Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/22**

Paper 2 Multiple Choice (Extended) **May/June 2023**

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.

This document has **16** pages.

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1 Which process occurs both in plants and in animals?

A excretion

B phagocytosis

C photosynthesis

D transpiration

2 Some statements about species are given.

1 Members of a species all look identical.

2 Members of a species belong to the same genus.

3 Members of a species can produce fertile offspring.

4 Species are named using an international system.

Which statements are correct?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 2 and 4 only

D 2, 3 and 4 only

3 Which structures are found in the cells of all living organisms?

1 cell membrane

2 chloroplast

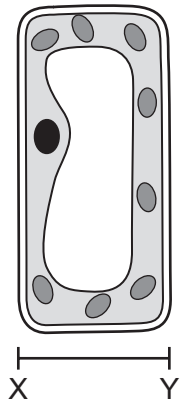
3 cytoplasm

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

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4 In the diagram of the palisade cell, the distance between X and Y is 20 mm.

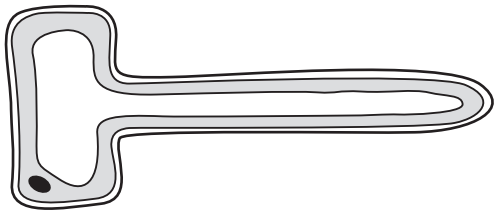
The actual width of the cell between X and Y is 40 μm.



What is the magnification of the diagram?

A ×200 **B** ×500 **C** ×2500 **D** ×5000

5 The diagram shows a root hair cell.



When does water enter the cell by osmosis?

A when the concentration of solutes outside the cell is greater than inside the cell

B when the concentration of solutes inside and outside the cell are equal

C when the water potential inside the cell is higher than outside the cell

D when the water potential outside the cell is higher than inside the cell

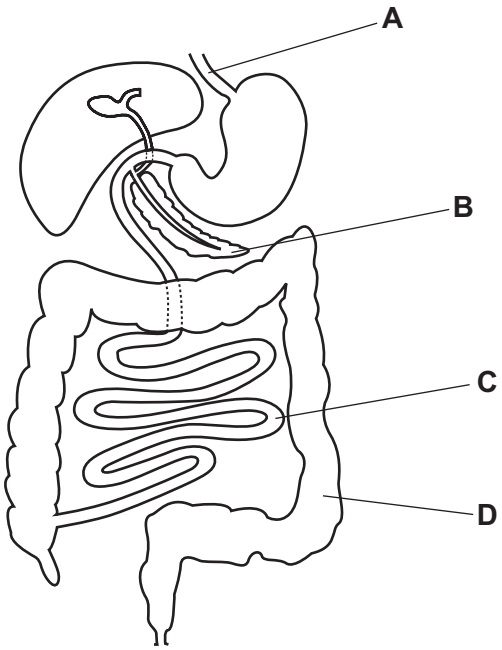
6 Which row shows the changes that occur during the germination of a seed?

	respiration rate	amount of energy required	how ions are absorbed
A	decreased	decreased	active transport
B	decreased	increased	diffusion
C	increased	decreased	diffusion
D	increased	increased	active transport

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7 The diagram shows the human alimentary canal.

In which structure is most glucose absorbed into the blood?



8 DNA contains pairs of bases.

Which pair shows a correct combination of bases?

