



Surname _____

Forename(s) _____

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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
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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]



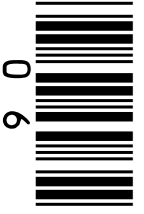
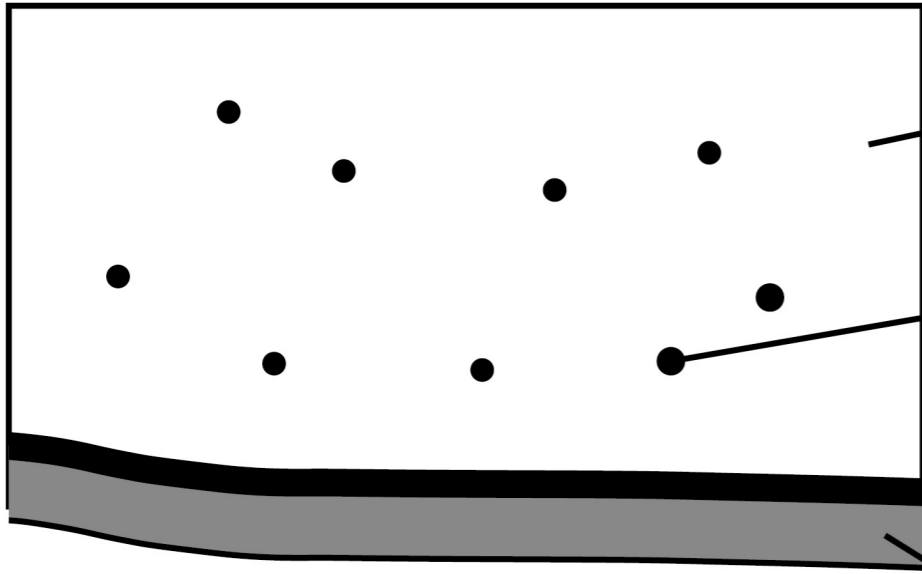


