Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/23**

Paper 2 Multiple Choice (Extended) **May/June 2025**

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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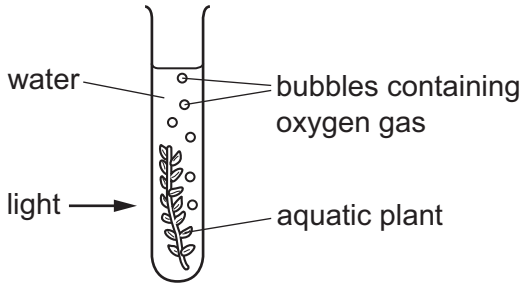
1 The diagram shows an aquatic plant in light.



What is a characteristic of **all** living things that is demonstrated in the diagram?

A breathing

B nutrition

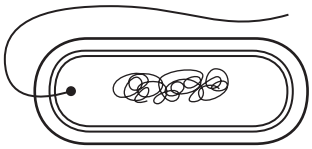
C photosynthesis

D respiration

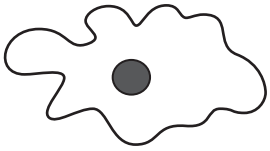
2 The diagrams show four organisms.

Which organism is a prokaryote?

A



B



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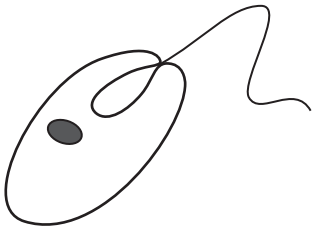
C



D

3 What happens when plant cells are placed in a sugar solution that has a lower water potential than the cytoplasm of the cells?

A The cells gain water and become flaccid.

B The cells gain water and become turgid.

C The cells lose water and become flaccid.

D The cells lose water and become turgid.

4 In a DNA molecule, bonds between pairs of bases hold two strands together. High temperatures can break these bonds to form two single strands of DNA.

The base pair C and G is held together more strongly than the base pair A and T.

Two DNA molecules containing the same number of bases were studied.

- In DNA molecule 1, 20% of bases are T.
- In DNA molecule 2, 20% of bases are C.

Which DNA molecule would require the lowest temperature to break into single strands?

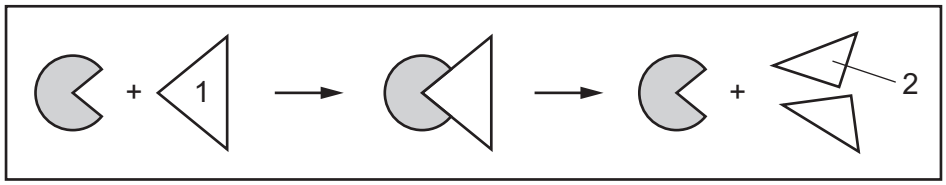
A DNA molecule 1, because there are more A bases present.

B DNA molecule 1, because there are more G bases present.

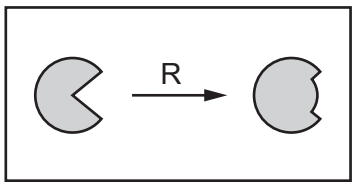
C DNA molecule 2, because there are more A bases present.

D DNA molecule 2, because there are more G bases present.

5 The diagram shows a process involving an enzyme in the human stomach.



The diagram shows another process, R, that affects this enzyme.



Which row identifies the substrate and the cause of process R?

	substrate	cause of process R
A	1	acidic conditions
B	1	alkaline conditions
C	2	acidic conditions
D	2	alkaline conditions