A A and C **B** C and G **C** G and A **D** T and G

9 In which region of the alimentary canal is maltose digested?

A colon

B rectum

C small intestine

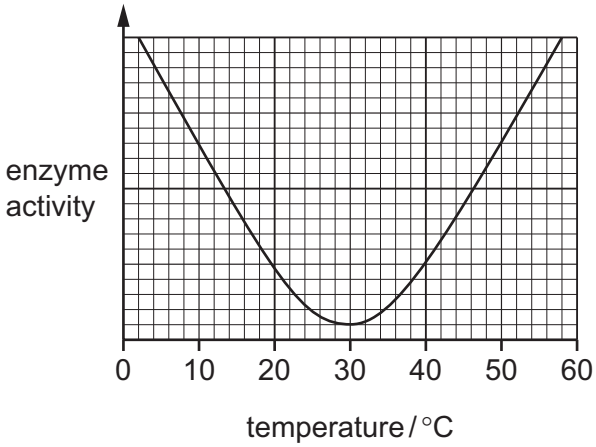
D stomach

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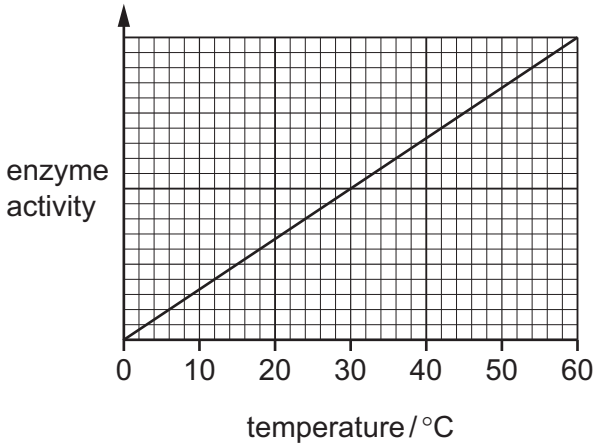
10 The graphs show the effect of temperature on enzyme activity. This enzyme has an optimum temperature of 30 °C.

Which graph shows the effect of temperature on the activity of this enzyme?