FIGURE 1



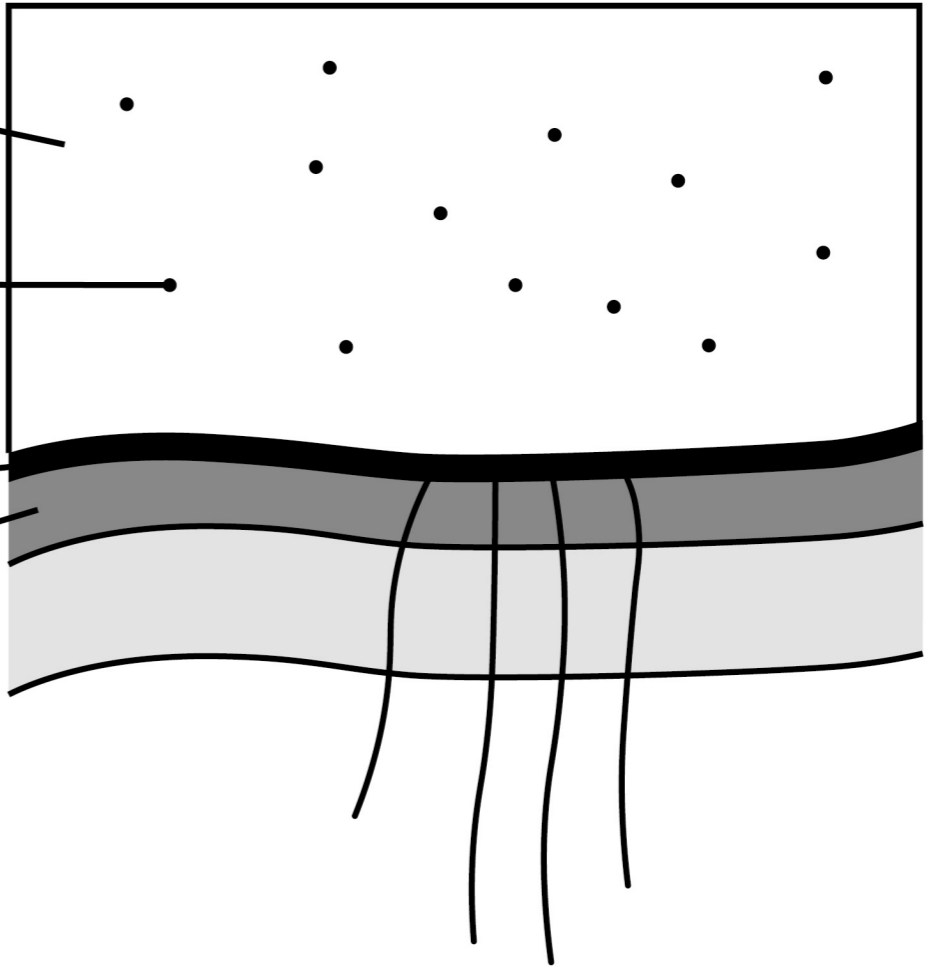
Cytoplasm

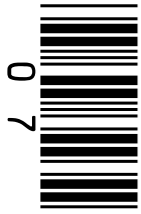
A

B

C

FIGURE 2





01.1

The cell in FIGURE 1 is a eukaryotic cell.

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

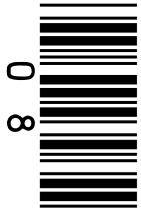
A

B

C

7

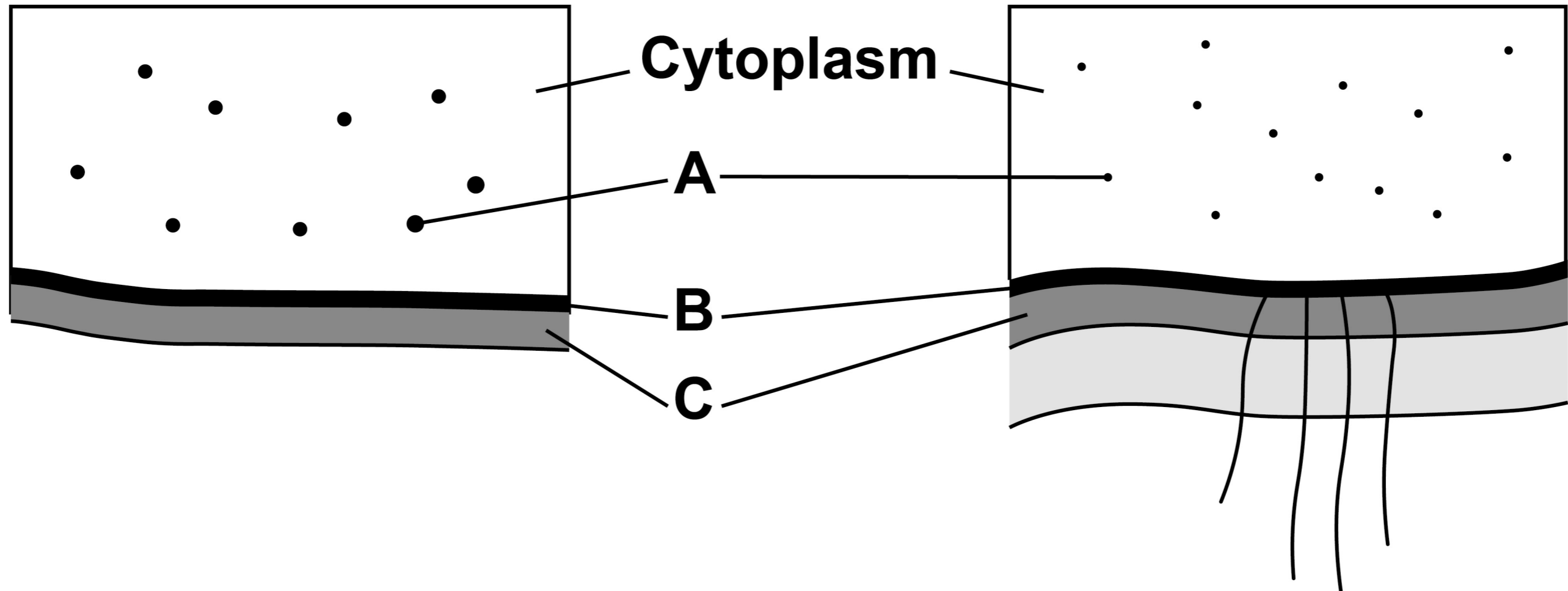
[Turn over]



REPEAT OF FIGURE 1 AND FIGURE 2

FIGURE 1

FIGURE 2

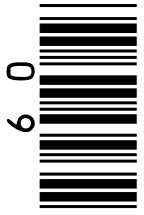


8

0 1 . 2

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





0 1 . 3

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

6

[Turn over]

