Cambridge Assessment International Education

# Cambridge IGCSE™

**BIOLOGY** **0610/21**

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.



IB25 06_0610_21/5RP


**[Turn over**

**1** Which characteristic of living things requires carbon dioxide to diffuse into a leaf?

**A** excretion

**B** movement

**C** nutrition

**D** respiration

**2** Which set of features is characteristic only of birds?

**A** hair and wings

**B** hard-shelled eggs and feathers

**C** scales and soft-shelled eggs

**D** wings and soft-shelled eggs

**3** Which structures are found in both plant and animal cells?

**A** cell walls and cell membranes

**B** nuclei and cell walls

**C** cytoplasm and chloroplasts

**D** cell membranes and nuclei

**4** A student made the following statements about the movement of ions by active transport.

1 It is the net movement of particles from a low concentration to a high concentration.

2 It is the net movement of particles from a high concentration to a low concentration.

3 It requires the use of energy from respiration.

4 It can only take place in living cells.

Which statements are correct?

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

**5** A DNA molecule contains pairs of bases.

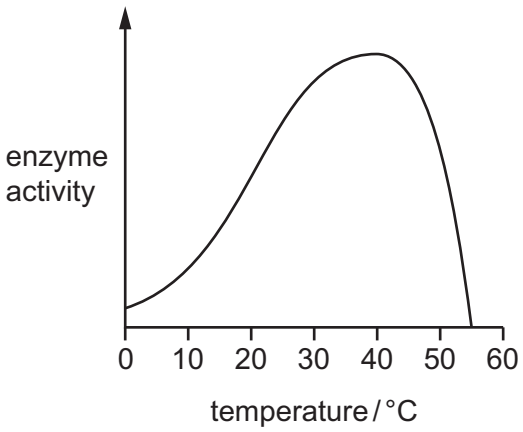
What is a correct combination of a pair of bases?

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

**6** What is the test for protein?

| | name of the test | heat | colour change |
|---|---|---|---|
| **A** | Benedict's | yes | blue to purple |
| **B** | biuret | yes | blue to red |
| **C** | biuret | no | blue to purple |
| **D** | Benedict's | no | blue to red |

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




Why is enzyme activity lower at 55 °C than it is at 40 °C?

**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** Which descriptions of adaptations for photosynthesis are correct for spongy mesophyll tissue?

| | air spaces for efficient gas exchange | long, rectangular cells to absorb light |
|---|---|---|
| **A** | yes | yes |
| **B** | yes | no |
| **C** | no | yes |
| **D** | no | no |



**[Turn over**

**9** The table shows the recommended daily allowance (RDA) of some nutrients for young children.

The table also shows the masses of these nutrients eaten by a child in one day.

| | mass of vitamin C / mg | mass of vitamin D / μg | mass of iron / mg | mass of calcium / mg |
|---|---|---|---|---|
| RDA | 50 | 10 | 11 | 260 |
| mass eaten in one day | 54 | 5 | 11 | 150 |

Which conditions will the child be at risk of developing if they consume the same diet for a long period of time?

1 anaemia (**not** having enough red blood cells)

2 rickets

3 scurvy

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

**10** Which term is used for the uptake and use of nutrients by cells?

**A** absorption

**B** assimilation

**C** egestion

**D** ingestion

**11** What is the function of trypsin in digestion?

**A** It catalyses the breakdown of maltose in the mouth.

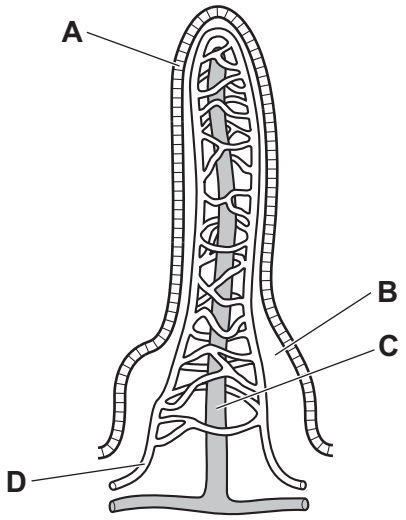
**B** It catalyses the breakdown of maltose in the small intestine.