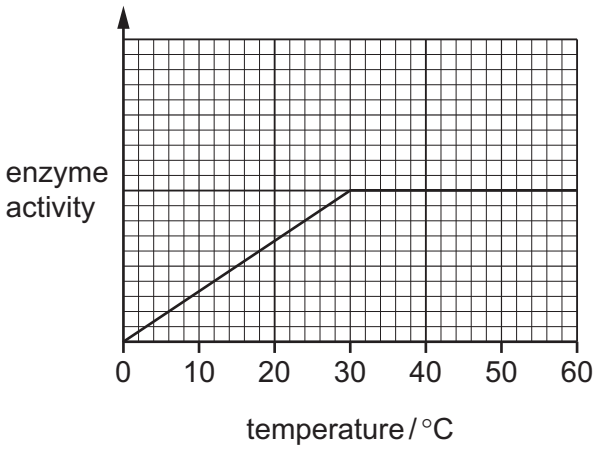
A



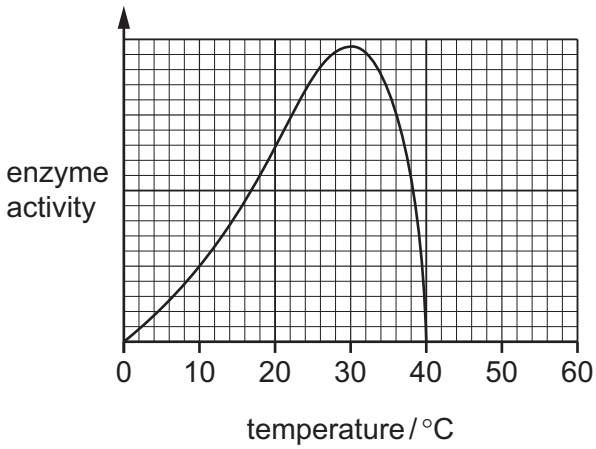
B



C



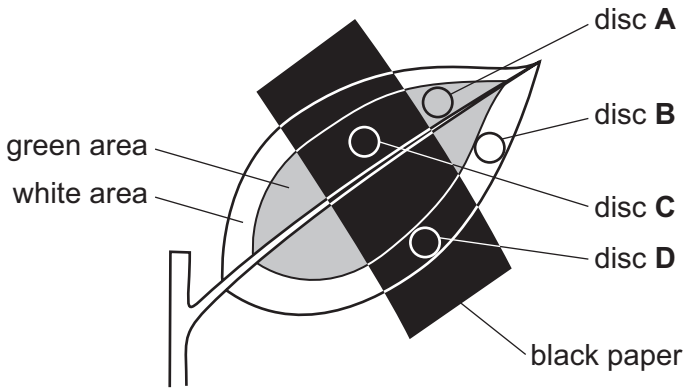
D



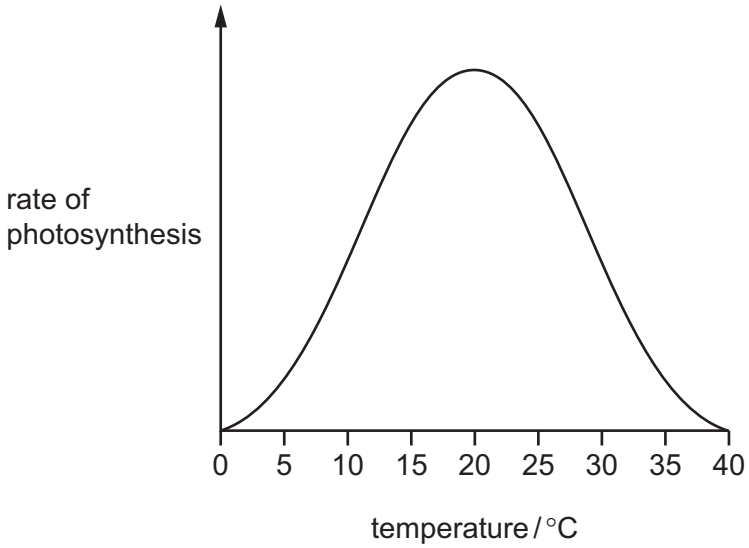
11 The diagram shows a leaf on a plant used in a photosynthesis experiment. At the start of the experiment, there is no starch in the leaf.

A piece of black paper is attached to the upper surface of the leaf. The plant is placed in bright light for 12 hours. Four discs are then cut from the leaf in the positions shown on the diagram. The discs are tested for starch.

Which disc contains starch?



12 The graph shows the effect of temperature on the rate of photosynthesis.



Which statement explains the change in rate of photosynthesis between 15 °C and 20 °C?

A Chlorophyll is able to transfer more energy in chemicals to energy in light.

B Enzymes involved in photosynthesis have denatured.

C Kinetic energy of molecules is increasing, resulting in more effective collisions.

D Light intensity and **not** temperature is limiting the rate of photosynthesis.

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13 The lack of which component of a balanced diet will lead to the development of scurvy?

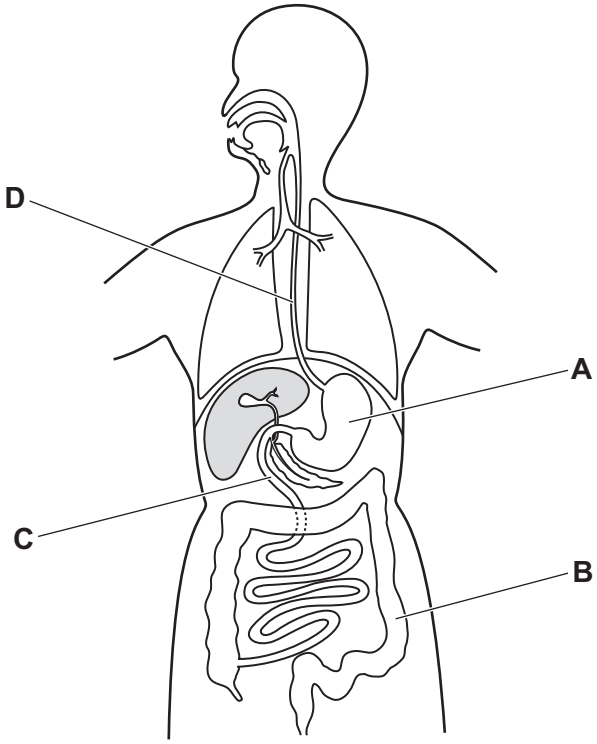
A calcium

B iron

C vitamin C

D vitamin D

14 Which structure is the duodenum?



15 Humidity and wind speed are two factors that affect the rate of transpiration.

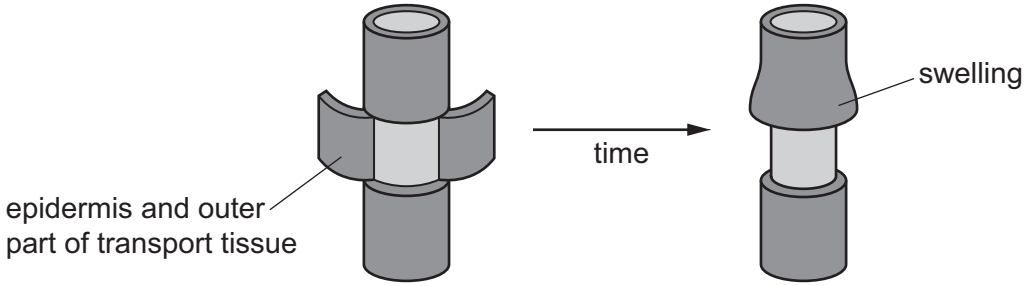
How do these two factors affect the concentration gradient of water molecules between the inside of the leaf and the outside atmosphere?