6

0	2
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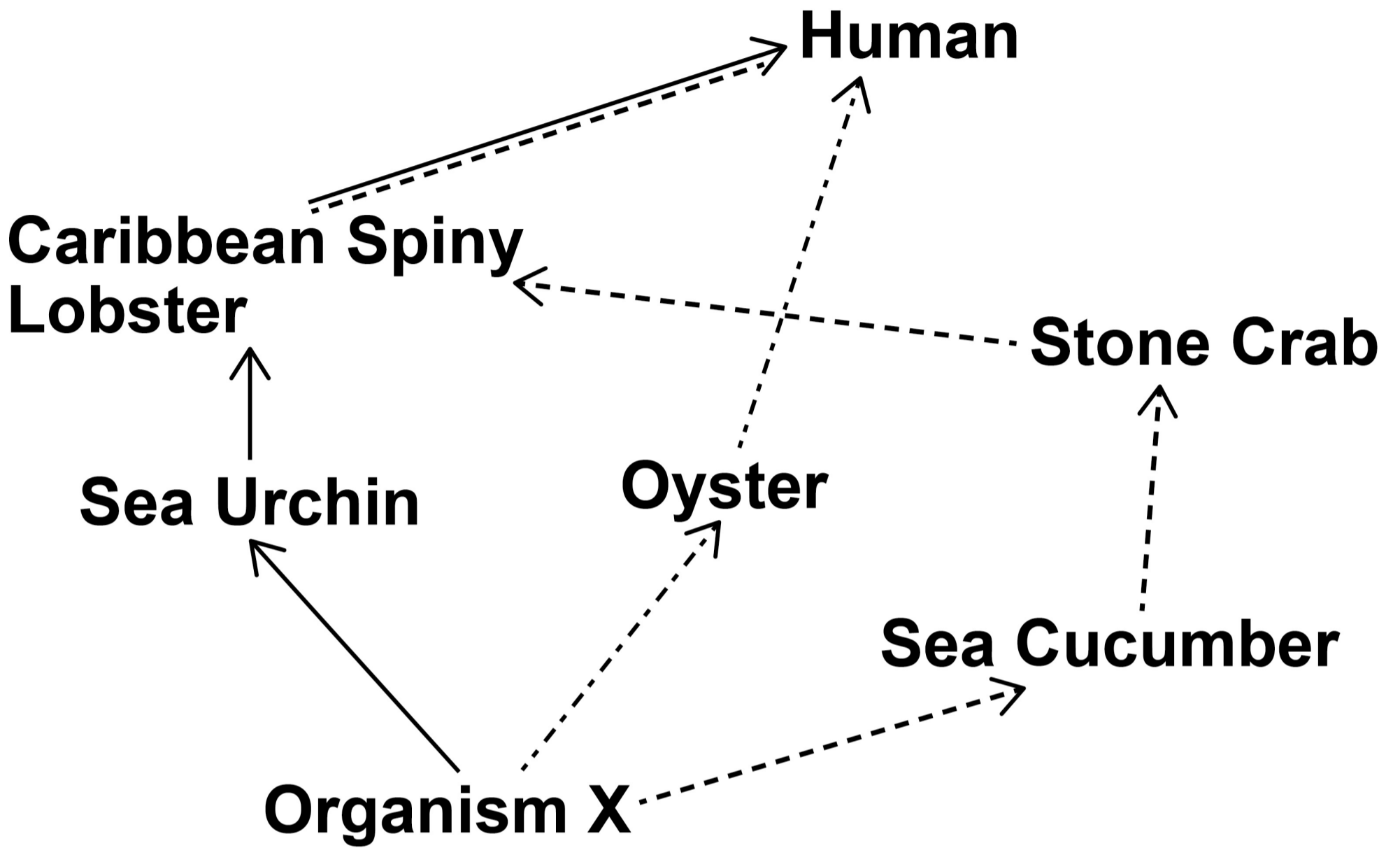
FIGURE 3, on the opposite page, shows part of a marine ecosystem food web.

