**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)

**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.

© UCLES 2017



CAMBRIDGE International Examinations

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

View solution

**A** breathing

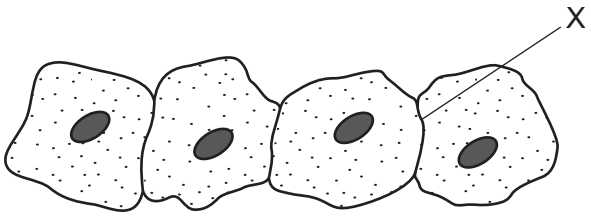
**B** excretion

**C** photosynthesis

**D** tropism

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

View solution




What will be present at X?

**A** one cell membrane

**B** one cell wall

**C** two cell membranes

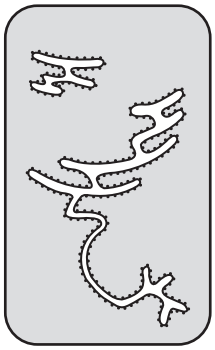
**D** two cell walls

**3** Each of the diagrams shows an area of cytoplasm.

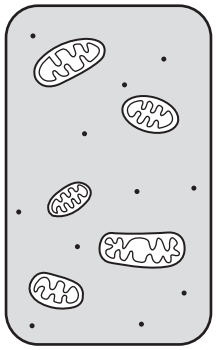
View solution

Which is from a prokaryote?

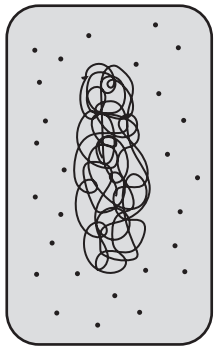
**A**



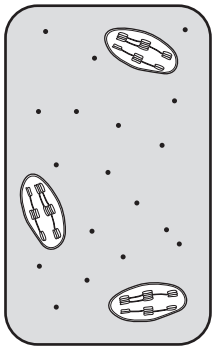
**B**



**C**



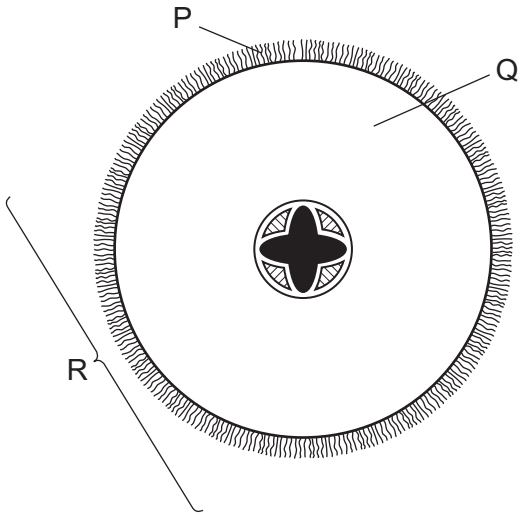
**D**



© UCLES 2017

**4** The diagram shows a section through a root.

View solution




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?

View solution

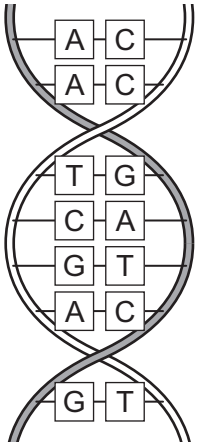
| | require a partially permeable membrane | require a concentration gradient | are energy consuming processes |
|---|---|---|---|
| **A** | ✓ | ✓ | ✗ |
| **B** | ✓ | ✗ | ✓ |
| **C** | ✗ | ✓ | ✗ |
| **D** | ✗ | ✗ | ✓ |

© UCLES 2017

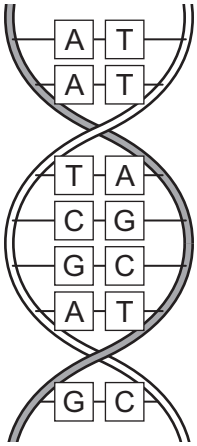
**6** Which diagram shows the structure of DNA?

