**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

**BIOLOGY** **0610/23**

Paper 2 Multiple Choice (Extended) **May/June 2016**

**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.

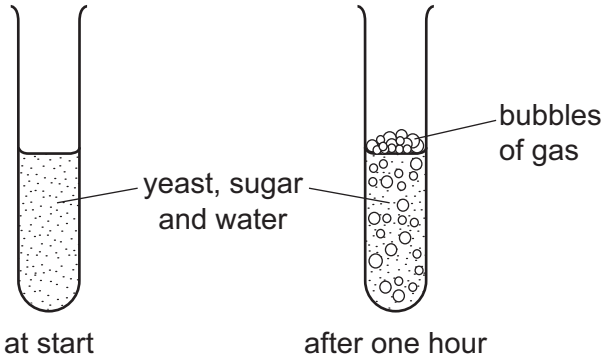
**Read the instructions on the Answer Sheet very carefully.**

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 **17** printed pages and **3** blank pages.

**1** Some yeast, sugar and water are mixed in a test-tube. The diagrams show the test-tube at the start and after one hour.




Which process causes this change?

**A** growth

**B** reproduction

**C** respiration

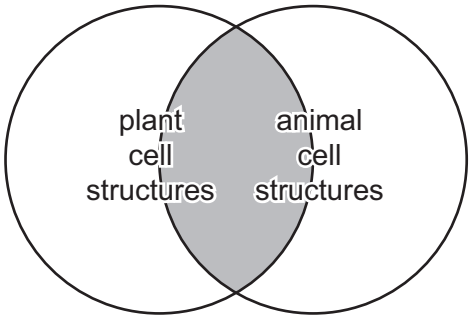
**D** sensitivity

**2** During the process of nutrition, all organisms need to absorb mineral ions and water from their environment.

Which other substances do plants and animals need to absorb during this process?

| | plants | animals |
|---|---|---|
| **A** | carbon dioxide | inorganic compounds |
| **B** | carbon dioxide | organic compounds |
| **C** | oxygen | inorganic compounds |
| **D** | oxygen | organic compounds |

**3** The shaded area of the diagram represents structures found in both plant and animal cells.




Which cell structure is from the shaded area?

**A** cell membrane

**B** cell wall

**C** chloroplast

**D** large vacuole

**4** What is the correct order of increasing size of the following structures, from smallest to largest?

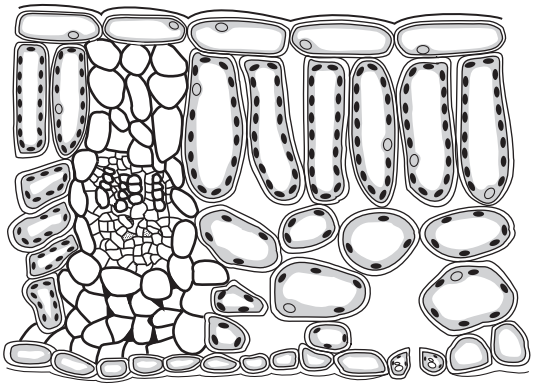
**A** chromosome → liver → white blood cell

**B** chromosome → white blood cell → liver

**C** liver → chromosome → white blood cell

**D** white blood cell → liver → chromosome

**5** The actual thickness of the leaf shown in the diagram is 2000 μm, but its thickness in the diagram is 50 mm.



What is the magnification of the diagram?

**A** ×0.025 **B** ×25 **C** ×100 **D** ×100 000

**6** Which statement describes how young plants are supported?

**A** the pressure of water inside the cells pressing outwards on the cell membranes

**B** the pressure of water inside the cells pressing outwards on the cell walls

**C** the pressure of water passing from the roots through the phloem

**D** the pressure of water passing from the roots through the xylem

**7** The diagram shows the order of bases along part of one strand of DNA.

A—C—T—T—A—G—A—T

What is the order of bases on the corresponding part of the other strand?

