A

AQA

Surname _____

Forename(s) _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

Level 3 Certificate/Extended Certificate

APPLIED SCIENCE

Unit 1 Key Concepts in Science

Section A – Biology

ASC1/B

Tuesday 17 January 2023 Morning

At the top of the page, write your surname and forename(s), your centre number, your candidate number and add your signature.

[Turn over]

Time allowed: 1 hour 30 minutes. You are advised to spend approximately 30 minutes on this section.

MATERIALS

For this paper you must have:

- **a calculator**
- **the Formulae Sheet (enclosed).**

INSTRUCTIONS

- **Use black ink or black ball-point pen.**
- **Answer ALL questions in each section.**
- **You must answer the questions in the spaces provided. Do not write on blank pages.**
- **If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).**

- **Do all rough work in this book. Cross through any work you do not want to be marked.**

INFORMATION

- **You will be provided with a copy of the Formulae Sheet.**
- **There are three sections in this paper:**
  SECTION A – Biology
  SECTION B – Chemistry
  SECTION C – Physics.
- **The marks for questions are shown in brackets.**
- **The maximum mark for this paper is 60 and the maximum mark for this section is 20.**

ADVICE

Read each question carefully.

DO NOT TURN OVER UNTIL TOLD TO DO SO

SECTION A – BIOLOGY

Answer ALL the questions in this section.

0 1

All living organisms are made of cells.

FIGURE 1 and FIGURE 2, on page 6, show part of two different types of cell.

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[Turn over]

FIGURE 1

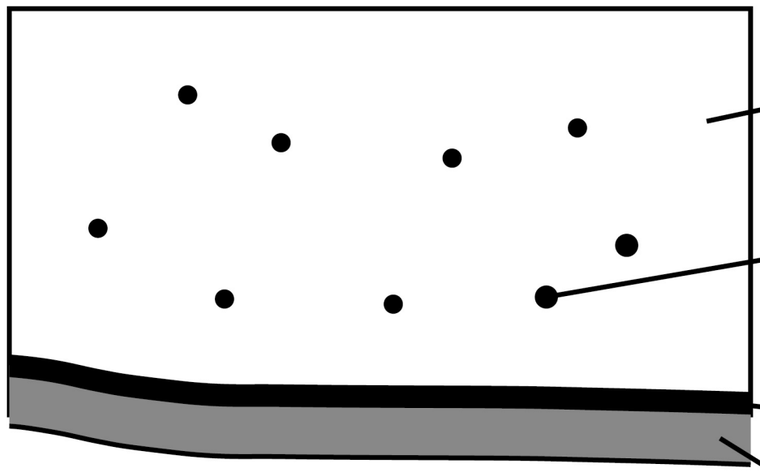
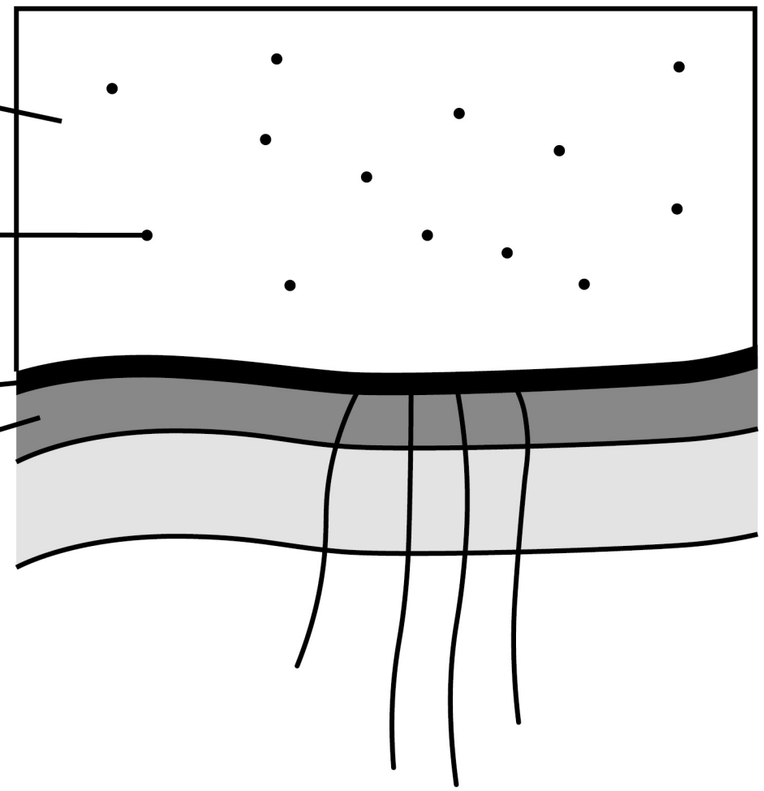


FIGURE 2



0 7

0 1 . 1

The cell in FIGURE 1 is a eukaryotic cell.