View solution

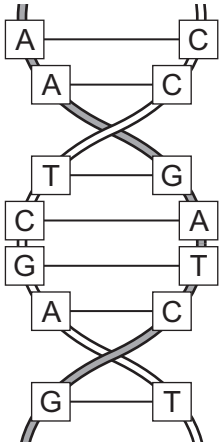
**A**



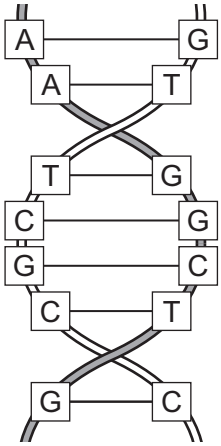

**B**




**C**

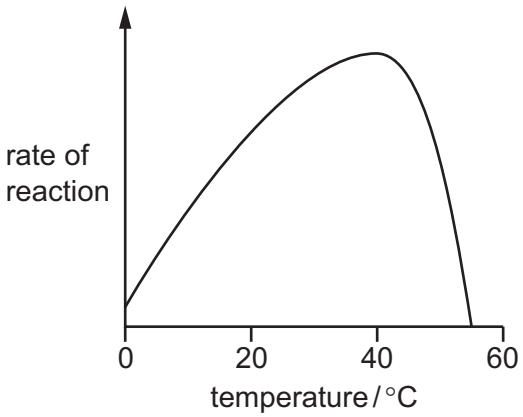



**D**




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

View solution




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.

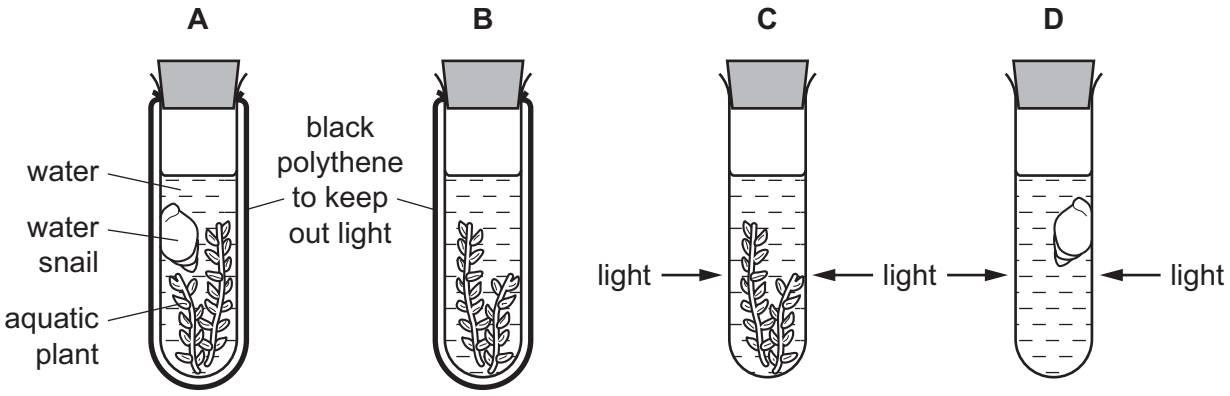
**C** The reactants are moving faster.