**A** A—C—T—T—A—G—A—T

**B** C—A—G—G—C—T—C—G

**C** T—A—G—A—T—T—C—A

**D** T—G—A—A—T—C—T—A

**8** Small molecules are used as the basic units in the synthesis of large food molecules.

Which statement is correct?

**A** Amino acids are basic units of carbohydrates.

**B** Fatty acids are basic units of glycogen.

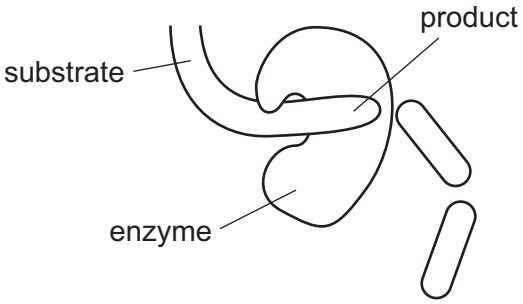
**C** Glycerol is a basic unit of oils.

**D** Simple sugar is a basic unit of protein.

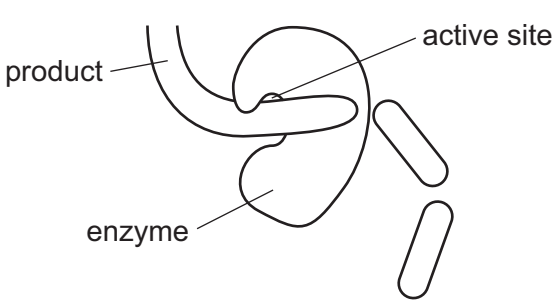
**9** The diagrams show a protease enzyme catalysing the breaking of part of a protein molecule into smaller pieces.

Which diagram has three correct labels?