Name parts A, B and C in FIGURE 1. [3 marks]

A _____

B _____

C _____

7

REPEAT OF FIGURE 1 AND FIGURE 2

FIGURE 1

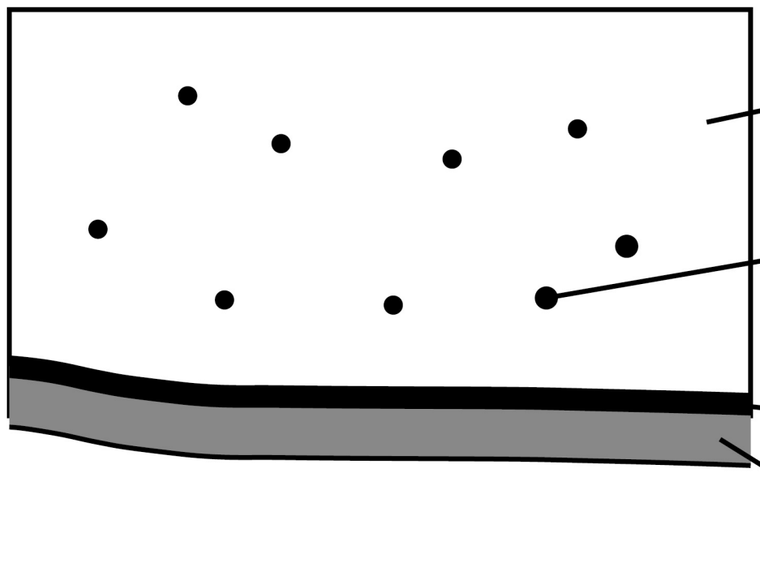
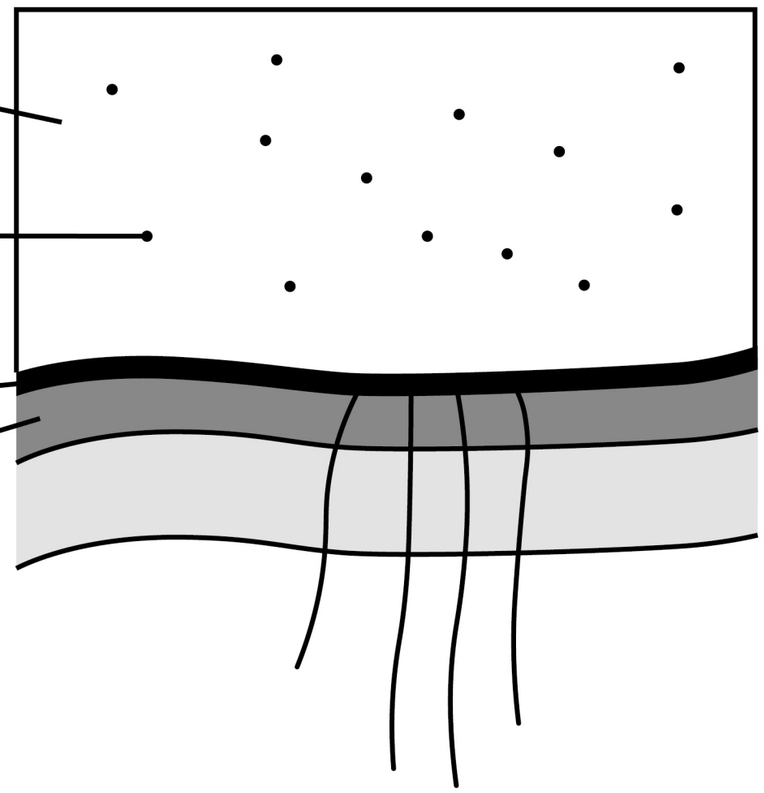


FIGURE 2



0 1 . 2

What type of cell is shown in FIGURE 2? [1 mark]

0 6

0 1 . 3

What evidence is shown in FIGURE 2 to support your answer to Question 01.2? [2 marks]