	high humidity	high wind speed
A	lowers concentration gradient	raises concentration gradient
B	raises concentration gradient	raises concentration gradient
C	lowers concentration gradient	lowers concentration gradient
D	raises concentration gradient	lowers concentration gradient

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[Turn over

16 During an investigation into the movement of substances in a plant, a ring of tissue containing the outer part of the transport tissue is removed, as shown.



Which statement explains why a swelling develops in the stem?

A Phloem has been removed causing a build up of sucrose and amino acids.

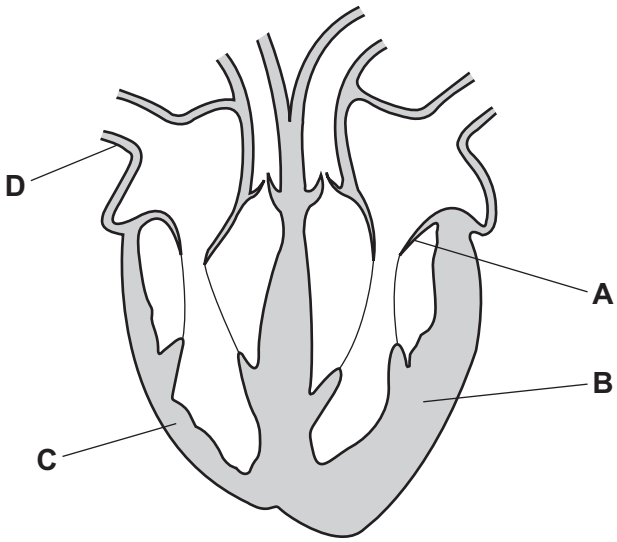
B Phloem has been removed causing a build up of water and mineral ions.

C Xylem has been removed causing a build up of sucrose and amino acids.

D Xylem has been removed causing a build up of water and mineral ions.

17 The diagram shows the human heart.

Which label shows the left ventricle?



18 Which row shows the features of an artery or a vein?

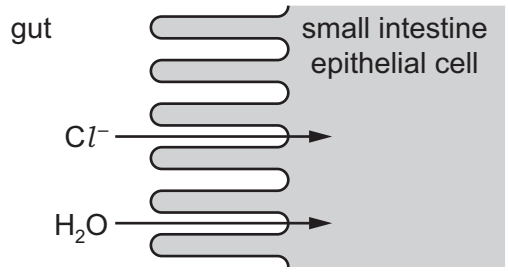
	blood vessel	diameter of lumen	thickness of wall
A	artery	large	thick
B	artery	small	thin
C	vein	large	thin
D	vein	small	thick

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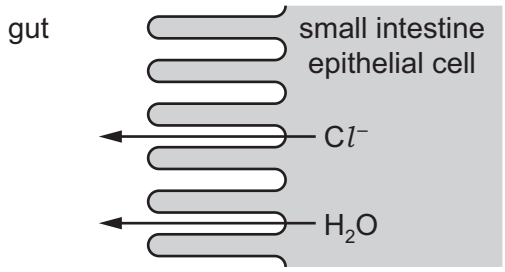
19 Cholera bacteria in the gut cause secretion of chloride ions which leads to diarrhoea.

Which diagram shows the correct movement of chloride ions (Cl^-) and water (H_2O)?