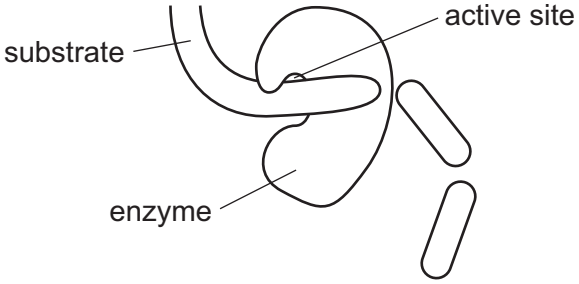
**A**



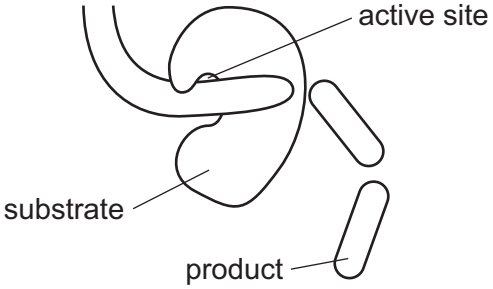

**B**



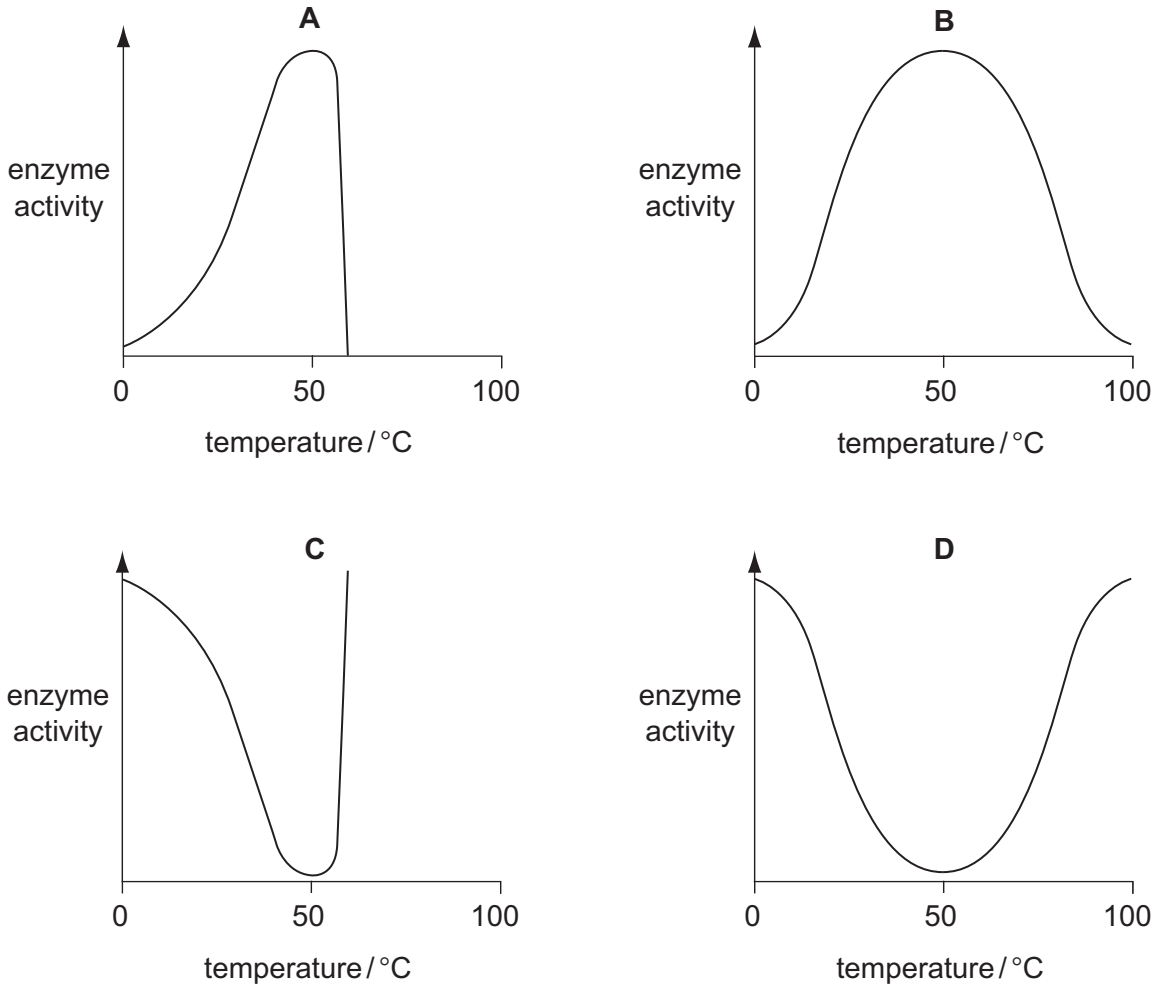

**C**




**D**



**10** Which graph shows the effect of temperature on the activity of an enzyme?




**11** Which feature is a leaf adaptation for living in the desert?

**A** large size

**B** many stomata

**C** rolled along its length

**D** thin waxy cuticle

**12** In which region of the alimentary canal is maltose digested?

**A** colon

**B** rectum

**C** small intestine

**D** stomach

**13** Which description of the cholera pathogen is correct?

**A** The bacterium prevents the kidney from absorbing water, so water is secreted into the small intestine, causing diarrhoea.

**B** The bacterium produces a toxin that causes the secretion of chloride ions into the small intestine, drawing in water by osmosis.

**C** The virus prevents the kidney from absorbing water, so water is secreted into the small intestine, causing diarrhoea.

**D** The virus produces a toxin that causes the secretion of chloride ions into the small intestine, drawing in water by osmosis.

**14** The diagram shows a fat globule (P) in one part of the alimentary canal and the same globule (Q) as it appears in another part of the alimentary canal.

