Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/23**

Paper 2 Multiple Choice (Extended) **October/November 2021**

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

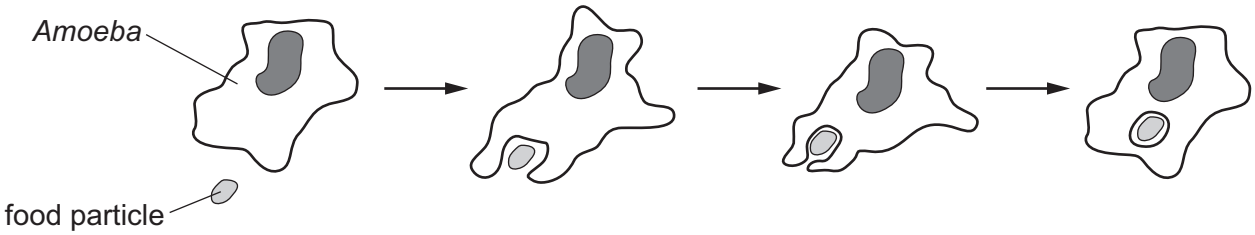
INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

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1 An *Amoeba* is a single-celled organism.

The diagram shows an *Amoeba* engulfing a food particle.



Which characteristics of living organisms are shown?

A excretion, movement and nutrition

B excretion, nutrition and sensitivity

C movement, nutrition and sensitivity

D movement, reproduction and sensitivity

2 Two animals have an identical sequence of amino acids in one of the proteins found in their cells.

What does this indicate about these animals?

A They have been eating the same types of food.

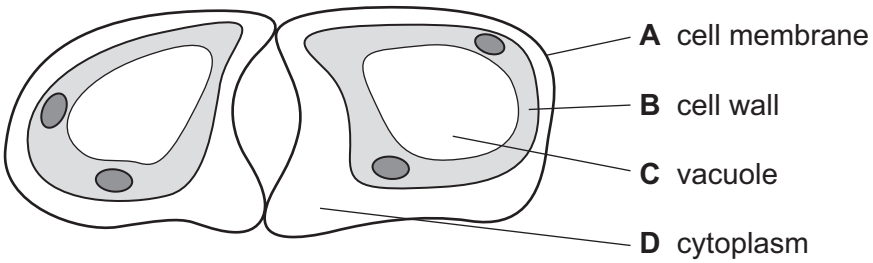
B They have not been exposed to substances that cause mutation.

C They must be members of the same genus.

D They share an ancestor.

3 The diagram shows two guard cells.

Which label is correct?



4 The length of a mitochondrion in a photomicrograph is 15 mm.

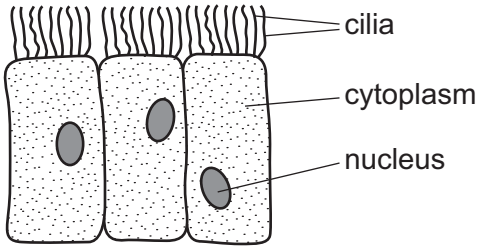
The actual length of the mitochondrion is 3 μm.

What is the magnification of the photomicrograph?

A ×5 **B** ×45 **C** ×5000 **D** ×45 000

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5 The diagram shows some cells.



Where are these cells found?

A alimentary canal

B blood

C bronchus

D plant roots

6 In which diagram would oxygen diffuse into the cell?

A

high oxygen concentration in the cell

low oxygen concentration outside of the cell

cell membrane

B

high oxygen concentration in the cell

high oxygen concentration outside of the cell

cell membrane

C

low oxygen concentration in the cell

low oxygen concentration outside of the cell

cell membrane

D

low oxygen concentration in the cell

high oxygen concentration outside of the cell

cell membrane

7 Which statement about the role of the pressure of water in supporting plants is correct?

A The pressure of water inside the cells presses inwards on the cell wall.

B The pressure of water outside the cells presses inwards on the cell wall.

C The pressure of water inside the cells presses outwards on the cell wall.

D The pressure of water outside the cells presses outwards on the cell wall.