**C** It catalyses the breakdown of protein in the small intestine.

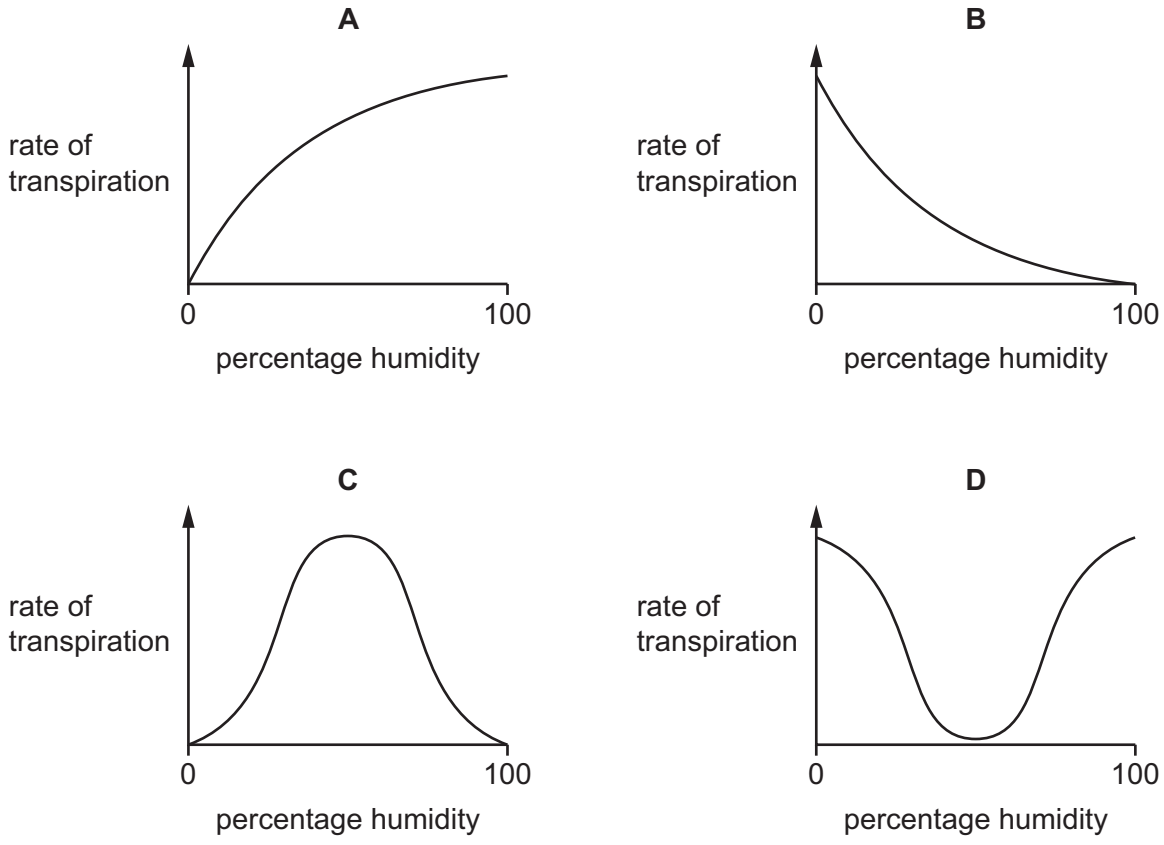
**D** It catalyses the breakdown of protein in the stomach.

**12** The diagram shows the structure of a villus.

Which label shows a lacteal?




**13** Which graph shows the effect of humidity in the air on the rate of transpiration in a plant?



**14** In some countries, spring is the time of year when daffodil plants have green leaves and produce flowers.

Which parts of the daffodil plants act as sources and sinks in spring?

| | flowers | leaves |
|---|---|---|
| **A** | sink | sink |
| **B** | source | source |
| **C** | sink | source |
| **D** | source | sink |