P

Q

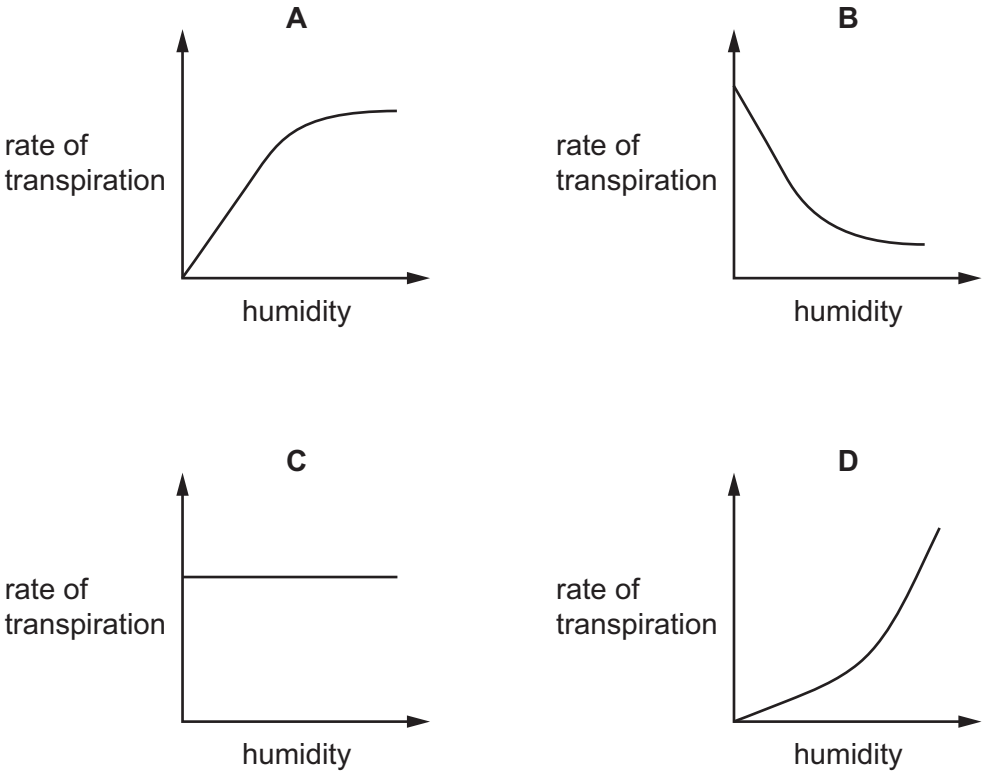
In which parts of the alimentary canal are P and Q found?

| | P | Q |
|---|---|---|
| **A** | duodenum | stomach |
| **B** | ileum | oesophagus |
| **C** | oesophagus | ileum |
| **D** | rectum | ileum |

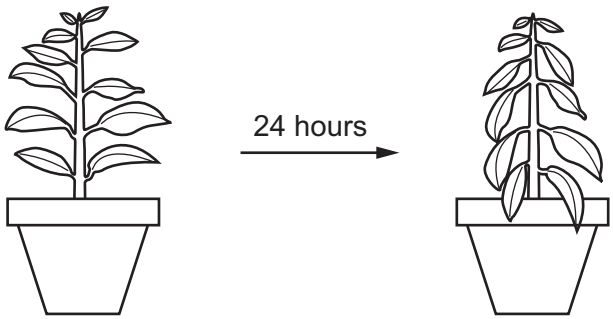


**[Turn over**

**15** Which graph shows most clearly what will happen to the rate of transpiration as humidity increases?




**16** The diagram shows a potted plant and the same plant 24 hours later.




What causes the change in the appearance of the plant?