6

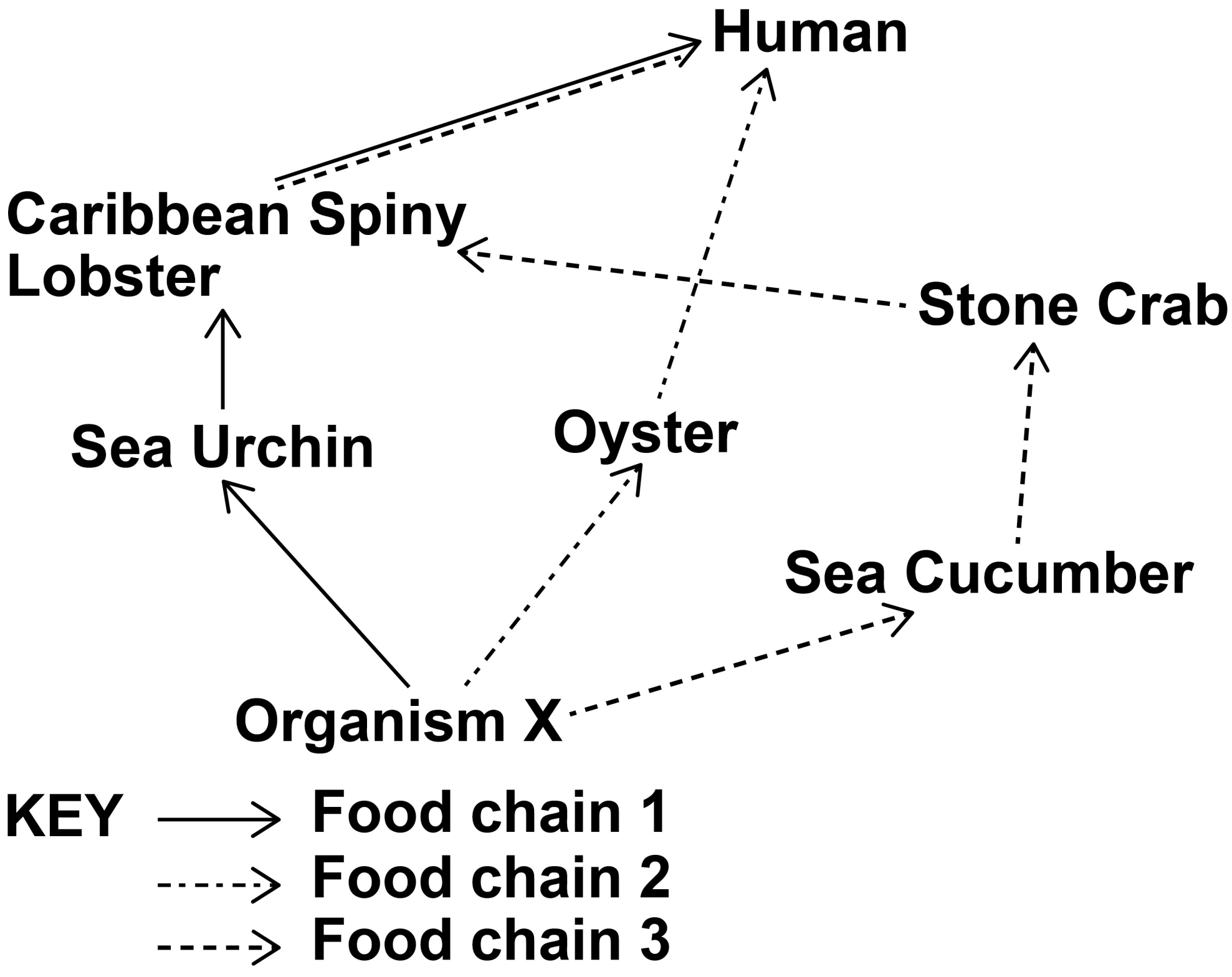
0 2

FIGURE 3, on the opposite page, shows part of a marine ecosystem food web.