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[Turn over

8 The bases on one of the strands of a DNA molecule have the sequence shown.

A-A-T-C-T-G

What is the corresponding sequence of bases on the other strand?

A A-A-T-C-T-G

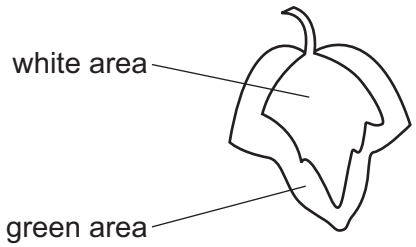
B C-C-G-A-G-T

C G-G-C-T-C-A

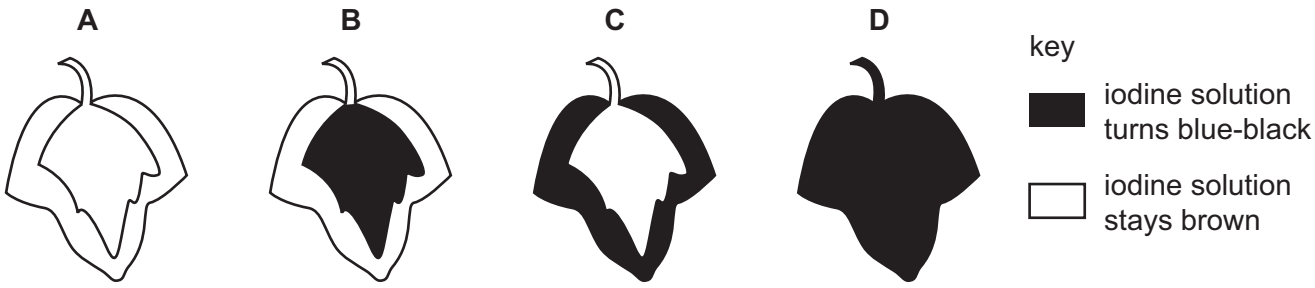
D T-T-A-G-A-C

9 In a photosynthesis experiment, a plant is left in bright sunlight for several hours. A leaf is then removed from the plant and tested for starch, using iodine solution.

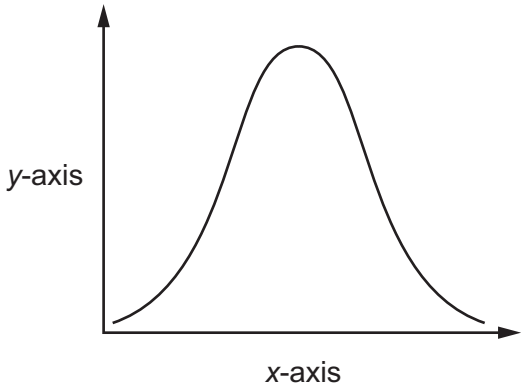
The diagram shows the leaf from the plant that was used in the experiment.



Which diagram shows the result of the experiment?