**A** Water loss is greater than water uptake.

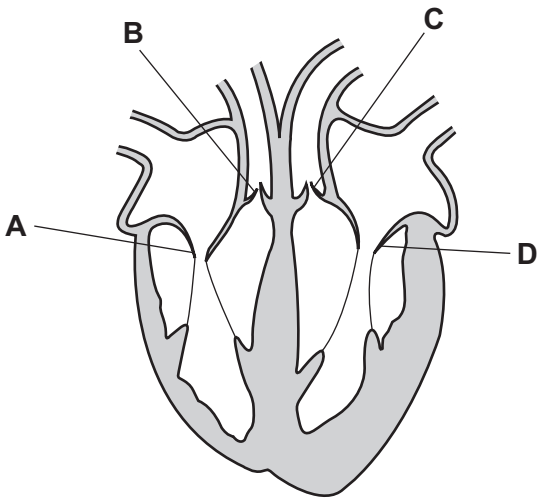
**B** Water moves from the leaves to the stem.

**C** Water uptake is equal to water loss.

**D** Water uptake is greater than water loss.

**17** The diagram shows a section through the human heart.

Which is the right atrioventricular valve?




**18** What is a method of reducing the risk of coronary heart disease?

**A** angioplasty

**B** 'by-pass' surgery

**C** controlled exercise

**D** inserting a stent

**19** Which row describes the features of passive immunity?

| | antibodies made | involves memory cells | effective period |
|---|---|---|---|
| **A** | no | no | short term |
| **B** | no | yes | short term |
| **C** | yes | no | long term |
| **D** | yes | yes | long term |

**20** What is the path of carbon dioxide as it leaves the lungs?

**A** alveolus → bronchiole → bronchus → trachea

**B** alveolus → bronchus → bronchiole → trachea

**C** trachea → bronchiole → bronchus → alveolus

**D** trachea → bronchus → bronchiole → alveolus



[Turn over

**21** When the external intercostal muscles contract, how do the pressure and the volume inside the lungs change?

| | pressure | volume |
|---|---|---|
| **A** | decreases | decreases |
| **B** | decreases | increases |
| **C** | increases | decreases |
| **D** | increases | increases |

**22** What is the equation for aerobic respiration?

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

**23** What is an example of excretion in mammals?

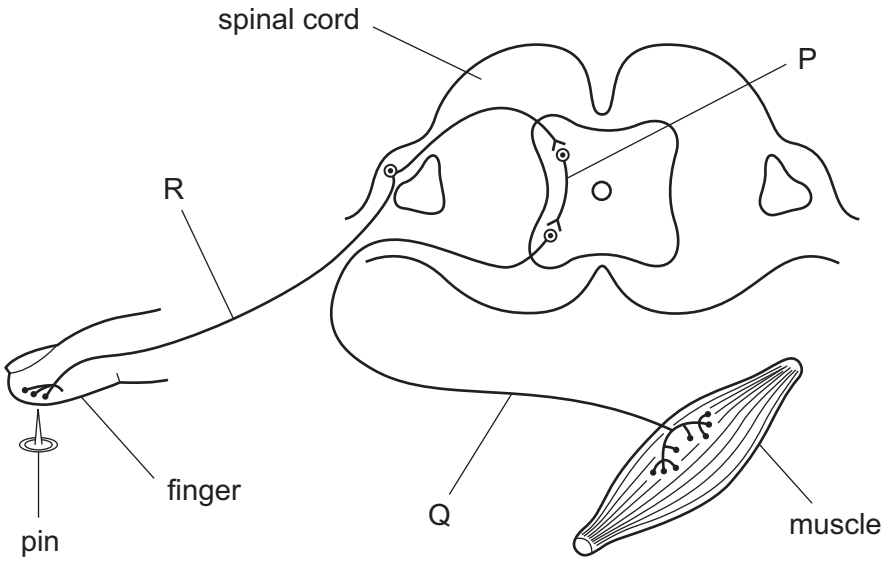
**A** the release of hormones from glands

**B** the release of saliva into the mouth

**C** the removal of undigested food through the anus

**D** the removal of urea by the kidneys

**24** The diagram represents a simple reflex arc.




What is the sequence of nerve cells through which an impulse passes during a reflex action?