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

**8** Four test-tubes are set up as shown.

View solution

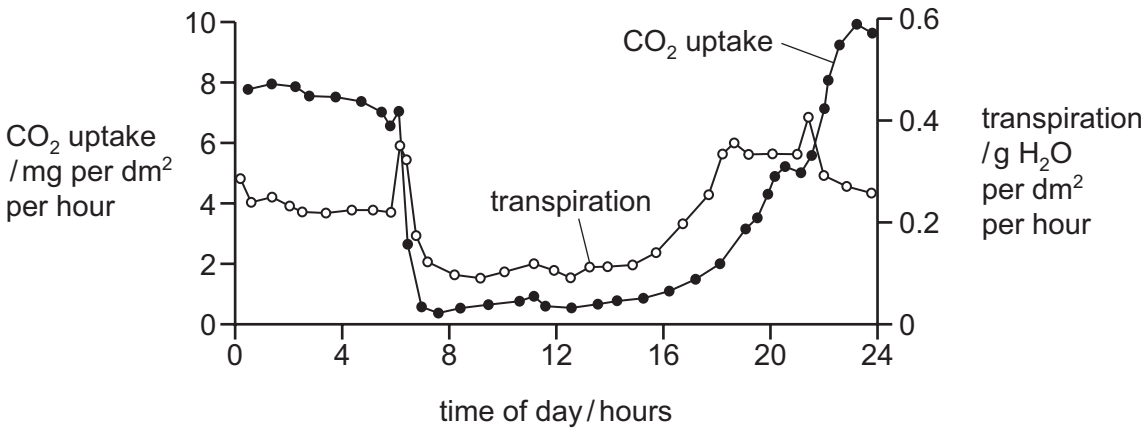
Which test-tube contains the most carbon dioxide after one hour?




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

View solution

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?

View solution

**A** magnesium

**B** nitrates

**C** phosphates

**D** potassium

© UCLES 2017

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

View solution

- 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.

View solution

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** $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

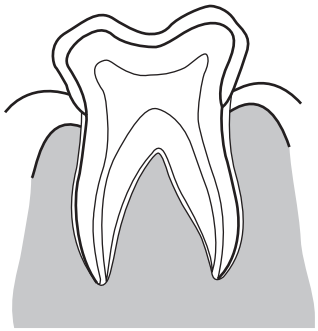
**C** $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

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

© UCLES 2017

**13** The diagram shows a human tooth.

View solution



Which statement best describes the function of this tooth?

**A** It bites into food.

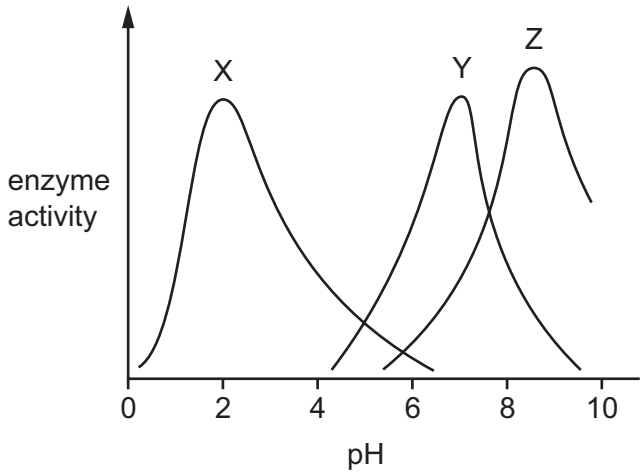
**B** It cuts food.

**C** It grinds food.

**D** It tears food.

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

View solution




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

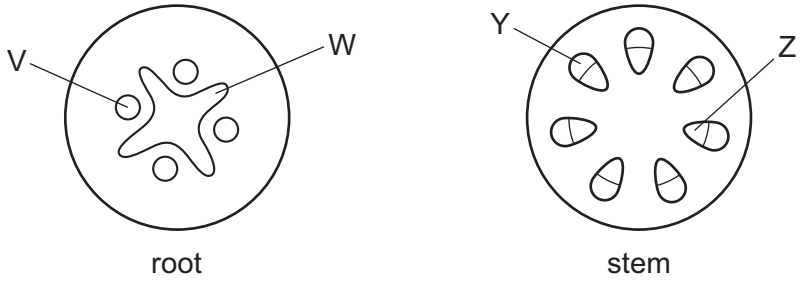
| part of the alimentary canal | pH |
|---|---|
| mouth | 7.0 |
| stomach | 2.0 |
| small intestine | 8.5 |

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.

View solution




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?

View solution

| | 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?

View solution

**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

© UCLES 2017

**18** The diagram shows a human blood cell.

View solution



What is its function?