6 What is the balanced chemical equation for photosynthesis?

A $3CO_2 + 3H_2O \rightarrow C_6H_{12}O_6 + 3O_2$

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

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

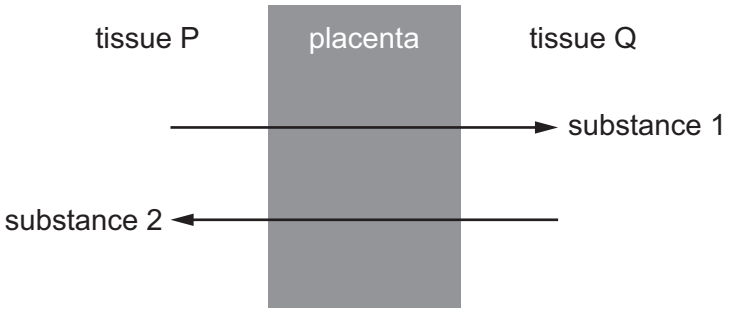
D $6CO_2 + 6H_2O \rightarrow 6C_6H_{12}O_6 + 6O_2$

7 A potato was removed from a potato plant. A 5 g cube of potato was cut and put into a beaker of distilled water.

What is the most likely mass of the cube of potato after two hours?

A 2 g **B** 4 g **C** 5 g **D** 7 g

8 The diagram shows the direction of **net** movement of two substances across a human placenta.

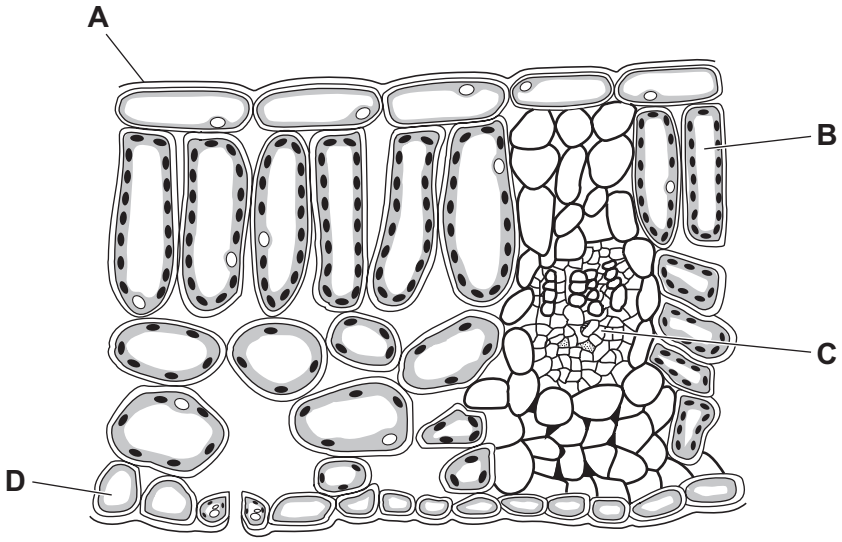


Which tissue represents maternal blood and which substance is identified correctly?

	tissue that represents maternal blood	substance that is identified correctly
A	P	1 = carbon dioxide
B	P	2 = urea
C	Q	1 = amino acids
D	Q	2 = starch

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

Which structure is a palisade mesophyll cell?



10 A person has swollen, bleeding gums and slow wound healing.

This could be caused by a lack of which nutrient in a diet?

A calcium

B fibre

C iron

D vitamin C

11 Digested food molecules move into the cells of the body where they are used and become part of the cells.

What is this a definition of?

