Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/21**

Paper 2 Multiple Choice (Extended) **May/June 2017**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

* 0 1 9 0 0 7 0 9 4 6 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **15** printed pages and **1** blank page.

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1 Which characteristic do **all** living organisms show?

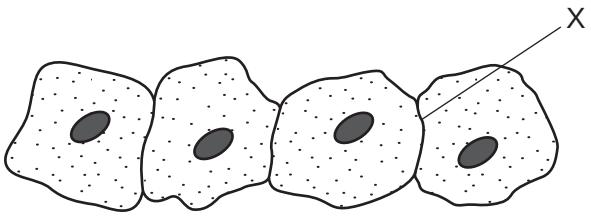
A breathing

B excretion

C photosynthesis

D tropism

2 The diagram shows some animal cells, as seen under the microscope.



What will be present at X?

A one cell membrane

B one cell wall

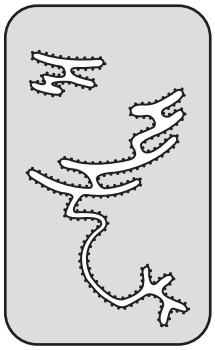
C two cell membranes

D two cell walls

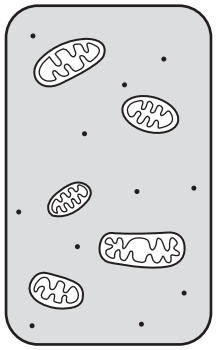
3 Each of the diagrams shows an area of cytoplasm.

Which is from a prokaryote?

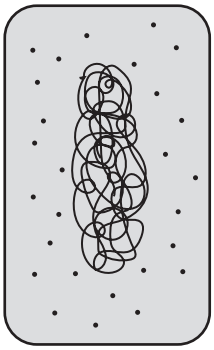
A



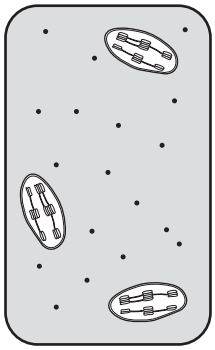
B



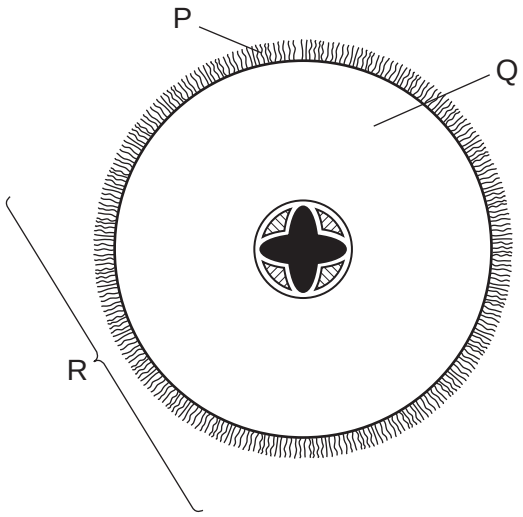
C



D



4 The diagram shows a section through a root.



What are the levels of organisation of the labelled structures?

	cell	organ	tissue
A	P	Q	R
B	P	R	Q
C	Q	R	P
D	R	Q	P

5 Which characteristics are correct for **both** osmosis and diffusion?

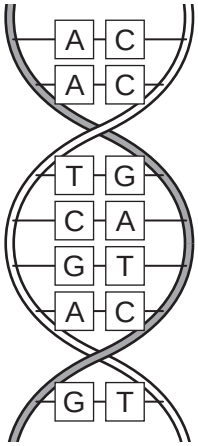
	require a partially permeable membrane	require a concentration gradient	are energy consuming processes
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

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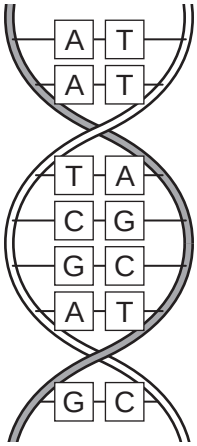
[Turn over