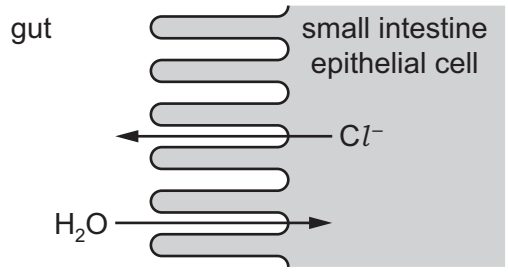
A



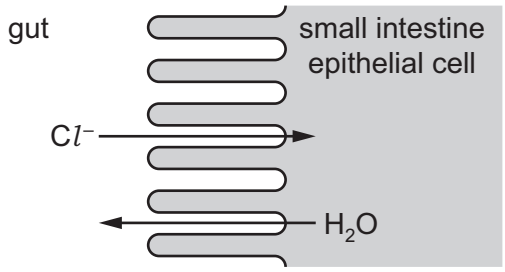
B



C



D



20 Different stages in the process of expiration are listed.

1 Rib cage moves downwards and inwards.

2 Volume of thorax decreases and pressure in lungs increases.

3 Air is pushed out of lungs.

4 Diaphragm and external intercostal muscles relax.

What is the correct order of these stages?

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

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

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

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

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[Turn over

21 Which row shows aerobic respiration?

	substrates	products
A	$6CO_2 + 6H_2O$	$C_6H_{12}O_6 + 6O_2$
B	$C_6H_{12}O_6 + 6CO_2$	$6H_2O + 6O_2$
C	$6CO_2 + 6O_2$	$C_6H_{12}O_6 + 6H_2O$
D	$C_6H_{12}O_6 + 6O_2$	$6CO_2 + 6H_2O$

22 In which organ is lactic acid respired aerobically to remove an oxygen debt?

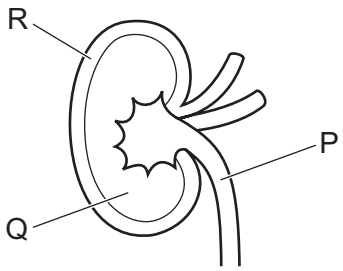
A brain

B heart

C liver

D lungs

23 The diagram shows a cross-section of a kidney.



What are the correct names for structures P, Q and R?

	P	Q	R
A	urethra	cortex	medulla
B	ureter	medulla	cortex
C	urethra	medulla	cortex
D	ureter	cortex	medulla

24 Which statement describes what happens during the transmission of an electrical impulse along a reflex arc?

A The relay neurone has receptor proteins which bind with neurotransmitter molecules.

B The relay neurone has vesicles which bind with neurotransmitter molecules.

C The sensory neurone causes receptor proteins to release neurotransmitter molecules.

D The sensory neurone impulses cause vesicles to release receptor protein molecules.

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25 During the pupil reflex in bright light, what describes the actions of the muscles in the iris?

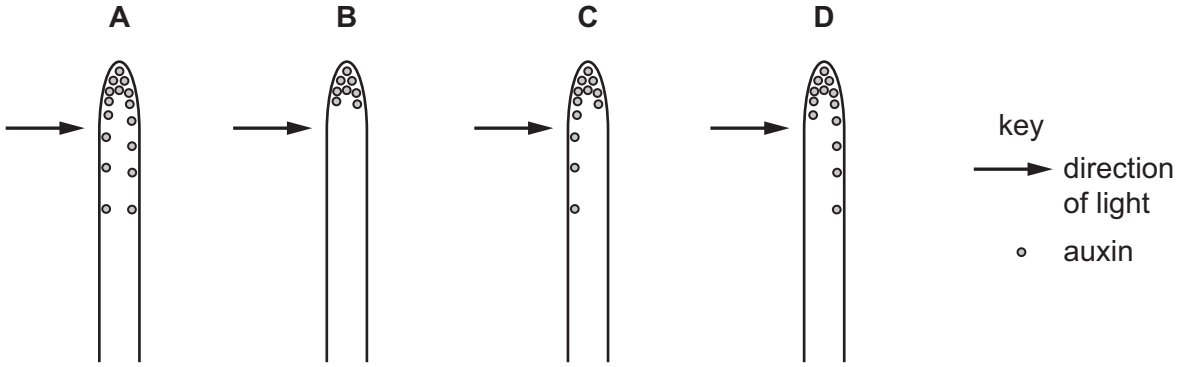
A The circular muscles of the iris contract and the radial muscles relax.

B The circular muscles of the iris contract and the radial muscles contract.

