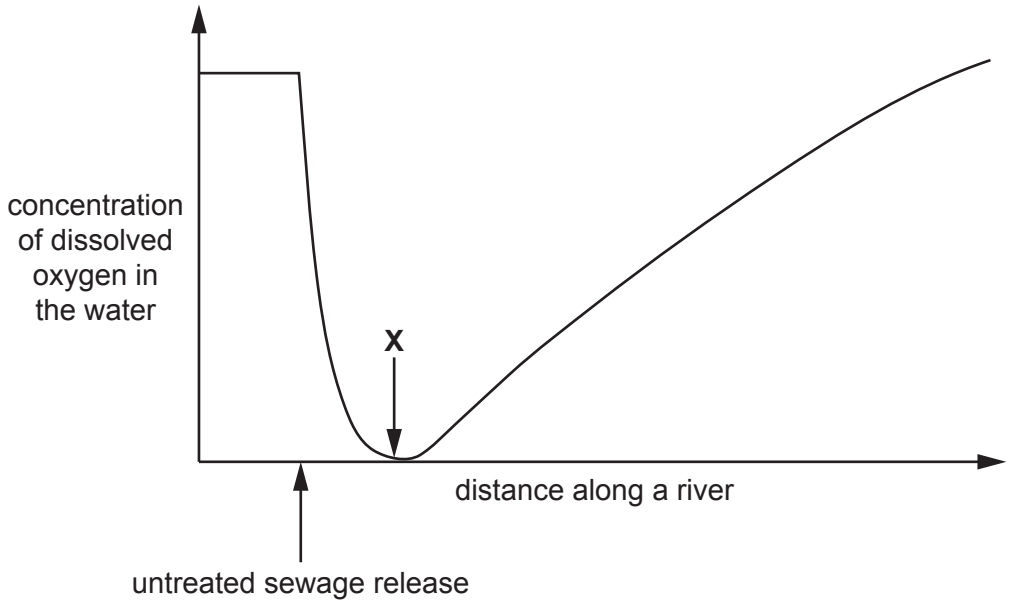

Fig. 6.1

(i) Describe the results shown in Fig. 6.1.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) Predict **and** explain the effect on the organisms in the river of the dissolved oxygen concentration at **X** in Fig. 6.1.

.....

.....

.....

.....

..... [2]

(b) Describe why it is important for humans that sewage is treated before entering rivers.

.....

.....

..... [1]

(c) Pollution can cause organisms to become extinct.

View solution

State **three** other factors that can cause extinction.

1 .....

2 .....

3 .....

[3]

[Total: 9]

7 **(a)** Fig. 7.1 is a diagram showing some of the organs in the human body.

View solution

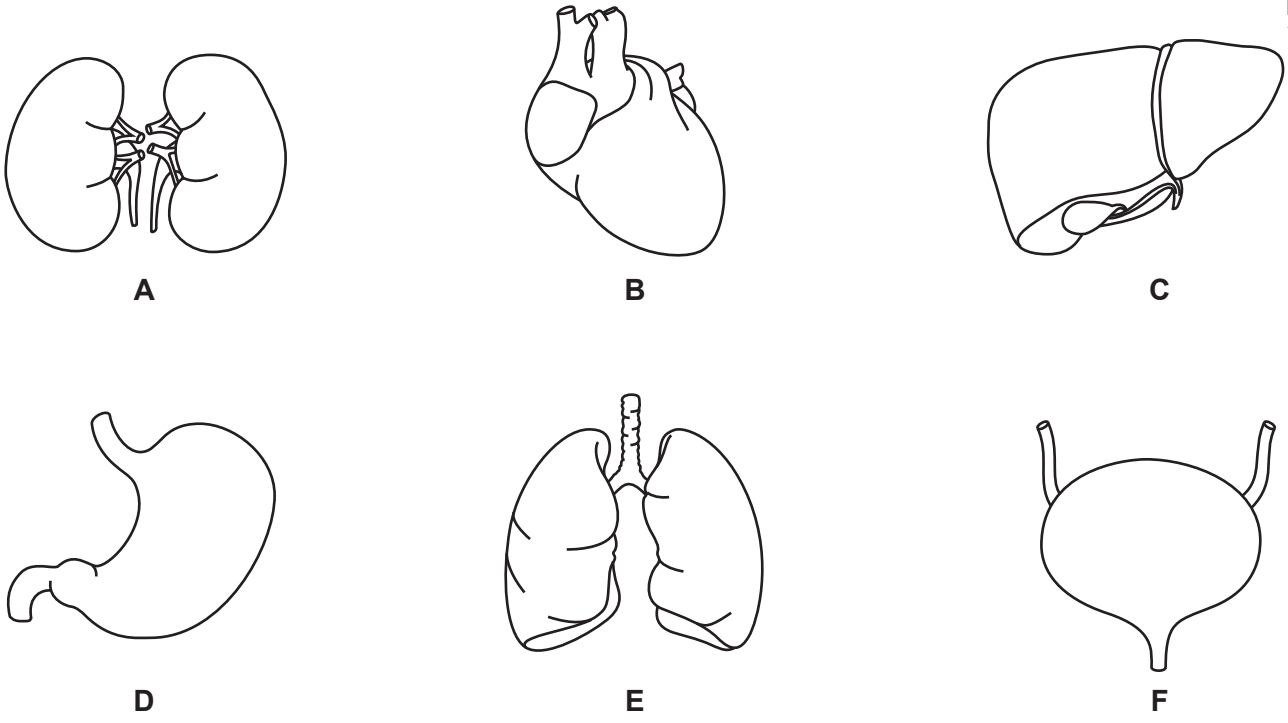

Fig. 7.1

Table 7.1 shows the names of some of the organs in Fig. 7.1, the identifying letters of some of these organs and their functions.