10 An experiment was carried out to investigate the effect of pH on enzyme action. The graph shows the results.

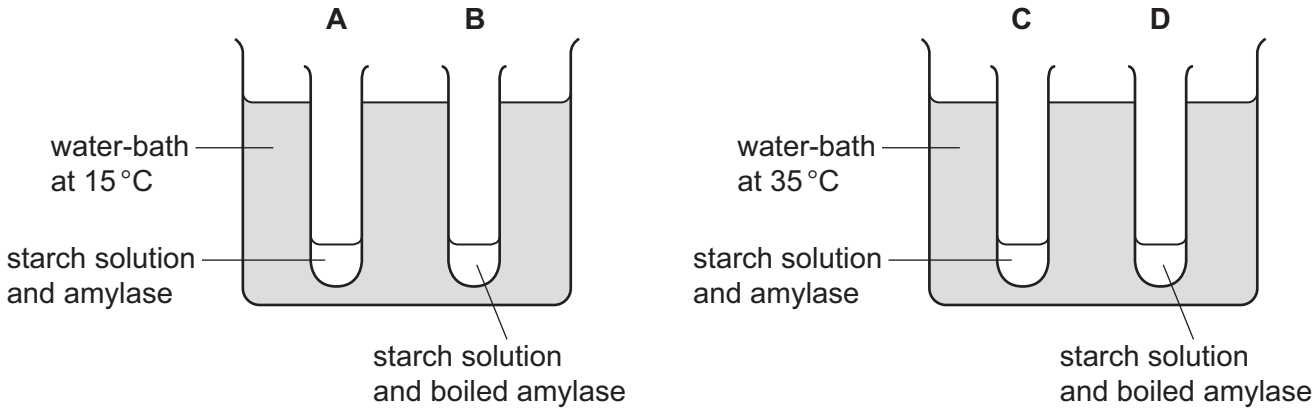


What are the labels for the *x*-axis and the *y*-axis?

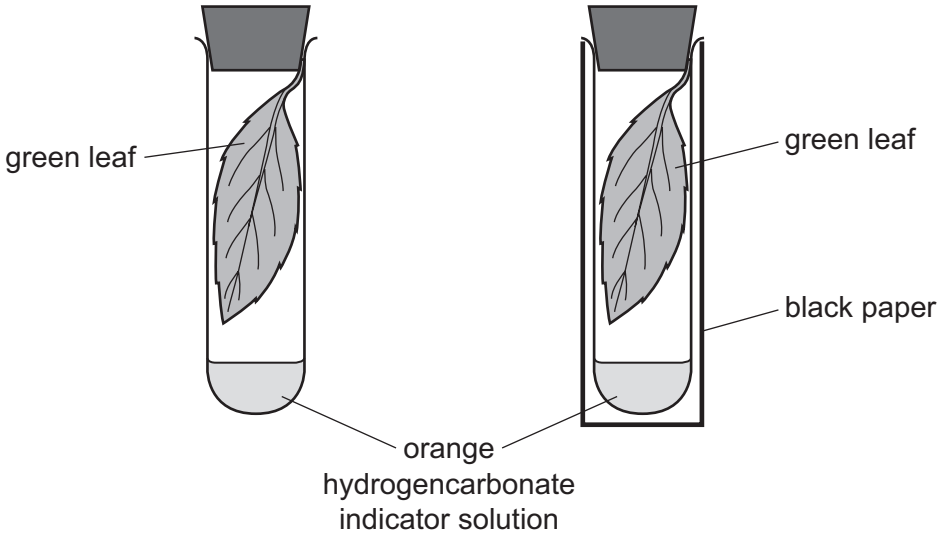
	x-axis	*y*-axis
A	pH	rate of reaction
B	pH	time
C	rate of reaction	pH
D	time	pH

11 Four test-tubes were set up as shown in the diagram.

In which test-tube is the starch digested most quickly?