C The circular muscles of the iris relax and the radial muscles contract.

D The circular muscles of the iris relax and the radial muscles relax.

26 Which distribution of auxin will cause the shoot tip to grow towards the light?



27 What is an advantage of asexual reproduction in a wild population?

A The population has reduced ability to respond to changes in the environment.

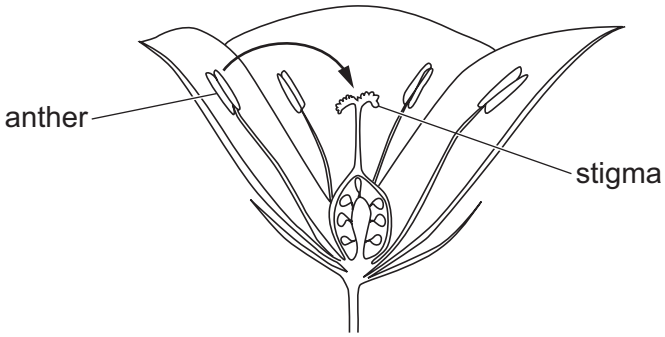
B The population can increase rapidly when conditions are suitable.

C The population shows a lot of variation.

D The whole population may be killed by a disease pathogen.

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28 The diagram shows the structure of part of a flower.



The arrow represents the transfer of pollen.

Which statement about the arrow is correct?

A The arrow represents cross-pollination in an insect-pollinated flower.

B The arrow represents cross-pollination in a wind-pollinated flower.

C The arrow represents self-pollination in an insect-pollinated flower.

D The arrow represents self-pollination in a wind-pollinated flower.

29 In a sperm cell, which structure contains enzymes that can digest the jelly coat of an egg cell?

A acrosome

B flagellum

C mitochondria

D nucleus

30 The following are involved in protein synthesis.

1 amino acids assembled in order

2 mRNA moves to the cytoplasm

3 mRNA passing through a ribosome

4 DNA in the nucleus

In which order do they become involved when proteins are made?

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

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

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

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

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31 A man of genotype I^AI^o and woman of genotype I^BI^o have a child.

What is the chance that the child will have the same blood group as one of its parents?

A zero **B** 1 in 4 **C** 1 in 2 **D** 3 in 4

32 A man who has red-green colour blindness has a child with a woman who does **not** have red-green colour blindness. The child has red-green colour blindness. The man and woman decide to have another child.

What is the percentage probability that their next child will have red-green colour blindness?

A 0% **B** 25% **C** 50% **D** 100%

33 Which types of variation can be inherited?

	variation caused by genes	variation caused by the environment
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

34 Which feature is a leaf adaptation for living in a hot, dry desert?

A hairy

B large surface area

C many stomata

D thin waxy cuticle

35 Which term is used to describe an organism that makes its own organic nutrients?

A carnivore

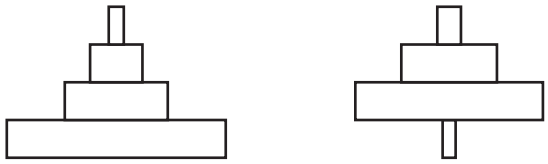
B decomposer

C herbivore

D producer

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36 The diagram shows two pyramids based on food chains in which the producer is a large tree.



What do the two pyramids represent?