Complete Table 7.1.

Table 7.1

name	letter in Fig. 7.1	function
		excretes carbon dioxide from the body
heart	**B**	
	F	stores urine
		excretes urea, excess water and ions

[6]

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(b) State the names of **two** organs from the human female reproductive system.

View solution

1 .....

2 .....

[2]

(c) Excretion and reproduction are two characteristics of all living organisms.

View solution

Place ticks (✓) in **two** boxes to show other characteristics of all living organisms.

breathing	
eating	
growing	
moving	
sleeping	
talking	

[2]

[Total: 10]

8 **(a)** Fig. 8.1 is a diagram representing a reflex action.

When the knee is tapped with a small rubber hammer, the leg will immediately straighten.

View solution

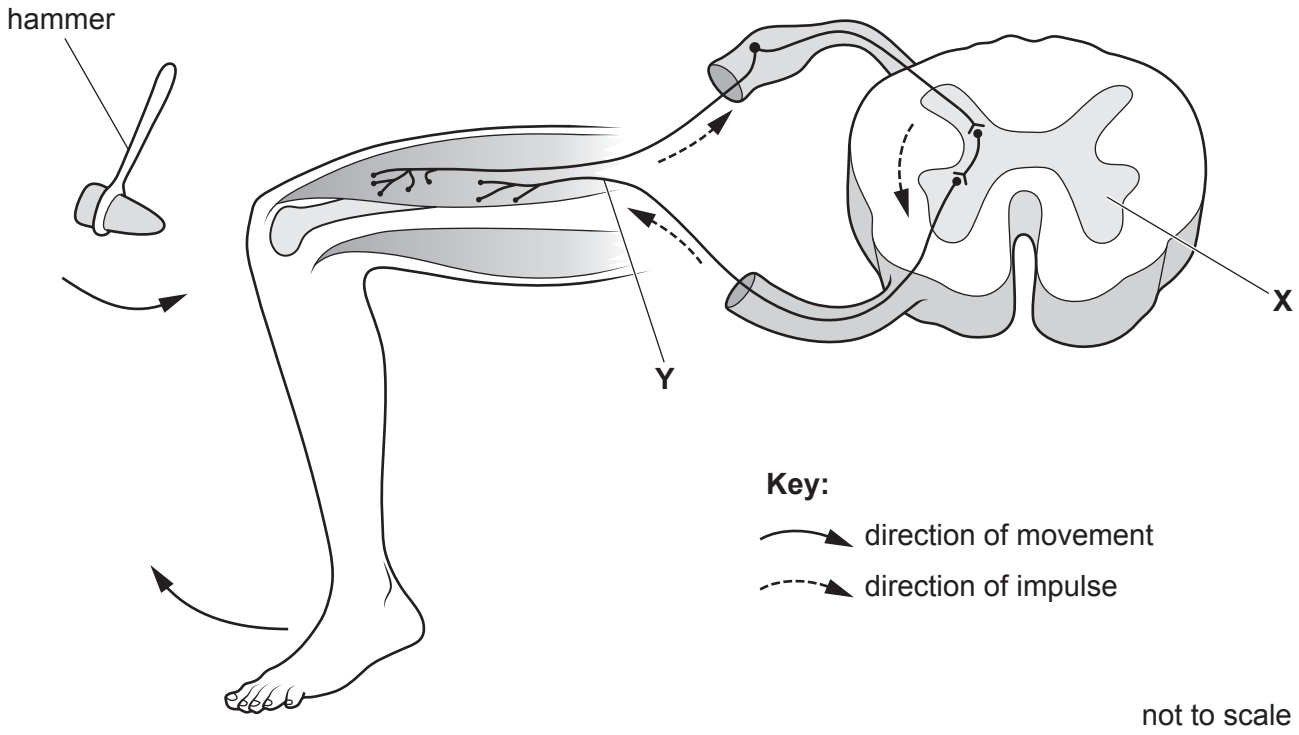

Fig. 8.1

(i) Identify the parts labelled **X** and **Y** in Fig. 8.1.

X .....

Y .....

[2]

(ii) State the name of the effector in the example shown in Fig. 8.1.

..... [1]

(iii) Describe the stimulus in the example shown in Fig. 8.1.

.....

.....

..... [1]

(iv) State **two** features of reflex actions.

1 .....

2 .....

[2]

(b) The shortest neurones in the human body are 0.0004 mm.

The longest neurones are 1.5 m.

Calculate how many times longer the longest neurones are than the shortest.

Space for working.

View solution

.....
[2]

(c) State the name given to the junction between neurones.

..... [1]

[Total: 9]

View solution

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