12 Two similar leaves are set up in test-tubes as shown. One is exposed to light, while the other is kept in the dark.

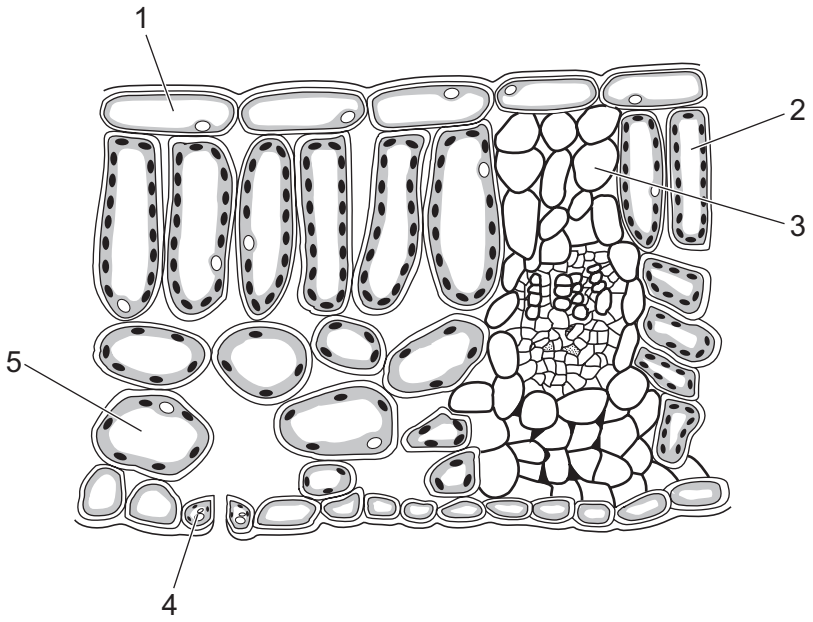


After a few hours, which colour would the hydrogencarbonate indicator solution be in each test-tube?

	light	dark
A	colourless	blue-black
B	purple	yellow
C	red	blue
D	yellow	purple

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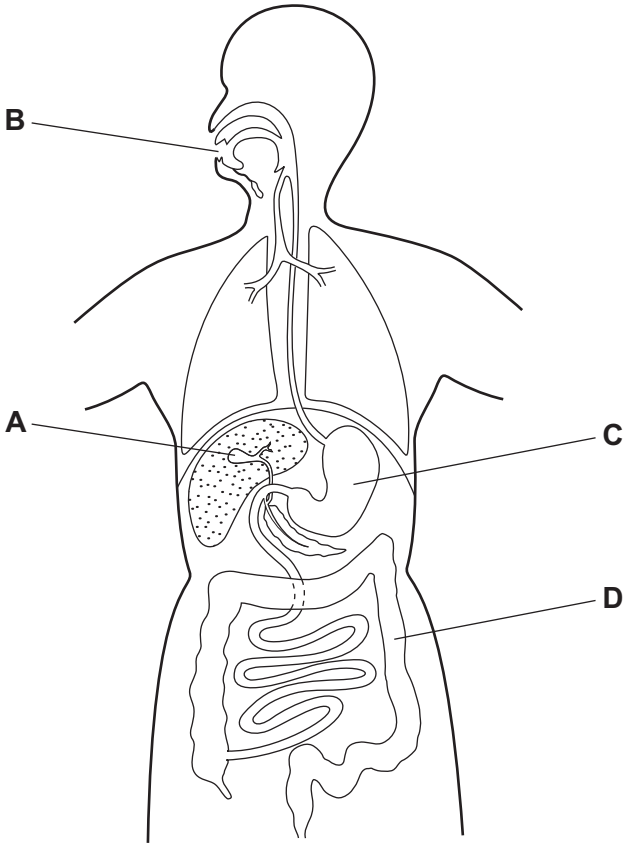
13 The diagram shows part of a leaf cross-section.



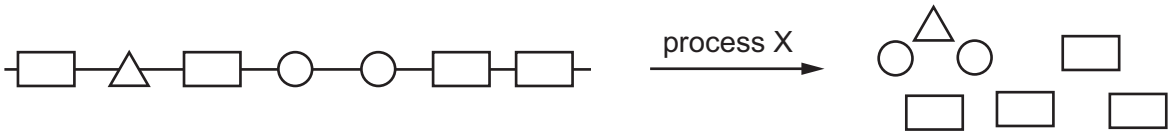
Which cells can carry out photosynthesis?

A 1, 2 and 3 **B** 2, 3 and 4 **C** 2, 4 and 5 **D** 1, 3 and 5

14 Which part of the alimentary canal produces an enzyme that digests proteins?



15 The diagram shows a large food molecule changing into smaller molecules.



What is process X?

A absorption

B chewing

C digestion

D secretion

16 How is the structure of root hair cells related to their function?

A They have chloroplasts for photosynthesis.

B Their cell wall is partially permeable to absorb water by osmosis.

C They have a large surface area to increase the rate of mineral ion uptake.

D Both the cell wall and cell membrane control the active uptake of mineral ions.