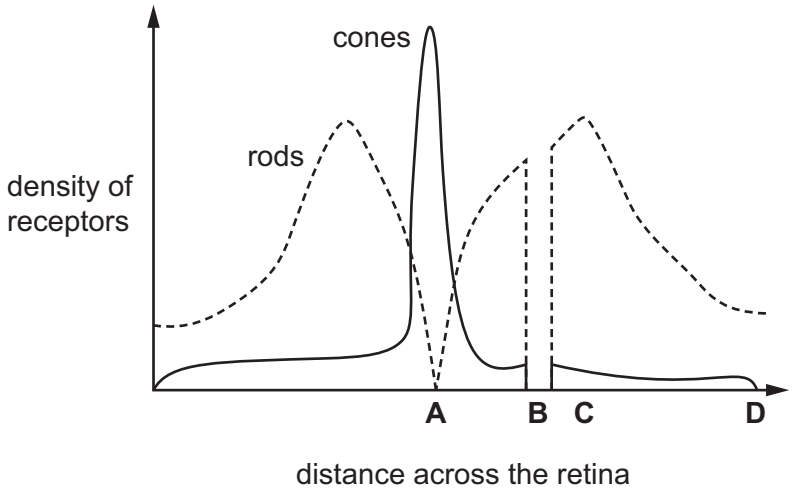
| | first → | | last |
|---|---|---|---|
| **A** | P | Q | R |
| **B** | Q | R | P |
| **C** | Q | P | R |
| **D** | R | P | Q |

**25** What effect does adrenaline have on blood glucose concentration and pulse rate?

| | blood glucose concentration | pulse rate |
|---|---|---|
| **A** | decreases | decreases |
| **B** | decreases | increases |
| **C** | increases | decreases |
| **D** | increases | increases |

**26** The diagram shows the density of rods and cones across a horizontal section of the retina.

What is the position of the optic nerve?




**27** A teacher said a way to remember the difference between two groups of cells is ‘many, minute and motile’ or ‘few, fat and fixed’

What are the groups of cells?

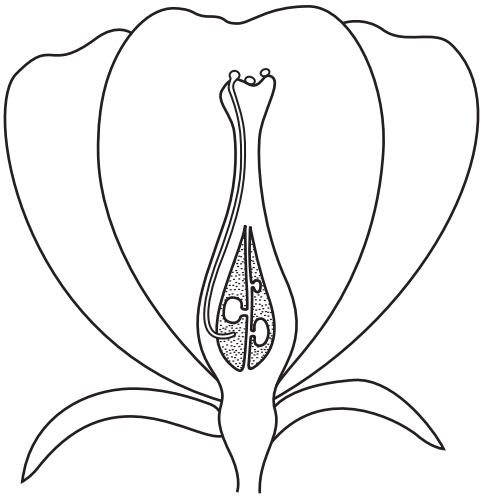
**A** animal and plant cells

**B** male and female gametes

**C** red and white blood cells

**D** xylem and phloem cells

**28** The diagram shows a flower.



Which processes have taken place?

| | pollination | fertilisation |
|---|---|---|
| **A** | no | no |
| **B** | no | yes |
| **C** | yes | no |
| **D** | yes | yes |

**29** The concentrations of LH and oestrogen are measured during part of a menstrual cycle.

On which day does ovulation occur?

| | date | concentration of LH / arbitrary units | concentration of oestrogen / arbitrary units |
|---|---|---|---|
| **A** | March 25th | 10 | 30 |
| **B** | March 28th | 12 | 135 |
| **C** | March 31st | 120 | 130 |
| **D** | April 3rd | 20 | 25 |

**30** Owners of successful race horses hope that the horses' offspring will be like their parents.

How does a young race horse inherit its characteristics?