A absorption

B assimilation

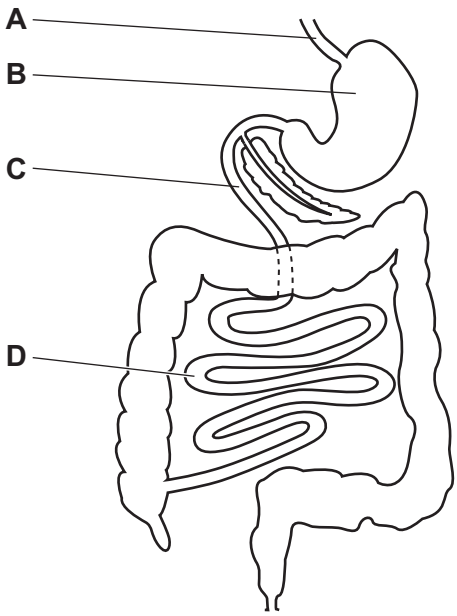
C digestion

D ingestion

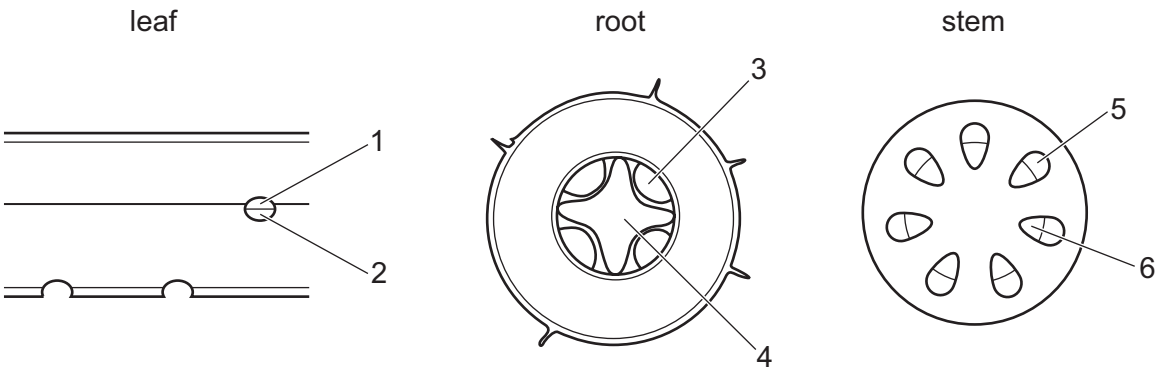
[Turn over

12 The diagram shows part of the human digestive system.

In which part does protein digestion **begin**?



13 The diagrams show cross-sections of a leaf, a root and a stem.



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In which row do the numbers represent the xylem in the leaf, the root and the stem?

	leaf	root	stem
A	1	3	5
B	1	4	6
C	2	3	5
D	2	4	6

14 Which structures in humans and in plants normally carry amino acids?

	arteries	phloem
A	yes	yes
B	yes	no
C	no	yes
D	no	no

15 Through which pathway does blood leave the heart?

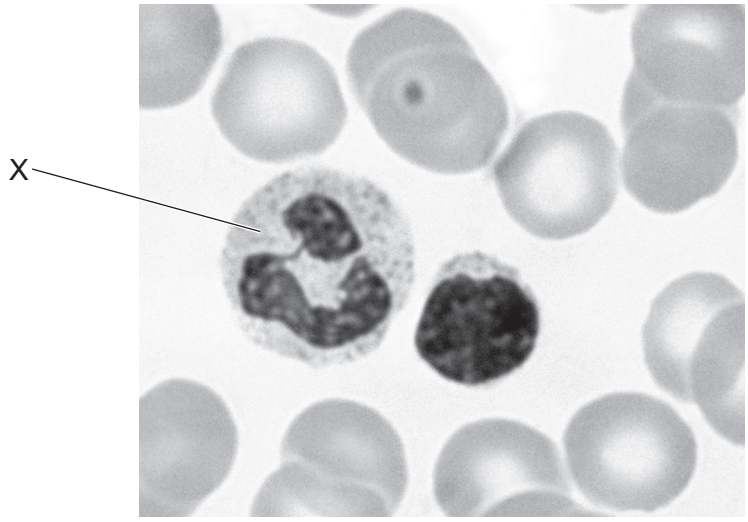
A through arteries from the atria

B through arteries from the ventricles

C through veins from the atria

D through veins from the ventricles

16 The photomicrograph shows some blood cells.



Which row shows the name and function of the cell labelled X?