0 2 . 1

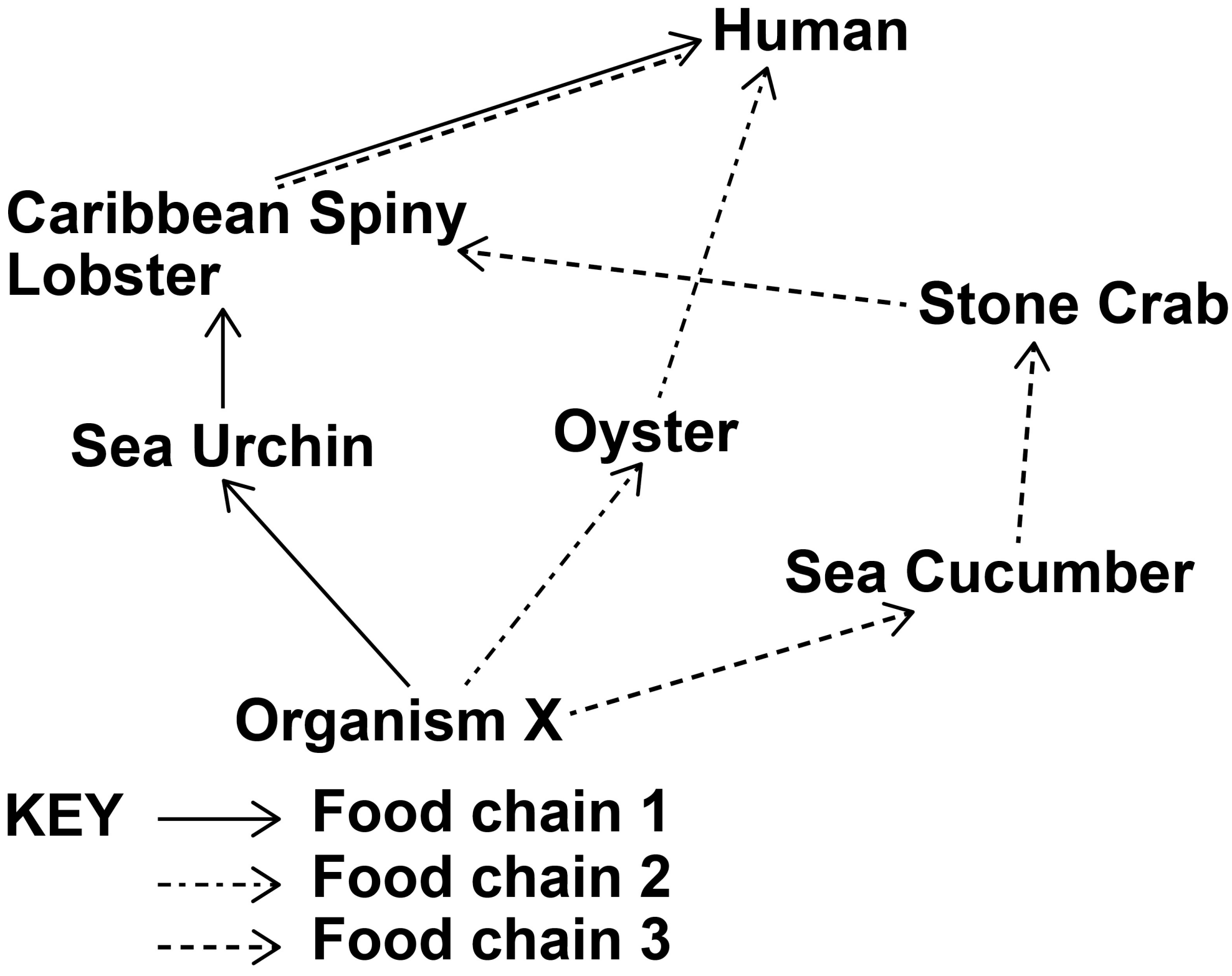
What type of organism is Organism X? [1 mark]

FIGURE 3



[Turn over]

REPEAT OF FIGURE 3



0 2 . 2

Three different food chains are shown in FIGURE 3.

Which is the most efficient food chain for human food production from FIGURE 3?

Give TWO reasons for your answer.
[3 marks]

Food chain _____

_____

_____

Reason 1 _____

_____

_____

Reason 2 _____

_____

_____

0 2 . 3

Which factor transfers energy out of food chains and reduces productivity?
[1 mark]

Tick (✓) ONE box.

- ☐ **Availability of space**
- ☐ **Excretion**
- ☐ **Light intensity**
- ☐ **Nutrient concentration**

0 2 . 4

What does ‘net primary production (NPP)’ mean? [1 mark]

_____

_____

_____

6

0 3

One function of the kidneys is to help keep the concentration of water and salts in our blood at the correct level.

The brain monitors the concentration of the blood.