**15** In a fish, what is the sequence of structures that blood passes through after it leaves the heart?

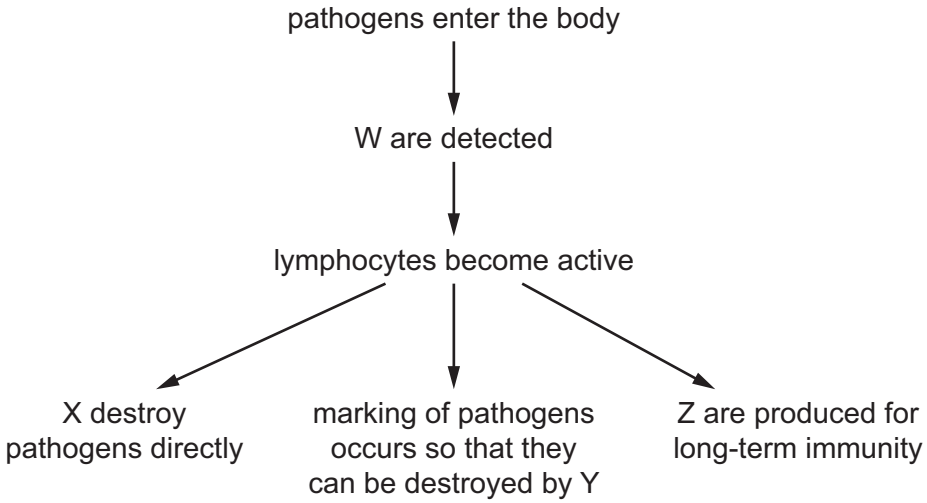
**A** gills → muscles → heart

**B** gills → heart → muscles → heart

**C** muscles → gills → heart

**D** muscles → heart

**16** The diagram shows what happens in the body during active immunity.




Which structures or cells represent W, X, Y and Z?

| | antibodies | antigens | memory cells | phagocytes |
|---|---|---|---|---|
| **A** | W | X | Y | Z |
| **B** | W | X | Z | Y |
| **C** | X | W | Y | Z |
| **D** | X | W | Z | Y |

**17** Cholera is a disease caused by a bacterium called *Vibrio cholerae* which produces a toxin in the infected person's gut.

What is the effect of this toxin?

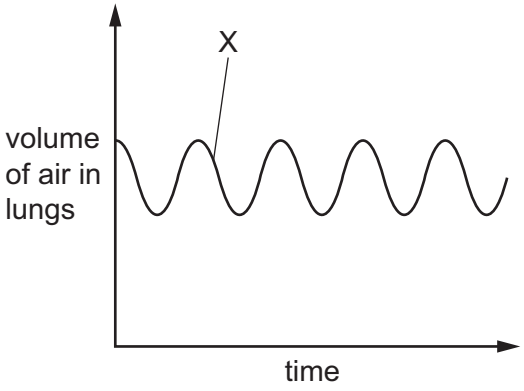
**A** The toxin causes loss of water from the gut into the blood.

**B** The toxin causes loss of water from the gall bladder into the blood.

**C** The toxin causes water to enter the gut from the blood.

**D** The toxin causes water to enter the gall bladder from the blood.

**18** The graph shows how the volume of air in lungs changes when a person is breathing at rest.




Which processes are occurring to change the volume at the point marked X?

**A** The diaphragm is relaxing and the external intercostal muscles are relaxing.

**B** The diaphragm is contracting and the internal intercostal muscles are contracting.

**C** The diaphragm is contracting and the internal intercostal muscles are relaxing.

**D** The diaphragm is relaxing and the external intercostal muscles are contracting.

**19** The processes listed occur in living organisms.

1 cell division

2 diffusion

3 muscle contraction

4 osmosis

Which processes require energy from respiration?

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

**20** What is a role of the glomerulus?

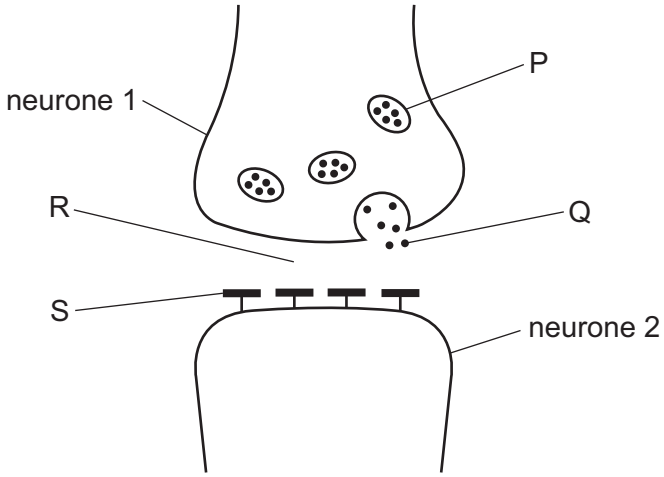
**A** assembling amino acids into proteins