**A** equally from its mother and father

**B** mainly from its father

**C** mainly from its mother

**D** passed across the placenta



**[Turn over**

**31** Which structures in plant cells build protein molecules under the control of the nucleus?

**A** cell walls

**B** chloroplasts

**C** mitochondria

**D** ribosomes

**32** In the inheritance of ABO blood groups, when two parents have the genotypes $I^AI^A$ and $I^AI^o$, what is the blood group of their offspring?

**A** group A

**B** group AB

**C** group B

**D** group O

**33** Which characteristic shows discontinuous variation in humans?

**A** height

**B** length of foot

**C** tongue rolling

**D** weight

**34** Sickle cell anaemia is determined by the gene Hb. $Hb^A$ is the allele for normal blood. $Hb^S$ is the allele for sickle cell anaemia.

Which combination of parents could result in some children with resistance to malaria and some with all normal red blood cells?

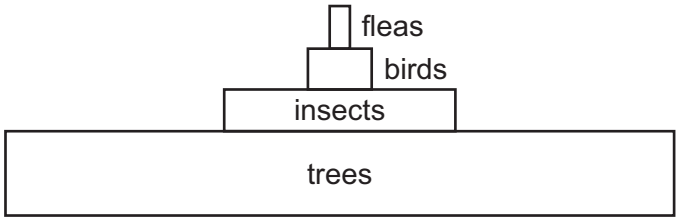
**A** $Hb^A\ Hb^A$ $Hb^A\ Hb^A$

**B** $Hb^A\ Hb^A$ $Hb^A\ Hb^S$

**C** $Hb^A\ Hb^A$ $Hb^S\ Hb^S$

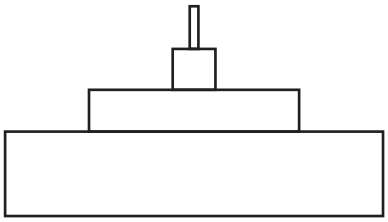
**D** $Hb^S\ Hb^S$ $Hb^S\ Hb^S$

**35** The diagram shows a pyramid of biomass for a food chain in a woodland ecosystem.

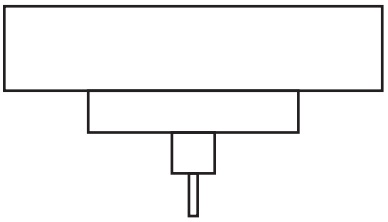



What is the pyramid of numbers for this food chain?

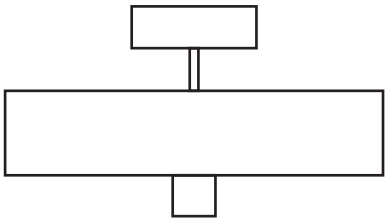
**A**



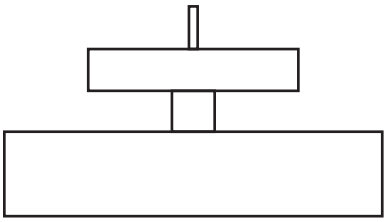
**B**



**C**



**D**



**36** Which process is **not** part of the water cycle?

**A** condensation

**B** fossilisation

**C** precipitation

**D** transpiration

**37** Which process is carried out by bacteria in the root nodules of leguminous plants?

**A** decomposition

**B** denitrification

**C** nitrification

**D** nitrogen fixation



**[Turn over**

**38** A gene for insulin is taken from a human cell and placed in a bacterium.

The bacterium can then make human insulin.

What is this process called?