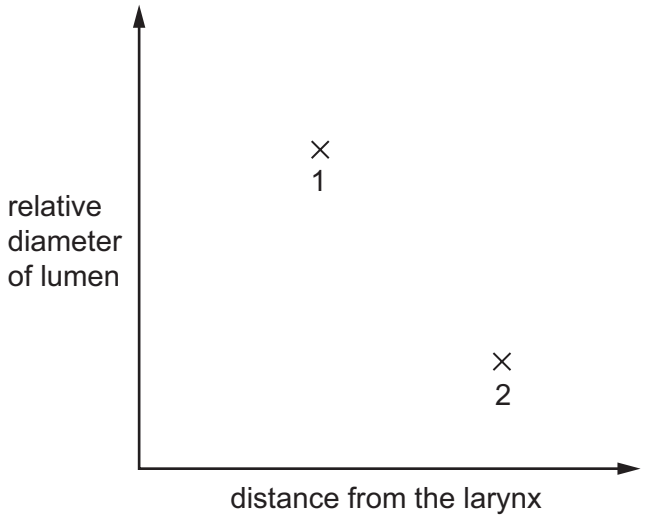
	name	function
A	lymphocyte	engulfs pathogens
B	lymphocyte	produces antibodies
C	phagocyte	engulfs pathogens
D	phagocyte	produces antibodies

[Turn over

17 Which row shows the effects of cholera on the human body?

	movement of chloride ions	effect of a build-up of chloride ions on water potential	effect on volume of water leaving the body through the anus
A	into blood	decreases	increases
B	into blood	increases	decreases
C	into small intestine	decreases	increases
D	into small intestine	increases	decreases

18 The plotted points, 1 and 2, on the graph show two different types of structure in the breathing system of a human.



Which row identifies a structure attached to alveoli and a structure containing cartilage?

	a structure attached to alveoli	a structure containing cartilage
A	1	1
B	1	2
C	2	1
D	2	2