0	2	.	1
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What type of organism is Organism X?
[1 mark]



FIGURE 3

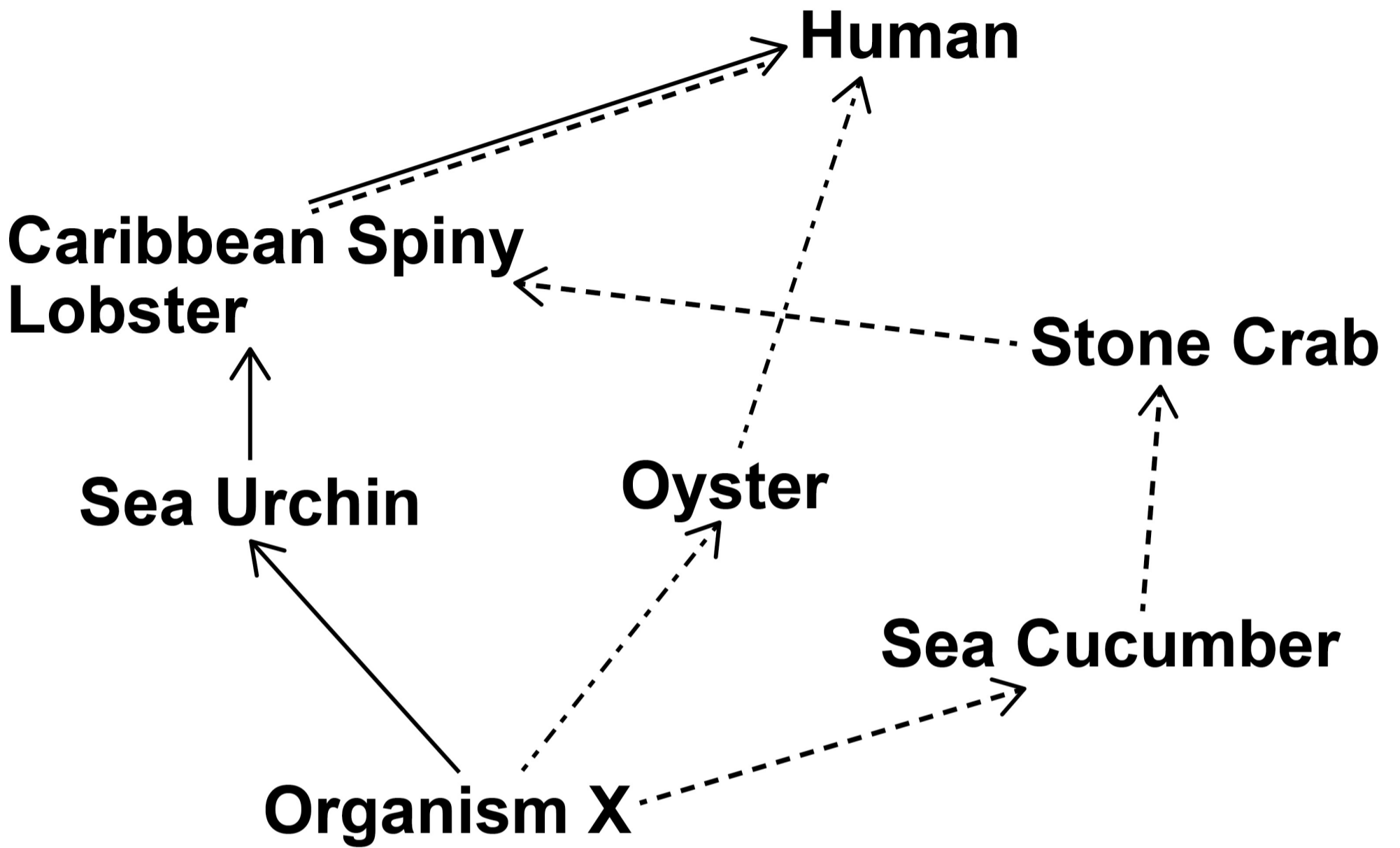


KEY ———> **Food chain 1**
 - - - -> **Food chain 2**
 > **Food chain 3**

[Turn over]



REPEAT OF FIGURE 3



KEY ———> **Food chain 1**
 - - - -> **Food chain 2**
 · · · · ·> **Food chain 3**



02.2

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 _____

[Turn over]



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]

[Turn over]

6



0	3
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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
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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]