**B** filtration of water, glucose, urea and ions from the blood

**C** reabsorption of glucose, ions and water back into the blood

**D** removal of the nitrogen-containing part of amino acids to form urea

**21** The diagram shows a synapse.



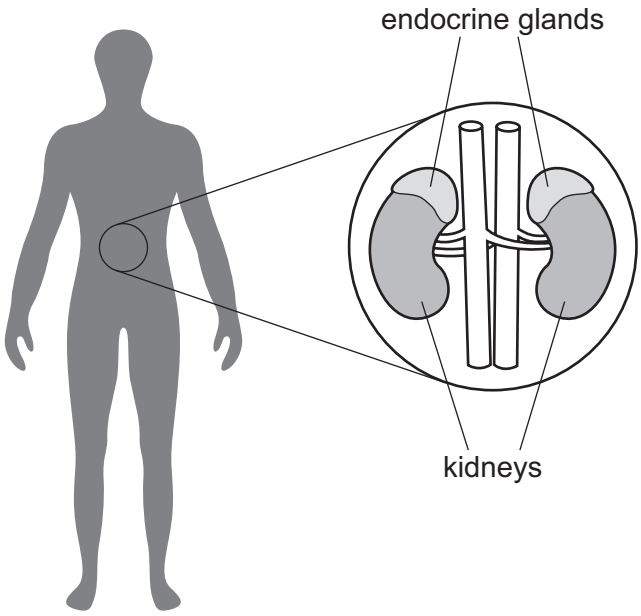

What are the labelled parts?

| | P | Q | R | S |
|---|---|---|---|---|
| **A** | synaptic gap | neurotransmitter | vesicle | receptor |
| **B** | synaptic gap | receptor | vesicle | neurotransmitter |
| **C** | vesicle | neurotransmitter | synaptic gap | receptor |
| **D** | vesicle | receptor | synaptic gap | neurotransmitter |

**22** Which row shows the function of rod cells?

| | night vision | colour vision |
|---|---|---|
| **A** | yes | yes |
| **B** | yes | no |
| **C** | no | yes |
| **D** | no | no |

**23** The diagram shows the positions of two endocrine glands in the human body.




What is a response of the body to the hormone released from these glands?

**A** a decrease in heart rate

**B** a decrease in blood glucose concentration

**C** an increase in pupil diameter

**D** the development of secondary sexual characteristics

**24** What is a response of the human body to overheating?

**A** vasoconstriction of arterioles

**B** vasoconstriction of veins

**C** vasodilation of arterioles

**D** vasodilation of veins

**25** What is an example of phototropism?

**A** the growth of a root in the direction of gravity

**B** the growth of a shoot towards light

**C** the release of energy from glucose using light

**D** the synthesis of glucose using light



**[Turn over**

**26** Which statement describes the effect of antibiotics?

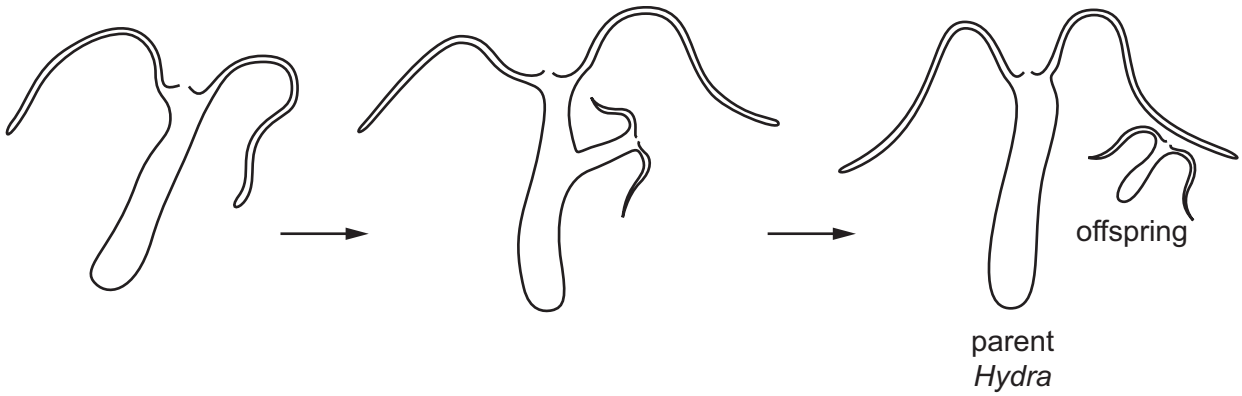
**A** Antibiotics do **not** affect bacteria or viruses.