19 Which process in plants uses energy from respiration?

A cell division

B osmosis

C photosynthesis

D transpiration

20 Which sequence of statements explains the build-up and removal of an oxygen debt?

1 Anaerobic respiration occurs in muscles during vigorous exercise.

2 Faster and deeper breathing continues after exercise.

3 Glucose is converted to lactic acid.

4 Lactic acid builds up in muscles causing an oxygen debt.

5 Oxygen enables the continued aerobic respiration of lactic acid.

A $1 \rightarrow 3 \rightarrow 4 \rightarrow 2 \rightarrow 5$

B $1 \rightarrow 3 \rightarrow 2 \rightarrow 4 \rightarrow 5$

C $3 \rightarrow 4 \rightarrow 5 \rightarrow 1 \rightarrow 2$

D $3 \rightarrow 4 \rightarrow 1 \rightarrow 5 \rightarrow 2$

21 What is filtered out of the blood in the glomerulus and into the nephron?

	glucose	urea
A	yes	yes
B	yes	no
C	no	yes
D	no	no

22 What can be broken down to form urea?

A amino acids

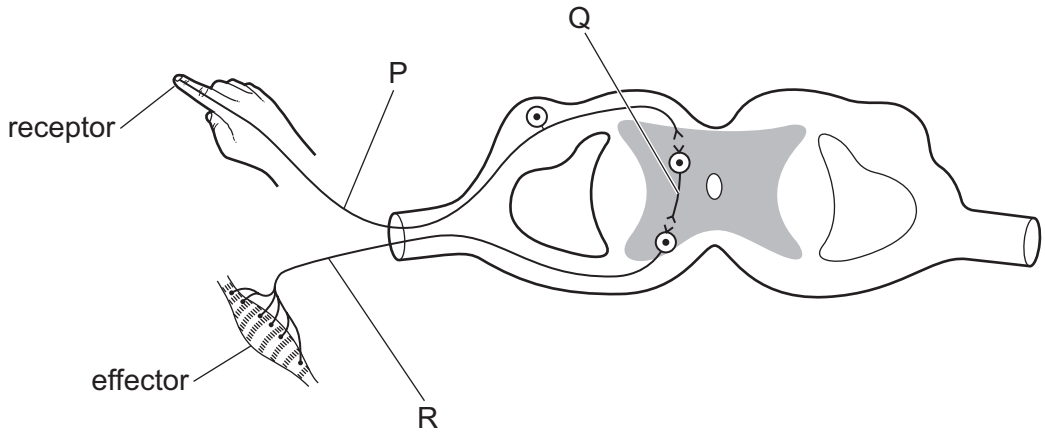
B fatty acids

C sugars

D vitamins

[Turn over

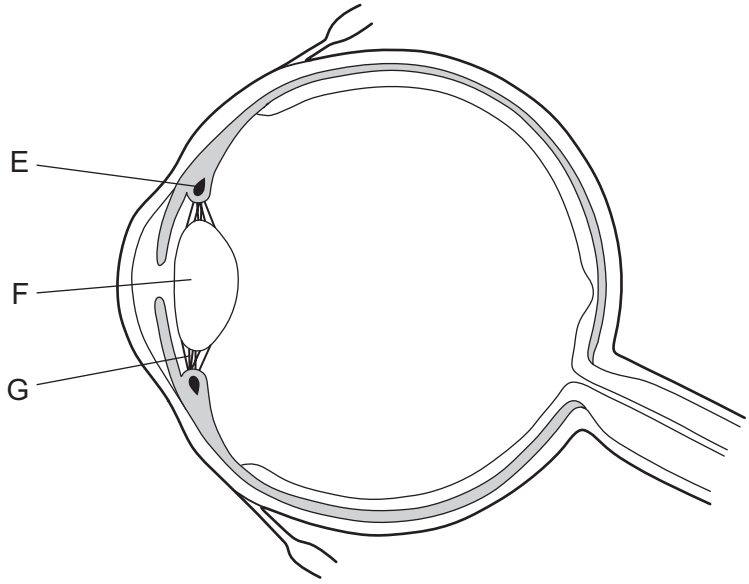
23 The diagram shows a simple reflex arc.



What are the names of the structures labelled P, Q and R?

	P	Q	R
A	motor neurone	relay neurone	sensory neurone
B	motor neurone	sensory neurone	relay neurone
C	sensory neurone	motor neurone	relay neurone
D	sensory neurone	relay neurone	motor neurone

24 The diagram shows a cross-section of an eye.



Which row is correct when a person views a near object?

	E	F	G	refraction
A	contracts	becomes thinner	pulled less	more
B	contracts	becomes thicker	pulled less	more
C	relaxes	becomes thinner	pulled less	less
D	relaxes	becomes thicker	pulled more	less

25 Which hormones increase the blood glucose concentration in humans?

A adrenaline and glucagon

B adrenaline and insulin

C glucagon only

D insulin only

[Turn over

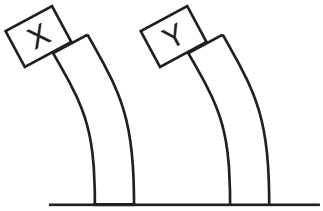
26 A shoot tip was placed on an agar block. Substances can diffuse through agar.

Light was shone on the shoot tip from one direction.

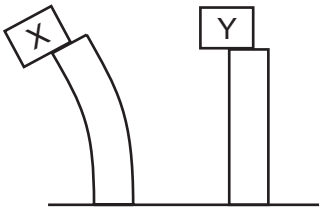
After three days, the agar was cut in half to form blocks X and Y. Blocks X and Y were placed on the stems of shoots that had the tips cut off. The agar blocks were kept on the shoot stems for one week.

Which set of shoots represents the results after one week?

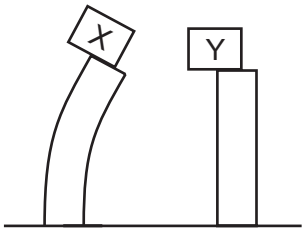
A



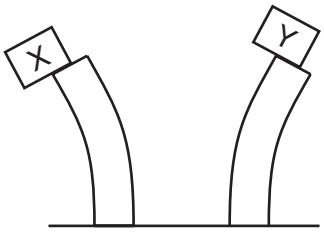
B



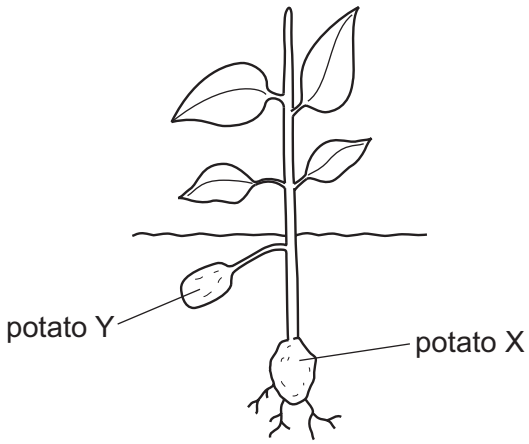
C



D



27 The diagram shows reproduction in a potato plant. Potato X was planted into the ground and a plant grew from it. The plant then produced potato Y.