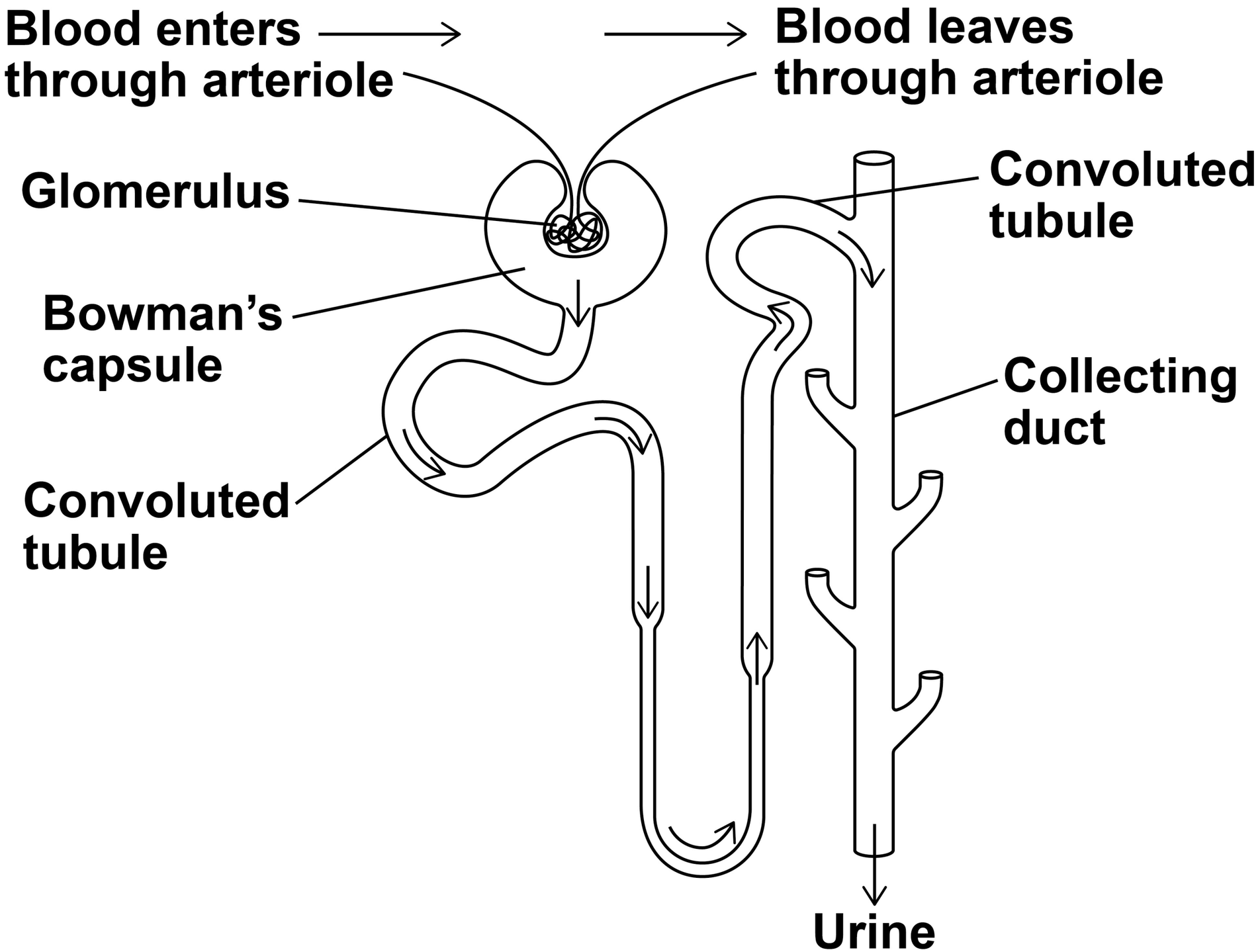
0 3 . 1

Which part of the brain monitors the concentration of the blood? [1 mark]

FIGURE 4, on page 18, shows the structure of a kidney nephron.

[Turn over]

FIGURE 4


Blood enters through arteriole
Blood leaves through arteriole
Glomerulus
Bowman's capsule
Convoluted tubule
Convoluted tubule
Collecting duct
Urine

0 3 . 2

Describe the function of the Bowman's capsule and the convoluted tubules. [2 marks]