6 Which diagram shows the structure of DNA?

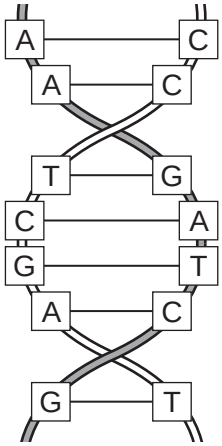
A



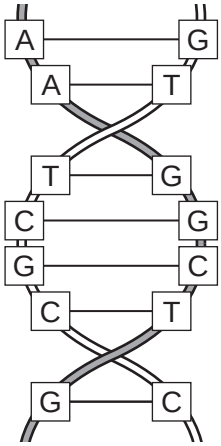
B



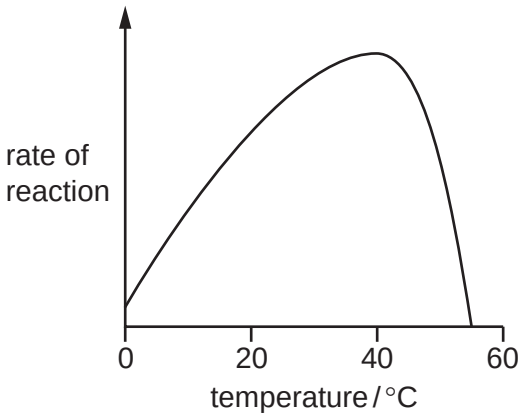
C



D



7 The graph shows how enzyme activity is affected by temperature.



How can the change in activity between 40 °C and 55 °C be explained?

A Heat has killed the enzyme.

B The enzyme has been used up.

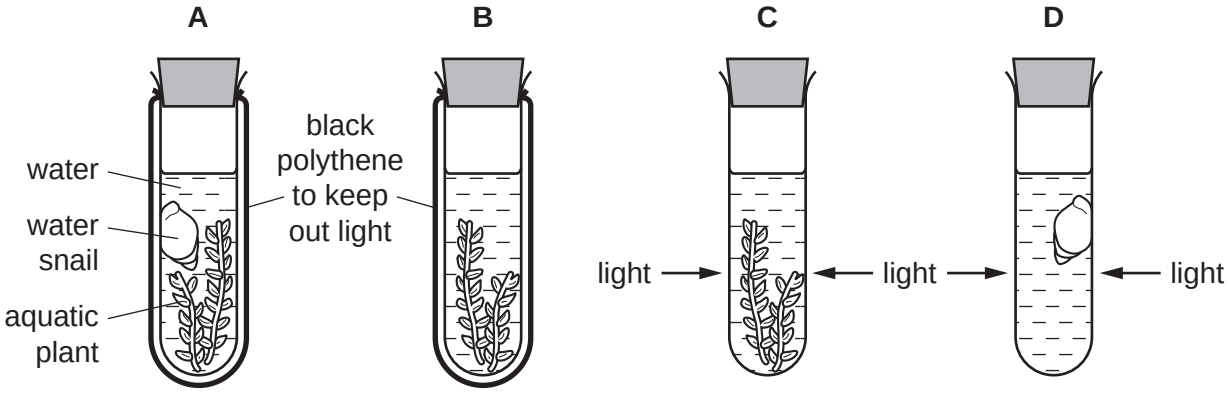
C The reactants are moving faster.

D The substrate is less likely to fit into the active site.