17 In plants, how are amino acids moved between sources and sinks?

A by translocation through xylem vessels

B by transpiration through phloem tissues

C by translocation through phloem tissues

D by transpiration through xylem vessels

18 Which component of blood produces antibodies?

A lymphocytes

B phagocytes

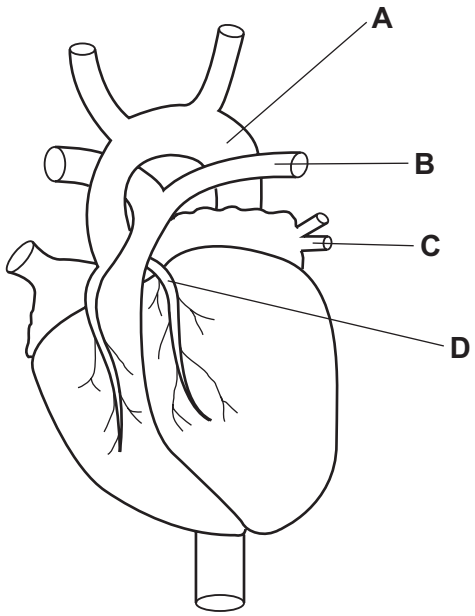
C plasma

D red blood cells

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19 The diagram shows the external structure of the human heart.

Which label identifies a coronary artery?



20 Which row shows what happens at the start of inspiration?

	external intercostal muscles contract	internal intercostal muscles contract	diaphragm contracts	volume of thorax increases	air pressure in thorax increases
A	✓	✗	✓	✓	✗
B	✓	✗	✓	✗	✓
C	✗	✓	✗	✓	✗
D	✗	✓	✗	✗	✓

key

✓ = yes

✗ = no

21 Some features that help to defend the body against pathogens are listed.

1 mucus

2 skin

3 stomach acid

4 phagocytosis

Which features can prevent pathogens entering body tissues?

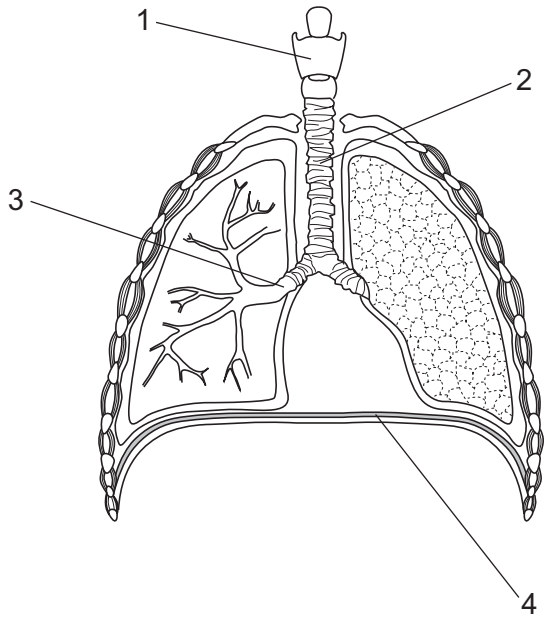
A 1, 2, 3 and 4

B 1, 2 and 3 only

C 2 and 3 only

D 4 only

22 The diagram shows the human gas exchange system.



Which row shows the correct labels?

	part of the gas exchange system			
	1	2	3	4
A	trachea	larynx	bronchus	diaphragm
B	larynx	trachea	bronchus	diaphragm
C	trachea	larynx	diaphragm	bronchus
D	larynx	trachea	diaphragm	bronchus

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23 What is the equation for anaerobic respiration in yeast?