Which statement is correct?

A X and Y are genetically different.

B Y was produced by asexual reproduction.

C Y was produced by sexual reproduction.

D Y was produced by the fusion of gametes.

28 Which statement about pollination is correct?

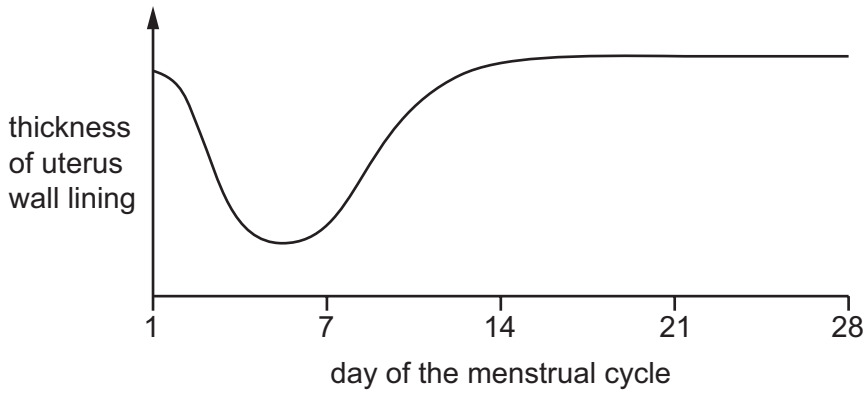
A Self-pollination increases the ability of the population to respond to changes in the environment by increasing variation.

B Self-pollination increases the ability of the population to respond to changes in the environment by reducing variation.

C Self-pollination reduces the ability of the population to respond to changes in the environment by increasing variation.

D Self-pollination reduces the ability of the population to respond to changes in the environment by reducing variation.

29 The graph shows changes in the thickness of the lining of the uterus wall during a menstrual cycle.



Which day is the last day of menstruation?

A 4 **B** 8 **C** 16 **D** 20

30 Which name is given to different versions of a gene?

A allele

B chromosome

C length of DNA

D protein

31 The diagram shows the cells of a mammalian embryo shortly after fertilisation.

What is the correct description of these cells?

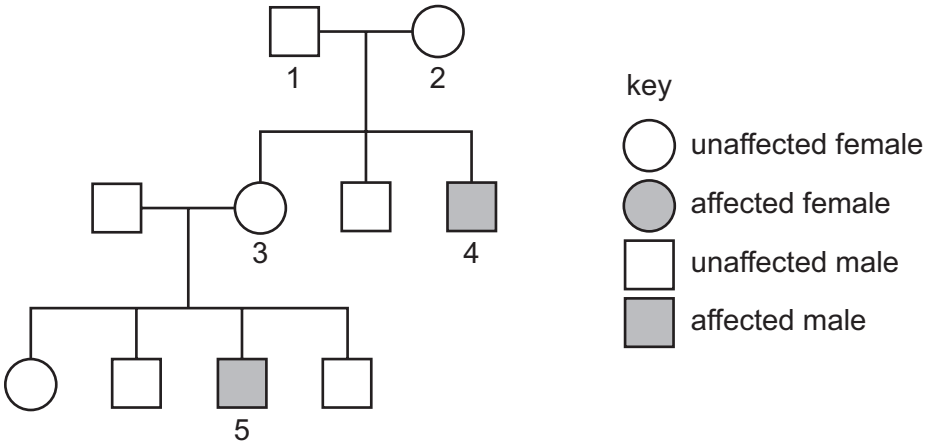
A embryo cells undergoing meiosis

B gametes undergoing mitosis

C stem cells undergoing mitosis

D zygote undergoing meiosis

32 The diagram shows the inheritance, in one family, of a sex-linked recessive disease.



Which individuals in the diagram are heterozygous for this disease?