**A** artificial selection

**B** genetic engineering

**C** heterozygous inheritance

**D** natural selection

**39** When a river is polluted by fertiliser, the following processes may occur.

1 increased aerobic respiration of decomposers

2 increased growth of producers

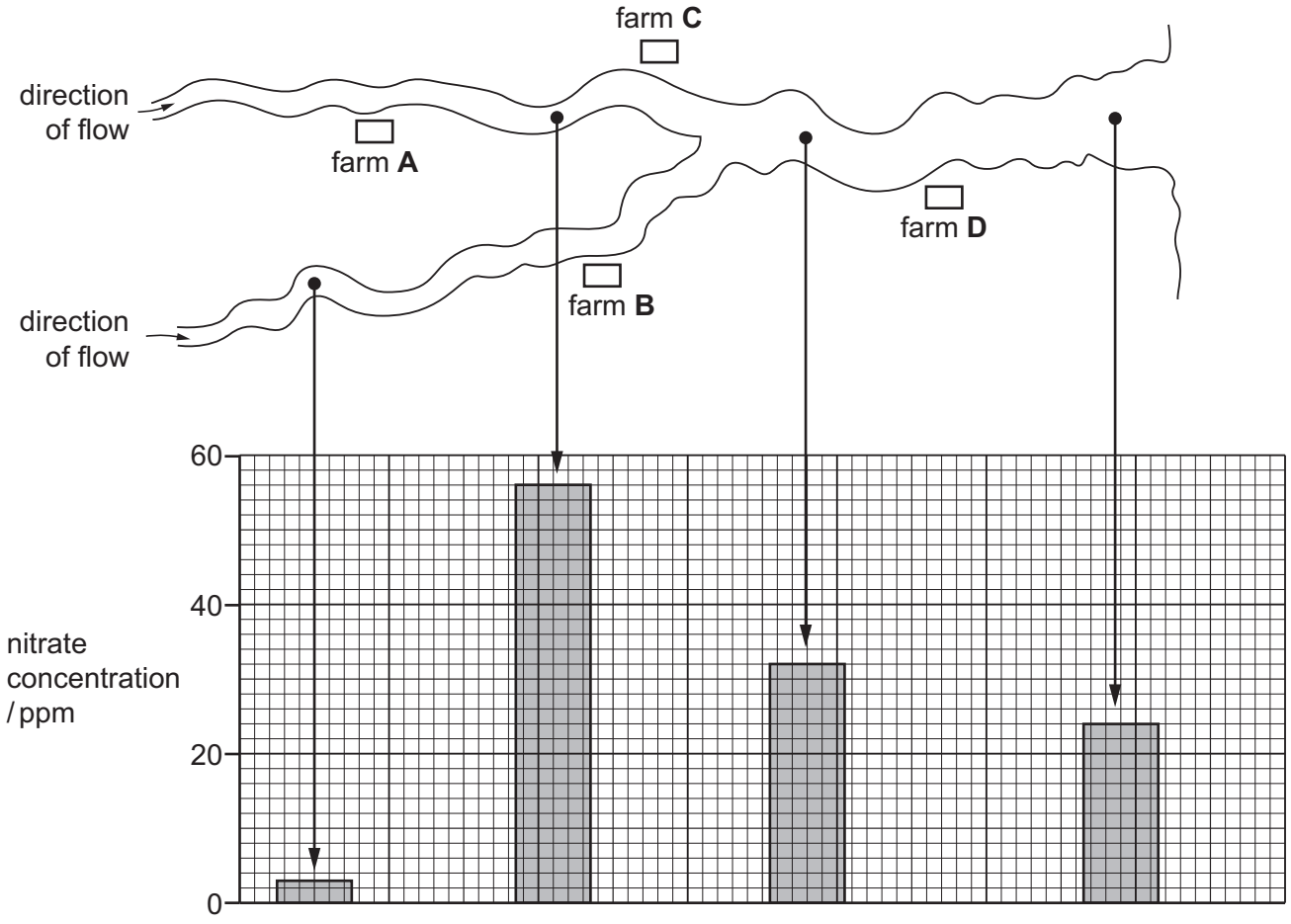
3 decreased oxygen concentration in the water

What is the correct sequence for these processes?

**A** $1 \rightarrow 2 \rightarrow 3$ **B** $1 \rightarrow 3 \rightarrow 2$ **C** $2 \rightarrow 1 \rightarrow 3$ **D** $2 \rightarrow 3 \rightarrow 1$

**40** 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?



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