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

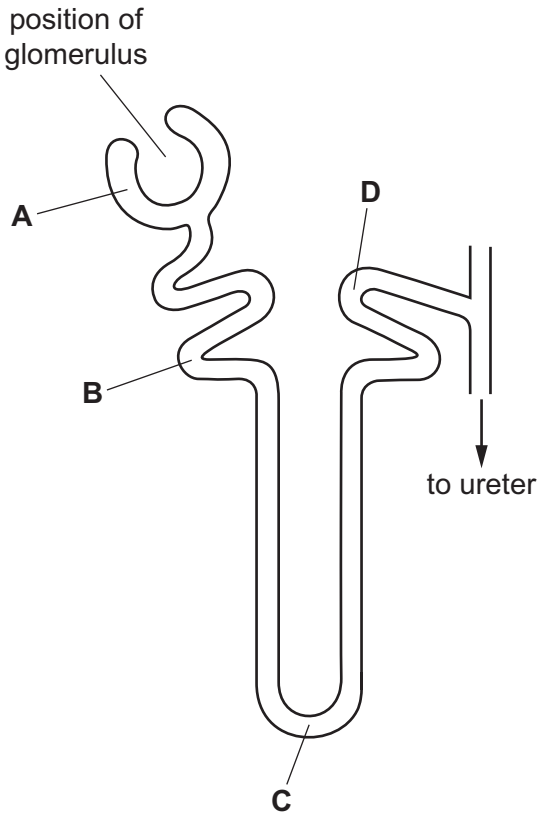
B $C_6H_{12}O_6 \rightarrow 2C_3H_6O_3$

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

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

24 The diagram shows a kidney tubule.

In which part of the tubule is the glucose concentration highest?



25 What happens to the muscles in the iris when a person moves from a brightly lit room to a dimly lit room?

A The circular muscles and the radial muscles relax.

B The circular muscles contract and the radial muscles relax.

C The circular muscles and the radial muscles contract.

D The circular muscles relax and the radial muscles contract.

26 What happens when someone has a low blood glucose concentration?

A Insulin is released from the pancreas.

B Glycogen is released from the pancreas.

C Glucagon is released from the liver.

D Glucose is released from the liver.

27 How can the development of antibiotic resistance in bacteria be reduced?

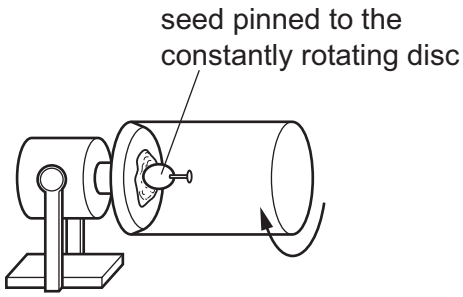
A treating every disease with antibiotics

B treating infections caused by a virus with antibiotics

C using antibiotics only when essential

D using antibiotics regularly to prevent disease

28 A seed is placed and grown on a rotating disc, as shown.



Which diagram shows the appearance of the seedling shoot after seven days?

A



B



C



D



29 Which statement describes a structural adaptation of wind-pollinated flowers?

A They have long filaments so that the anthers hang outside of the flower.

B They have round, sticky sepals to trap pollen grains.

C Their large petals protect the stigma.

D Their stamens are feathery so there is a large surface area.

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30 What are likely consequences of HIV infection?

1 decreased lymphocyte numbers

2 reduced active immunity

3 reduced passive immunity

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

31 Which row is correct for the type of cell?

	type of cell	nucleus	sets of chromosomes
A	body	diploid	two
B	gamete	diploid	one
C	gamete	haploid	two
D	body	haploid	one

32 Which structures in bacterial cells synthesise proteins?

A cell wall

B chloroplasts

C nucleus

D ribosomes

33 A man with blood group AB and a woman with blood group O have a child.

What are the correct percentages of the possible blood groups for this child?

A 50% A and 50% B

B 50% AB and 50% O

C 25% A, 25% B and 50% O

D 25% AB, 25% A, 25% B and 25% O

34 Which statement about a person who is heterozygous for the sickle-cell allele is correct?

A They are not resistant to malaria and their genotype is Hb^AHb^S.

B They are not resistant to malaria and their genotype is Hb^SHb^S.

C They are resistant to malaria and their genotype is Hb^AHb^S.

D They are resistant to malaria and their genotype is Hb^SHb^S.

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35 A species of insect usually has pale-coloured wings. This helps to camouflage them on pale-coloured tree trunks. A few of the insects in this species have darker coloured wings.

After a number of years the tree trunks become darker in colour due to environmental changes. The insects with dark-coloured wings become more common than insects with pale-coloured wings in this species.

Which process causes this change in the proportion of insects with dark-coloured wings?