	P	Q
A	biomass	biomass
B	biomass	numbers
C	numbers	biomass
D	numbers	numbers

37 What is a negative impact on the environment caused by deforestation?

A decrease in land for livestock production

B decreased levels of carbon dioxide in the air

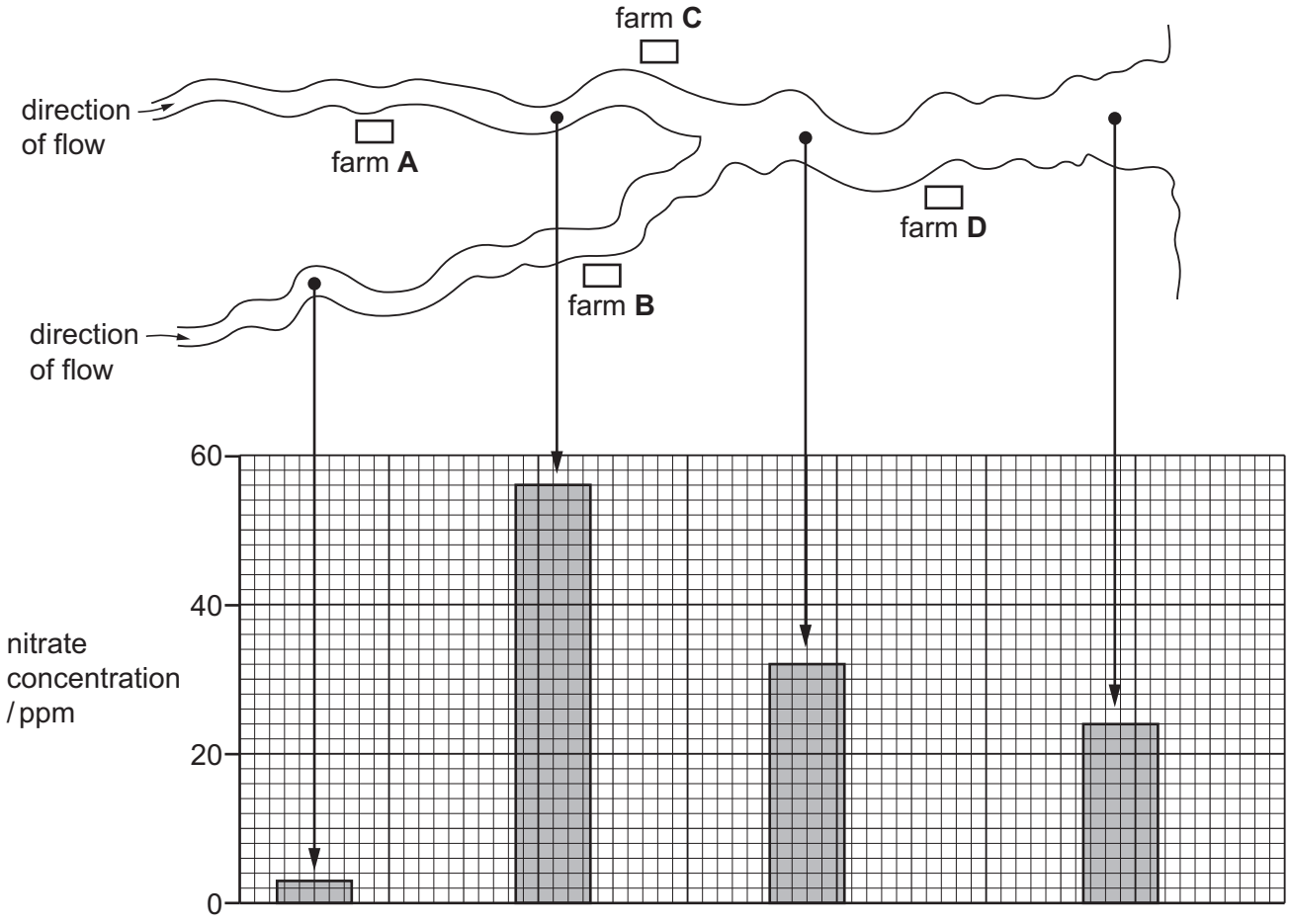
C increase in flooding

D increased levels of soil

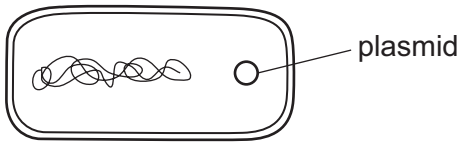
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38 The diagram shows the positions of four farms and the concentrations of nitrate at different points in a river.

Which farm is likely to have been using too much fertiliser on its land?



39 The diagram shows a bacterial cell containing a plasmid.



What is inserted into the plasmid if this cell is to be used for the production of insulin?

A a length of DNA from a human

B a length of DNA from another bacterium

C a molecule of insulin

D an enzyme

40 Yeast carries out anaerobic respiration, making carbon dioxide and ethanol as end-products.

Which end-products can be used to make biofuel and bread?

	biofuel	bread
A	carbon dioxide	carbon dioxide
B	carbon dioxide	ethanol
C	ethanol	carbon dioxide
D	ethanol	ethanol

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