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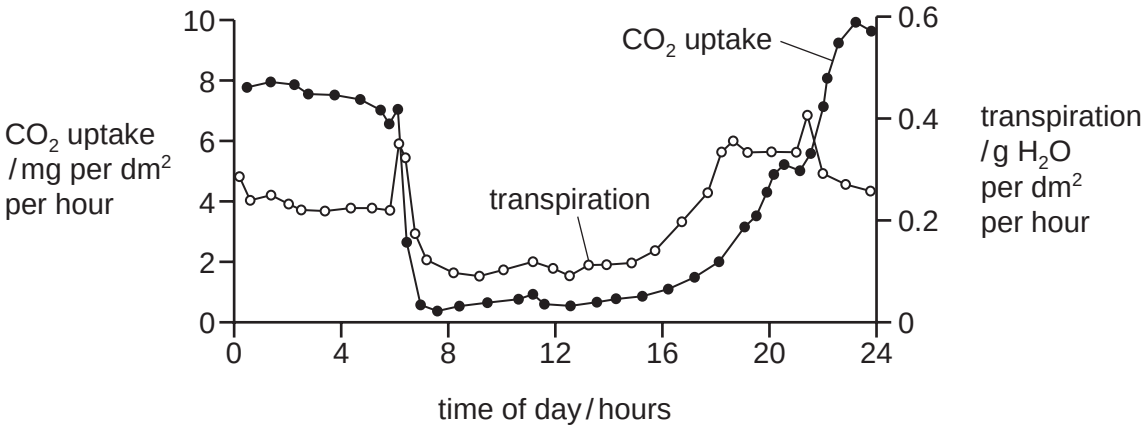
8 Four test-tubes are set up as shown.

Which test-tube contains the most carbon dioxide after one hour?



9 The graph shows daily carbon dioxide uptake and transpiration by the plant *Agave americana*.

The plant is adapted to live in very dry conditions.



What can be concluded from this graph?

A More stomata are closed during dark periods.

B More stomata are closed during light periods.

C There is no carbon dioxide uptake during dark periods.

D There is no water uptake during light periods.

10 In plants, which ions are used to make amino acids?

A magnesium

B nitrates

C phosphates

D potassium

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[Turn over

11 The following symptoms can be caused by a dietary deficiency:

- bone pain
- dental problems
- fragile bones
- skeletal deformities

A lack of which nutrient is most likely to cause these symptoms?

A iron

B protein

C vitamin C

D vitamin D

12 Statements 1–4 describe stages in the development of cholera.

1 Chloride ions are secreted in the gut.

2 Osmosis causes water to move into the gut.

3 The infected person becomes dehydrated.

4 Toxins are produced by the pathogenic bacteria.

What is the correct sequence of the four stages?

A $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

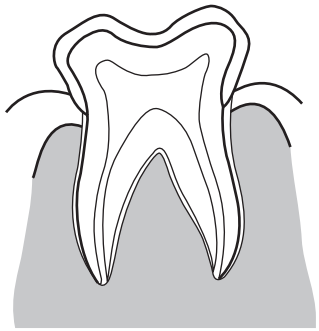
B $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

C $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

D $4 \rightarrow 1 \rightarrow 3 \rightarrow 2$

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13 The diagram shows a human tooth.



Which statement best describes the function of this tooth?

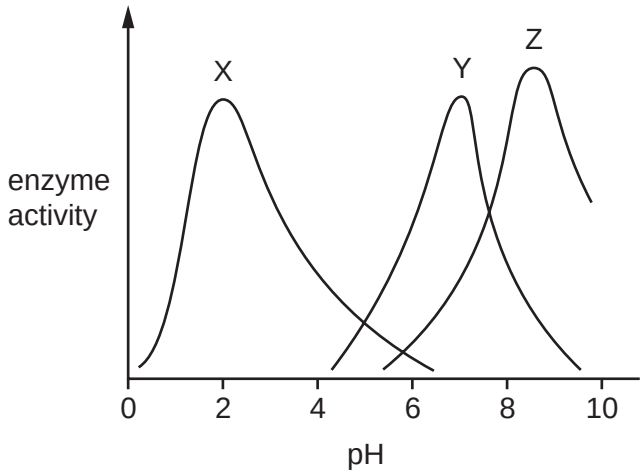
A It bites into food.

B It cuts food.

C It grinds food.

D It tears food.