A biotechnology

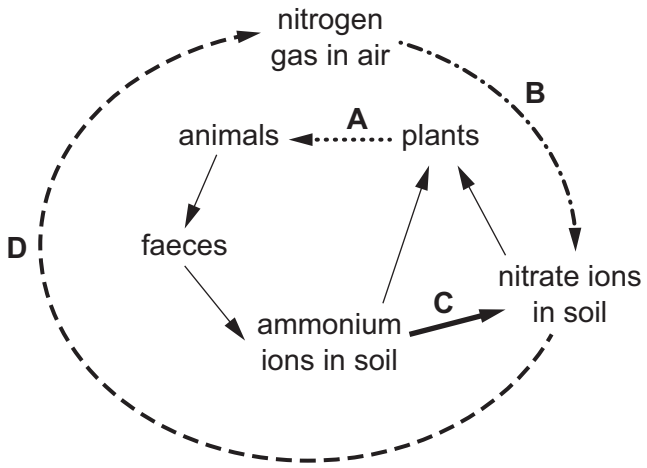
B conservation

C natural selection

D selective breeding

36 The diagram shows part of the nitrogen cycle.

Which letter represents denitrification?



37 Reasons why bacteria might be used in biotechnology and genetic engineering are listed.

1 All bacteria are harmless organisms.

2 Bacteria contain plasmids.

3 Bacteria share the same genetic code as other organisms.

4 There is a lack of ethical concerns about using bacteria.

Which reasons make bacteria useful in biotechnology and genetic engineering?

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

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38 Bacteria can be genetically engineered to produce human proteins, such as human insulin.

Which enzyme is used to join the human gene and the bacterial plasmid together to create a recombinant plasmid?

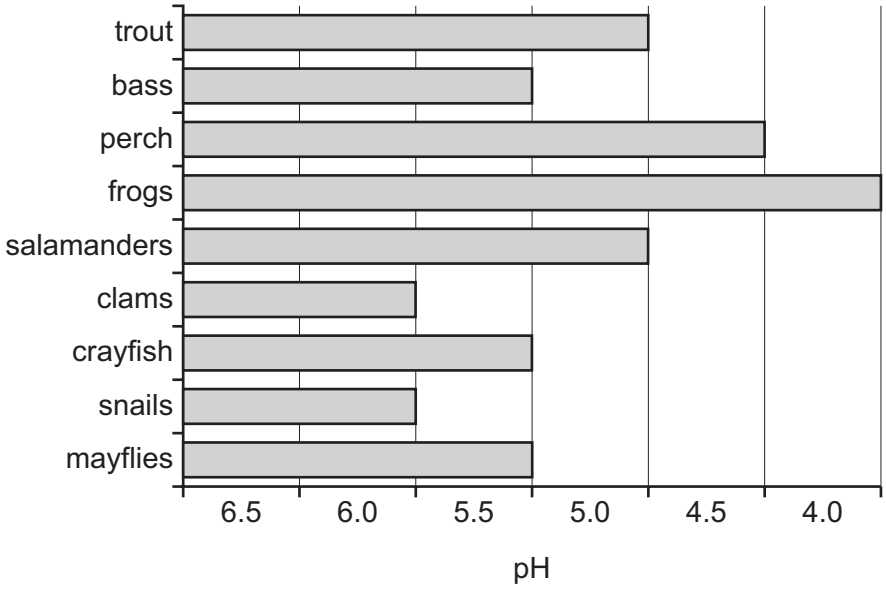
A lipase

B recombinant enzyme

C DNA ligase

D restriction enzyme

39 The bar chart shows the tolerance of some river organisms to different levels of pH.



Which organisms would be most affected if the pH of a river decreased from pH 6.0 to pH 5.5?

A crayfish and mayflies

B frogs and perch

C snails and clams

D trout and salamanders

40 What is meant by a sustainable resource?

A a resource that is produced by non-intensive farming and is rarely used

B a resource that is removed from a habitat without changing the environment

C a resource that does not pollute the environment

D a resource that is produced as rapidly as it is removed from the environment

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