**A** antibody production

**B** fibrinogen production

**C** oxygen transport

**D** phagocytosis

**19** What is a disease-causing organism called?

View solution

**A** antibody

**B** host

**C** pathogen

**D** phagocyte

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

View solution

**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?

View solution

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

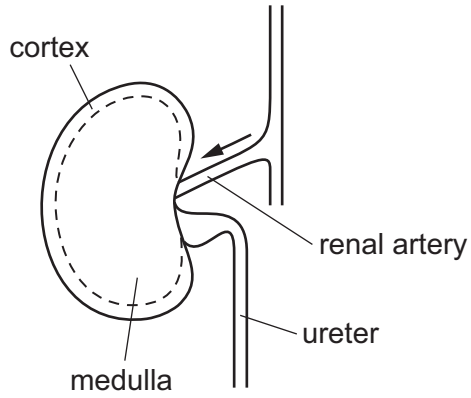
© UCLES 2017

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

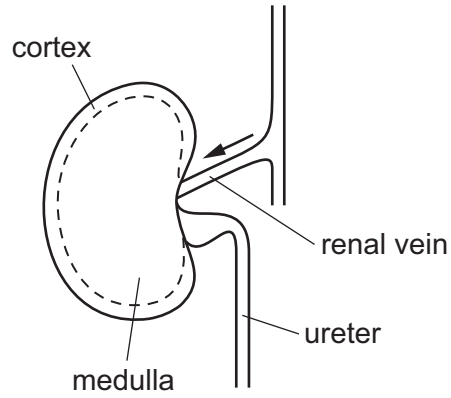
View solution

Which labelling is correct?

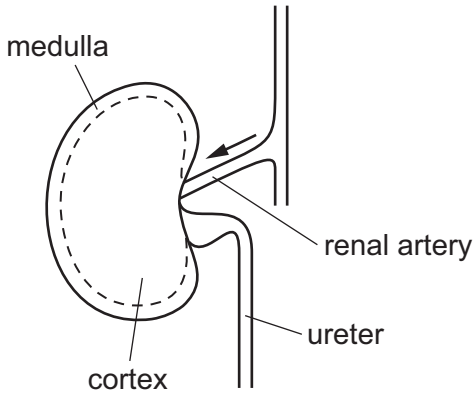
**A**



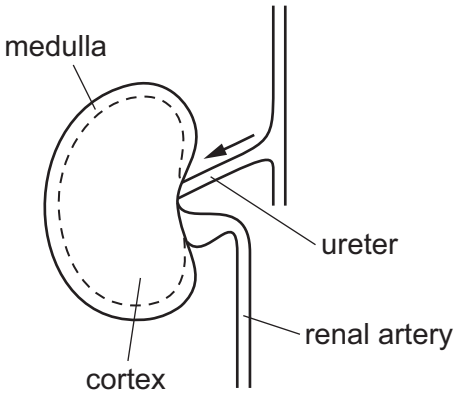

**B**




**C**




**D**




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

View solution

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** $3 \rightarrow 2 \rightarrow 1$

© UCLES 2017

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

View solution

| | 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?

View solution

| | blood glucose concentration | pulse rate |
|---|---|---|
| **A** | decreased | decreased |
| **B** | decreased | increased |
| **C** | increased | decreased |
| **D** | increased | increased |

**26** Which statement about microorganisms is correct?

View solution

**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.

View solution

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.

View solution

How many chromosomes will an alligator zygote contain?

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

© UCLES 2017

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

View solution

**A** FSH

**B** LH

**C** testosterone

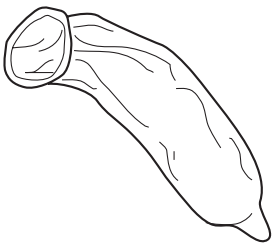
**D** progesterone

**30** The diagram shows four types of birth control device.

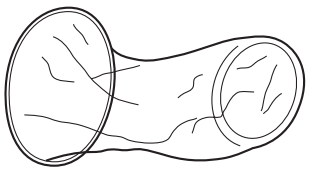
View solution

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

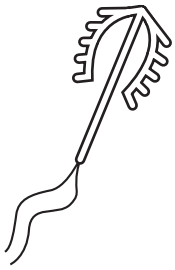
**A**



**B**



**C**



**D**



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

View solution

**A** lymphocytes

**B** phagocytes

**C** platelets

**D** red blood cells

**32** What are stem cells?

View solution

**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

© UCLES 2017

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

View solution

| | |
|---|---|
| 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?