14 The graph shows the effect of pH on the activity of three different enzymes.



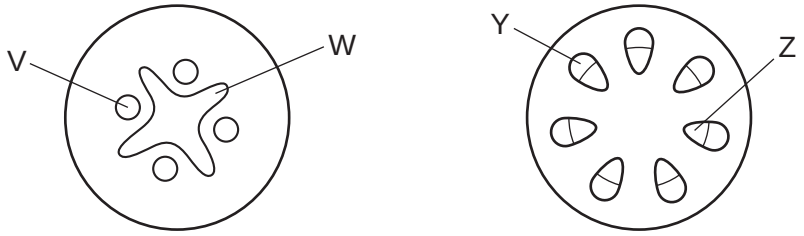
The table shows the pH of different parts of the alimentary canal.

part of the alimentary canal	pH
mouth	7.0
stomach	2.0
small intestine	8.5

Which enzymes in the graph are likely to be protease enzymes?

A X, Y and Z **B** X and Z only **C** Y and Z only **D** Z only

15 The diagrams show cross-sections through a root and a stem.



root stem

Which labels are correct?

	V	W	Y	Z
A	phloem	xylem	xylem	phloem
B	phloem	xylem	phloem	xylem
C	xylem	phloem	xylem	phloem
D	xylem	phloem	phloem	xylem

16 Which processes are used by root hairs to take up ions and water?

	ion uptake	water uptake
A	active transport	osmosis
B	diffusion	active transport
C	osmosis	diffusion
D	osmosis	osmosis

17 Which of the following increases transpiration?

A air around the leaf with high humidity

B air molecules around the leaf with less kinetic energy

C an absence of light falling on the leaf

D water molecules in the leaf with more kinetic energy

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18 The diagram shows a human blood cell.



What is its function?

A antibody production

B fibrinogen production

C oxygen transport

D phagocytosis

19 What is a disease-causing organism called?

A antibody

B host

C pathogen

D phagocyte

20 Which is a function of the cartilage in the trachea?

A gas exchange

B prevents collapse of the trachea

C produces mucus

D traps bacteria

21 Which is the equation for anaerobic respiration in yeast?

A $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

B $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

C $2CO_2 + 2C_2H_5OH \rightarrow C_6H_{12}O_6$

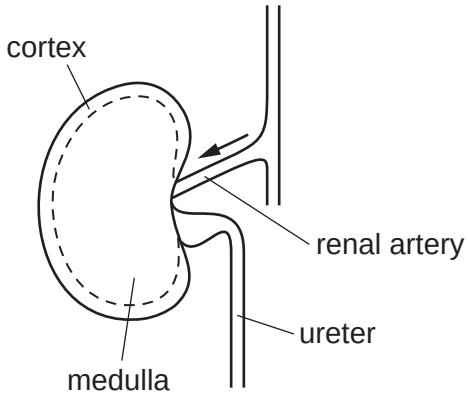
D $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

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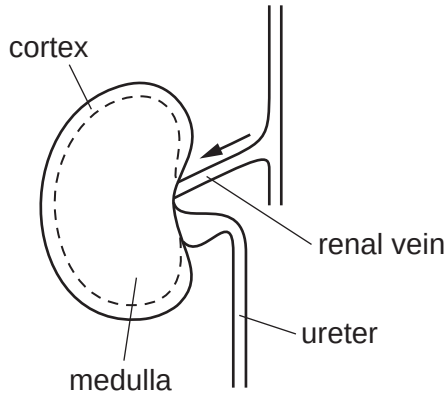
22 A longitudinal section of the kidney and some associated structures have been labelled.

Which labelling is correct?