**B** Antibiotics kill bacteria but do **not** affect viruses.

**C** Antibiotics kill both bacteria and viruses.

**D** Antibiotics kill viruses but do **not** affect bacteria.

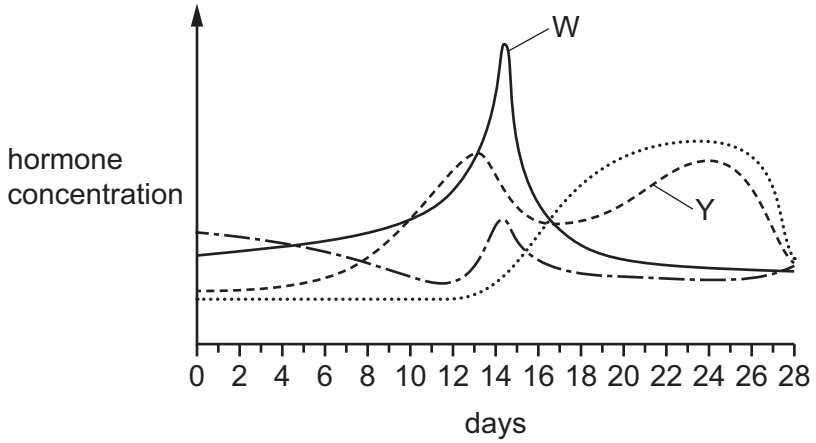
**27** The diagram shows one parent *Hydra* growing and releasing an offspring from the side of its body.




Which row is correct?

| | parent and offspring are genetically identical | involves asexual reproduction |
|---|---|---|
| **A** | yes | yes |
| **B** | yes | no |
| **C** | no | yes |
| **D** | no | no |

**28** The diagram shows the changing concentrations of some hormones involved in the menstrual cycle.




Which letters identify two of the hormones?

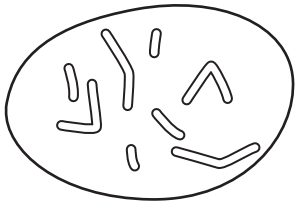
**A** W is FSH and Y is oestrogen.

**B** W is LH and Y is oestrogen.

**C** W is progesterone and Y is FSH.

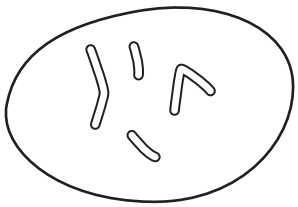
**D** W is progesterone and Y is LH.

**29** The diagram shows the chromosomes in the nucleus of a cell that divides by mitosis.

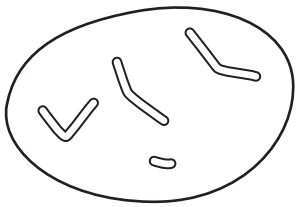


Which diagram shows the chromosomes in the nucleus of one of the daughter cells produced?

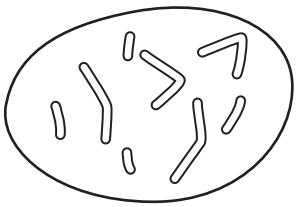
**A**



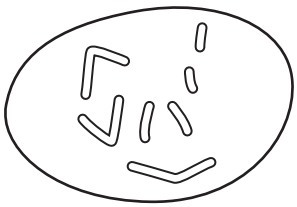
**B**



**C**



**D**



**30** A farmer bred together male cattle with white hair and female cattle with red hair. All the offspring produced had roan hair (a mixture of red and white).

He then repeatedly bred together two roan cattle, and the offspring were in the ratio of 1 red : 2 roan : 1 white.

What explains why the farmer obtained this ratio?

**A** The red phenotype is dominant to the white phenotype.

**B** The roan phenotype is an example of codominance.

**C** The roan phenotype is dominant to the red phenotype and the white phenotype.

**D** The white phenotype is dominant to the red phenotype.

**31** Phagocytes and neurones are two types of specialised cell.

Which statements are correct?