Bowman's capsule _____

_____

Convoluted tubules _____

_____

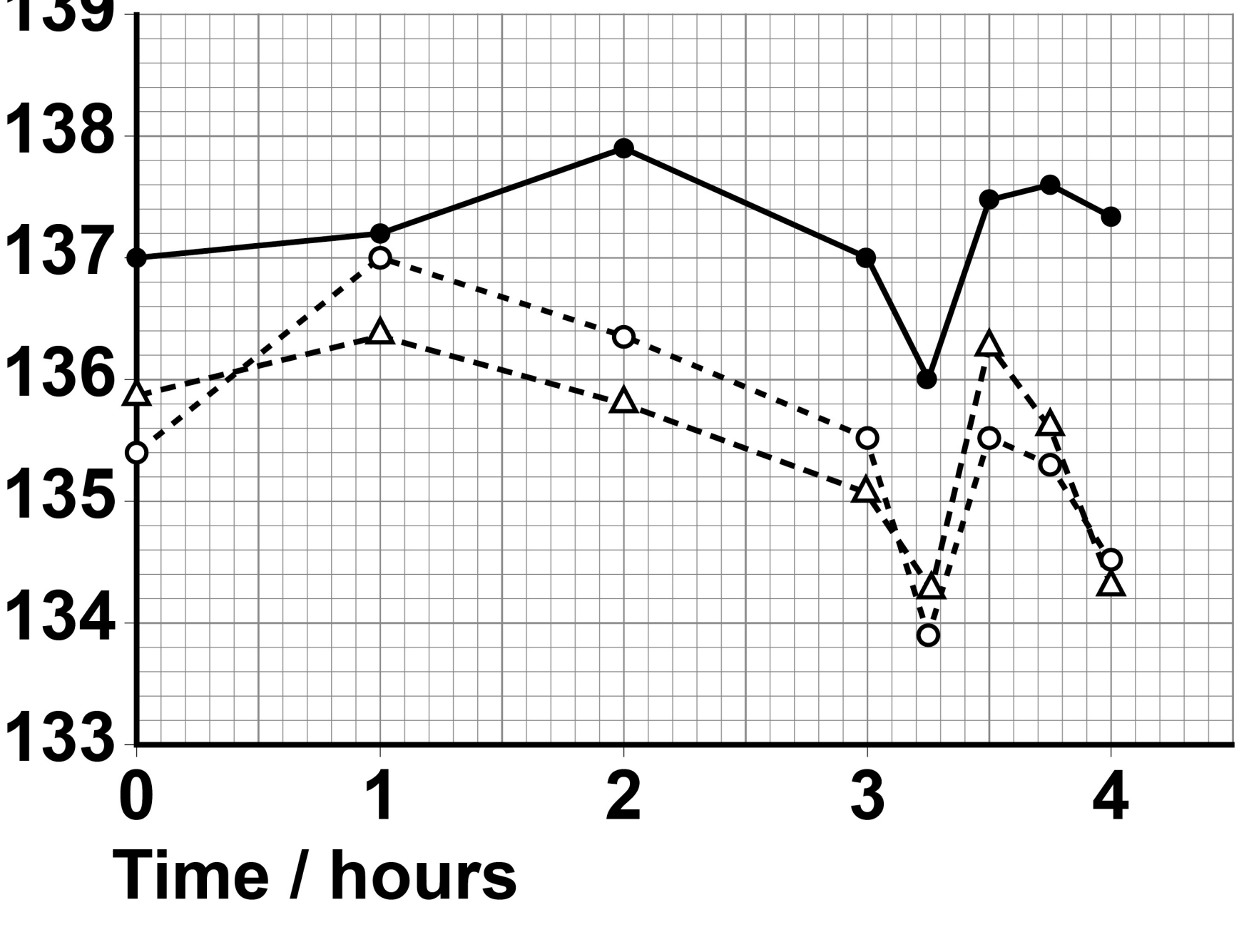
Scientists investigated the concentration of sodium ions in the blood of three athletes during exercise.

Each athlete completed the same exercise.

Each athlete drank a different drink during the exercise.

FIGURE 5, on the opposite page, shows the results.

FIGURE 5



[Turn over]

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0 3 . 3

Normal sodium ion concentration in the blood is between 135 mmol dm^{-3} and 145 mmol dm^{-3}.

Give TWO conclusions about the effectiveness of the different drinks in maintaining a healthy concentration of sodium ions in the blood. [2 marks]

1 _____

_____

_____

2 _____

_____

0 3 . 4

The adrenal cortex is on the top of each kidney.

Explain how the adrenal cortex causes the concentration of sodium ions in the blood to increase. [3 marks]

END OF QUESTIONS

8

Additional page, if required.

Write the question numbers in the left-hand margin.

Additional page, if required.

Write the question numbers in the left-hand margin.

Additional page, if required.

Write the question numbers in the left-hand margin.

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For Examiner's Use	
Question	Mark
1	
2	
3	
TOTAL	