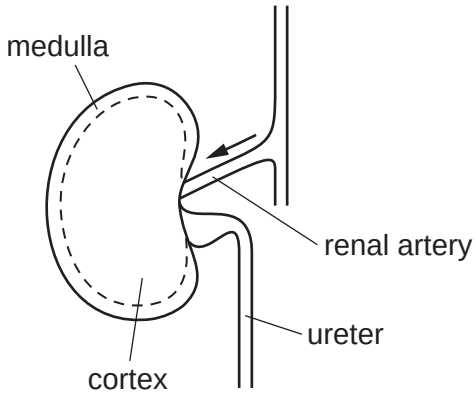
A



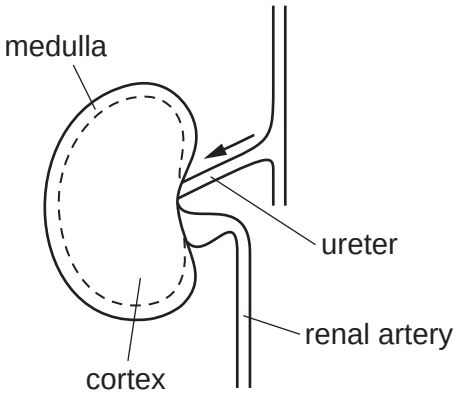
B



C



D



23 The steps to produce a reflex action where the hand is withdrawn from a hot object are shown.

1 Nerve impulses pass from the sensory neurone to the relay neurone.

2 Nerve impulses pass from motor neurone to the effector.

3 Nerve impulses pass from the receptor to the neurone.

What is the correct sequence of steps?

A $1 \rightarrow 2 \rightarrow 3$ **B** $2 \rightarrow 1 \rightarrow 3$ **C** $3 \rightarrow 1 \rightarrow 2$ **D** $3 \rightarrow 2 \rightarrow 1$

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24 How many different kinds of cone receptor and rod receptor are there in the human retina?

	types of cone receptor	types of rod receptor
A	1	1
B	1	3
C	3	1
D	3	3

25 What is the result of the release of adrenaline?

	blood glucose concentration	pulse rate
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

26 Which statement about microorganisms is correct?

A Bacteria are killed by hydrochloric acid in the duodenum.

B Bacteria can become resistant to antibiotics.

C Bacterial infection and viruses are treated with antibiotics.

D Bacteria produce sugars that cause tooth decay.

27 Dianthus flowers can be one of three different colours: red, pink or white.

A red flower is always homozygous and a white flower is always homozygous. Pink flowers are heterozygous.

If a red and a white flower are crossed, what percentage of the offspring will be pink?

A 0% **B** 25% **C** 75% **D** 100%

28 An alligator has 32 chromosomes in each of the cells of its nose.

How many chromosomes will an alligator zygote contain?

A 16 **B** 32 **C** 46 **D** 64

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29 Which hormone is produced by cells in the placenta of a developing fetus?

A FSH

B LH

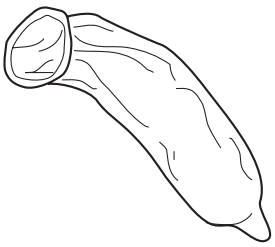
C testosterone

D progesterone

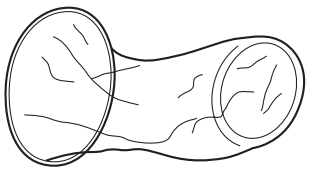
30 The diagram shows four types of birth control device.

Which is **not** a barrier method of contraception?

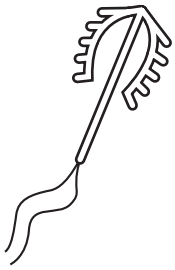
A



B



C



D



31 Which blood component is destroyed in people who are HIV positive?

A lymphocytes

B phagocytes

C platelets

D red blood cells

32 What are stem cells?

A specialised cells that divide by meiosis to produce daughter cells

B specialised cells that divide by mitosis to produce daughter cells

C unspecialised cells that divide by meiosis to produce daughter cells

D unspecialised cells that divide by mitosis to produce daughter cells

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33 The list shows the diploid number of chromosomes of four organisms.

fruit fly	8
human	46
potato	48
garden pea	14

What is the correct chromosome number of a male sex cell in each of these organisms?

	fruit fly	human	potato	garden pea
A	4	23	24	7
B	4	46	12	7
C	8	46	48	14
D	16	92	96	28

34 Which of these is a population?

1 all the insects in a rainforest

2 all the tigers in a rainforest

3 all the kapok trees in a rainforest

A 1, 2 and 3 **B** 1 only **C** 1 and 2 only **D** 2 and 3 only

35 The number of bacteria resistant to antibiotics is increasing.

What has contributed to this situation?