1 Phagocytes and neurones express the same genes.

2 Both types of cell have the same genes.

3 Both types of cell only express the genes that make the proteins needed for the cell to function.

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

**32** The table shows some features of leaves.

Which leaf is adapted to survive in hot, dry habitats?

| | number of stomata | thickness of waxy cuticle | surface area of leaf |
|---|---|---|---|
| **A** | many | thick | small |
| **B** | many | thin | large |
| **C** | few | thick | small |
| **D** | few | thin | large |

**33** Which row correctly describes a type of selection?

| | type of selection | humans involved | example |
|---|---|---|---|
| **A** | artificial | no | production of farmed animals that produce lots of milk |
| **B** | artificial | yes | production of bacteria that are resistant to antibiotics |
| **C** | natural | yes | production of insulin through genetic modification of bacteria |
| **D** | natural | no | production of wild animals with long necks to reach tree leaves as a food source |

**34** Which statement about a pyramid of energy for a food chain is correct?

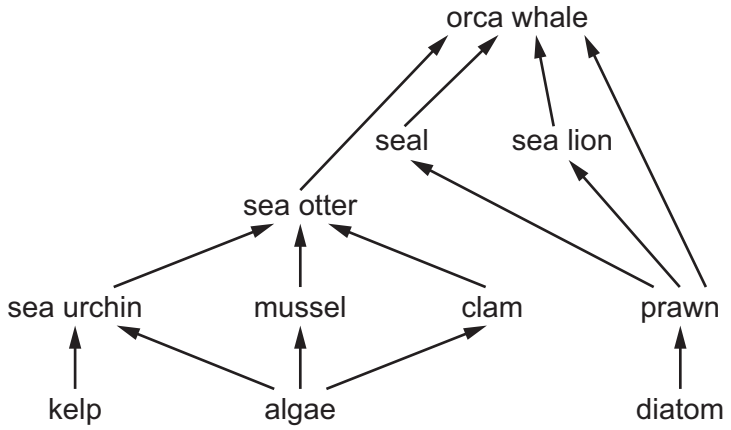
**A** It shows how energy is lost at each trophic level.

**B** It shows the energy stored at each trophic level.

**C** It shows the input of energy from the principal source.

**D** It shows the total energy stored within an ecosystem.

**35** The food web shows part of an ocean ecosystem.




Which row shows the number of secondary consumers and the number of tertiary consumers in the food web?

| | number of secondary consumers | number of tertiary consumers |
|---|---|---|
| **A** | three | one |
| **B** | four | one |
| **C** | three | two |
| **D** | four | two |

**36** A student investigated the effect of high temperature on the production of nitrate ions in soil.

Two samples of soil were taken. One sample was heated to 100 °C.

All the nitrate ions were completely removed from both soil samples.

Ammonium ions were then added to both soil samples.

After two weeks, both soil samples were tested for the presence of nitrate ions.

The results are shown.

| soil sample | nitrate ions present or absent |
|---|---|
| **not** heated to 100 °C | present |
| heated to 100 °C | absent |

Which statement explains the results?

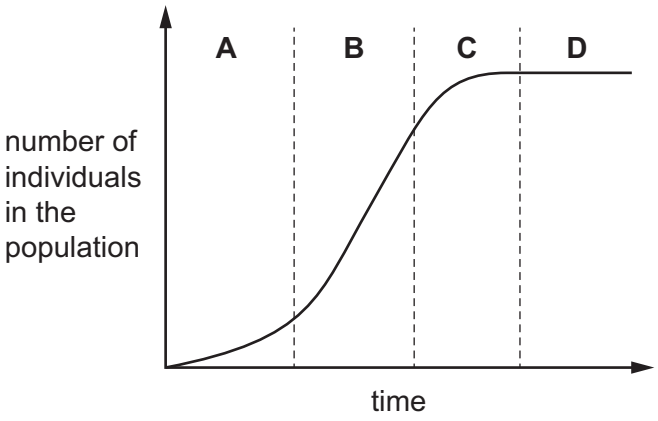
**A** Heating the soil broke down the nitrate ions.

**B** Heating the soil increased the activity of denitrifying bacteria.

**C** Heating the soil killed nitrifying bacteria.

**D** Heating the soil killed nitrogen-fixing bacteria.

**37** Which letter represents the lag phase in the population graph shown?




**38** Which term describes the number of different species living in an area?

**A** biodiversity

**B** conservation

**C** ecosystem

**D** population

**39** Which source of pollution can cause eutrophication?

**A** carbon dioxide

**B** methane

**C** non-biodegradable plastic

**D** sewage

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

1 cutting of bacterial plasmid DNA with restriction enzymes

2 expression in bacteria of the human gene to make insulin

3 insertion of recombinant plasmids into bacteria

4 multiplication of bacteria containing recombinant plasmids

In which order do these processes occur?

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

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

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

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