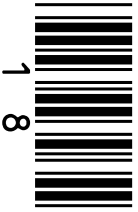


FIGURE 4

Blood enters through arteriole →

→ **Blood leaves through arteriole**

Glomerulus

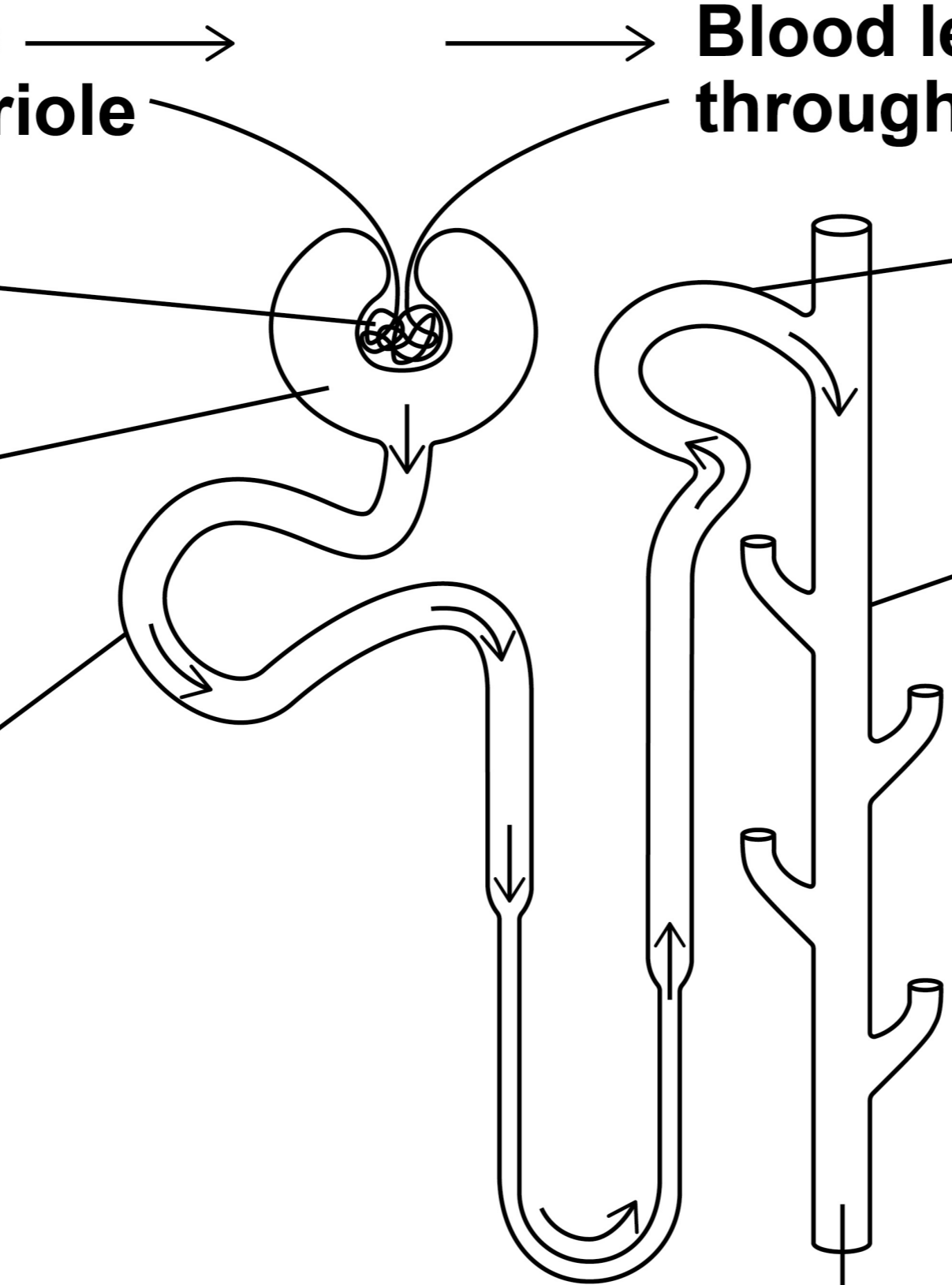
Bowman's capsule

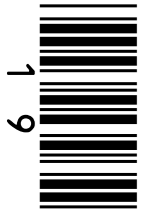
Convolutated tubule

Convolutated 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 _____

[Turn over]

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

Each athlete completed the same exercise.