A choosing the antibiotic carefully to match the strain of bacterium

B not completing the course of prescribed antibiotics

C tracing, testing and treating people who have been in contact with the infected person

D using antibiotics only when essential

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36 The processes listed in 1–4 will affect the concentration of carbon dioxide in the atmosphere.

1 increased deforestation

2 increased forestation

3 decreased fossil fuel combustion

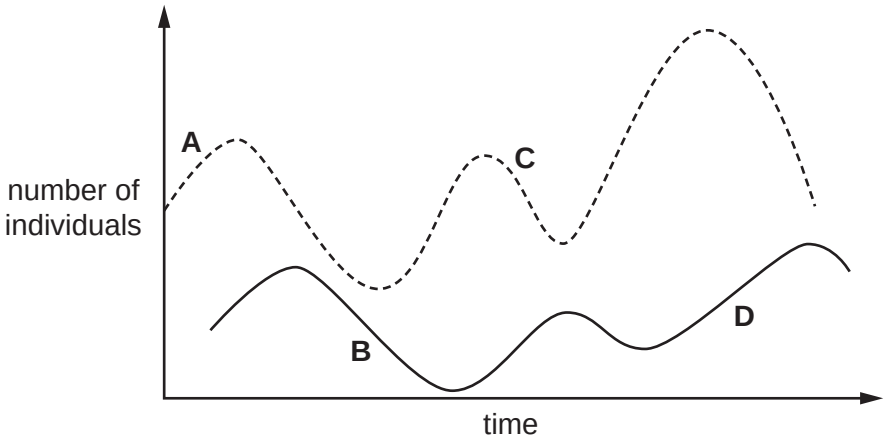
4 increased fossil fuel combustion

Which processes would increase the concentration of carbon dioxide in the atmosphere?

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

37 The graph shows the changes in the populations of predator and prey over a period of time.

Which point on the graph shows a decrease in predator population?



38 Which is a reason for using bacteria in biotechnology?

A Bacteria are found inside the human body.

B Bacteria can become resistant to antibiotics.

C Bacteria can make complex molecules.

D Bacteria reproduce slowly.

39 Why is yeast used in breadmaking?

A to produce alcohol

B to produce carbon dioxide

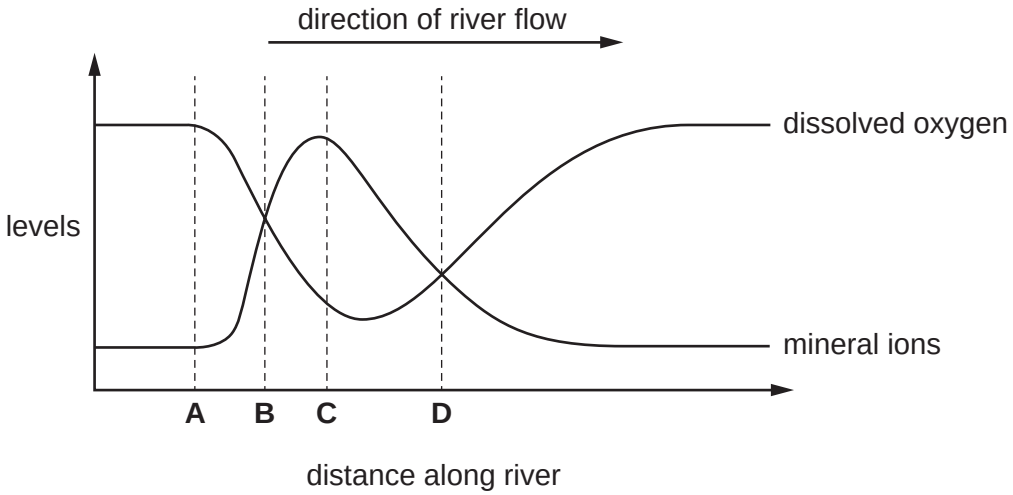
C to use up oxygen

D to use up sugar

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40 The graph shows the levels of dissolved oxygen and mineral ions in a river.

At which point does raw sewage enter the river?



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