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

33 Which row describes continuous and discontinuous variation?

	continuous variation	discontinuous variation
A	body mass in animals is an example	caused by genes and the environment
B	caused by genes and the environment	seed shape in peas is an example
C	caused by genes only	ABO blood groups is an example
D	seed colour in peas is an example	caused by genes only

34 Which statements describe an adaptive feature in an organism?

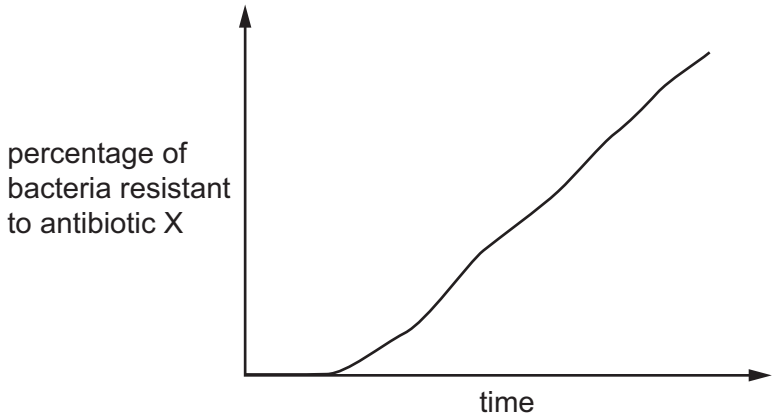
1 It helps an organism to survive and reproduce in its environment.

2 It always shows continuous variation.

3 It is inherited.

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

35 The graph shows the change in the percentage of bacteria resistant to antibiotic X.



What causes the change shown in the graph?

A artificial selection

B natural selection

C meiosis

D random fertilisation

36 The diagram shows the flow of energy, in units of energy, through a food chain.

producers	→	primary consumers	→	secondary consumers	→	tertiary consumers
1000 units		100 units		10 units		1 unit

Which percentage of energy is lost between the producers and secondary consumers?

A 1% **B** 10% **C** 90% **D** 99%

37 Which process in the nitrogen cycle can be caused by lightning and bacteria?

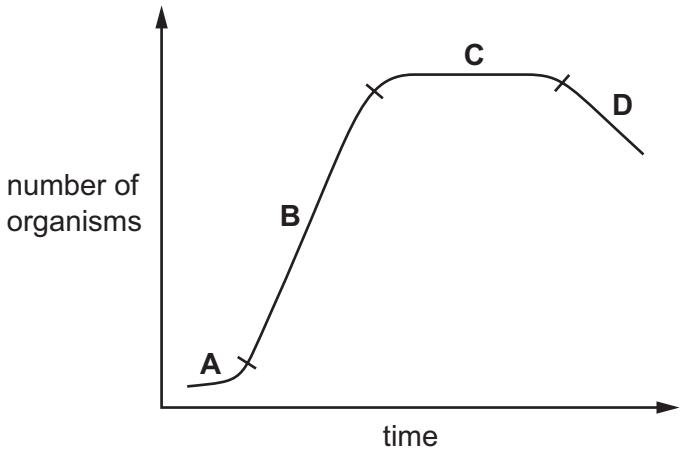
A deamination

B denitrification

C nitrification

D nitrogen fixation

38 Which phase in the population growth curve shows when death rates are higher than birth rates?



39 What is a **disadvantage** of large-scale monocultures of crop plants?

A a decrease in use of insecticides

B a decrease in fossil fuel emissions

C an increase in biodiversity

D an increase in risk of disease destroying the entire crop

40 Some processes involved in the production of human insulin by genetic modification are listed.

1 insertion of the human insulin gene DNA into a cut bacterial plasmid

2 bacteria containing recombinant plasmids multiply and make human insulin

3 human insulin gene DNA is isolated using restriction enzymes

4 recombinant plasmids are inserted into bacteria

What is the sequence of these processes in genetic modification?

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

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

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

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

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