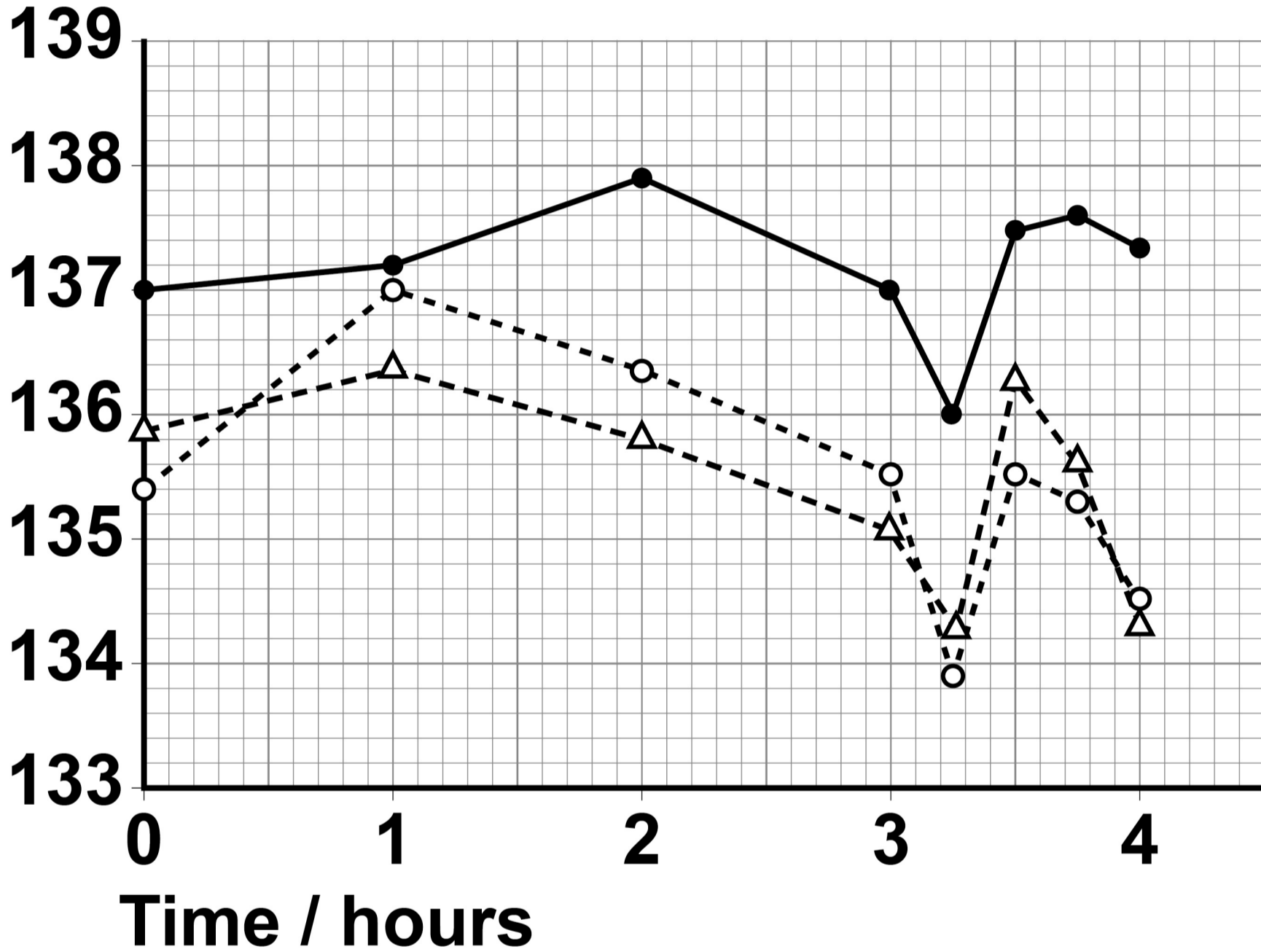
Each athlete drank a different drink during the exercise.

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



FIGURE 5

**Sodium ion
concentration in
blood / mmol dm^{-3}**

**KEY**

- Athlete 1 – sports drink containing sodium ions
- Athlete 2 – mineral water
- △--- Athlete 3 – distilled water

[Turn over]



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0	3	.	3
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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 _____

[Turn over]



03.4

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.

A series of horizontal lines for writing, with a vertical line on the left side defining a margin.



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For Examiner's Use	
Question	Mark
1	
2	
3	
TOTAL	

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2 8



2 3 1 A A S C 1 / B