View solution

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.

View solution

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

© UCLES 2017

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

View solution

1 increased deforestation

2 increased forestation

3 decreased fossil fuel combustion

4 increased fossil fuel combustion

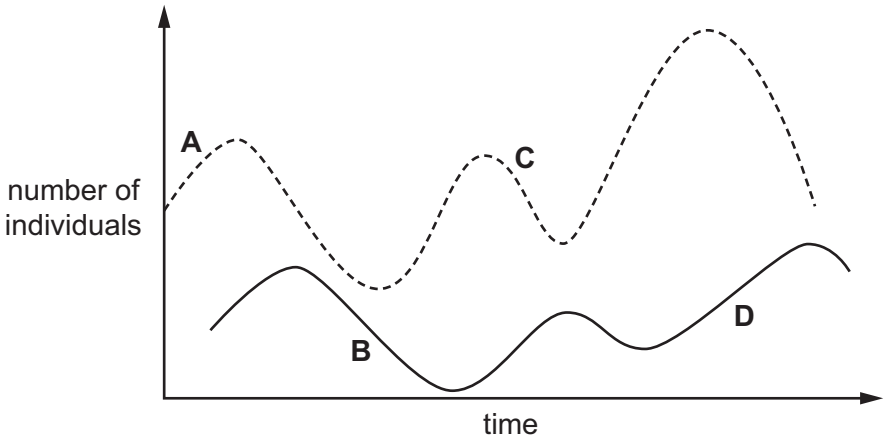
Which processes would increase the concentration of carbon dioxide in the atmosphere?

**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.

View solution

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




**38** Which is a reason for using bacteria in biotechnology?

View solution

**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?

View solution

**A** to produce alcohol

**B** to produce carbon dioxide

**C** to use up oxygen

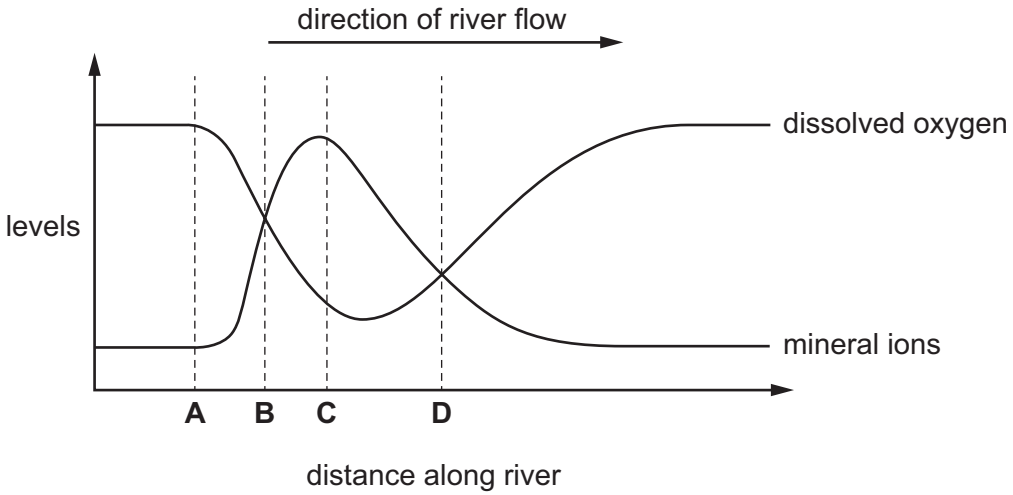
**D** to use up sugar

© UCLES 2017

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

View solution

At which point does raw sewage enter the river?



**BLANK PAGE**

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.