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)

* 7 0 3 7 5 4 7 6 9 2 *

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.

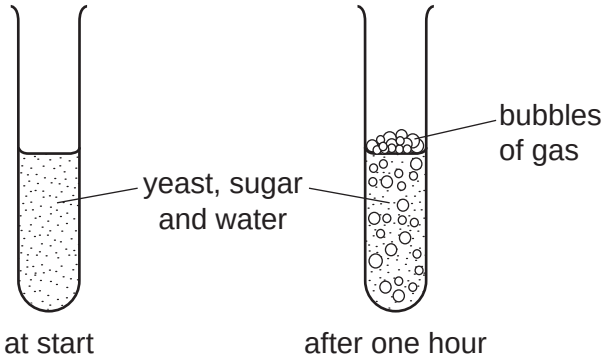
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

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.

© UCLES 2016

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

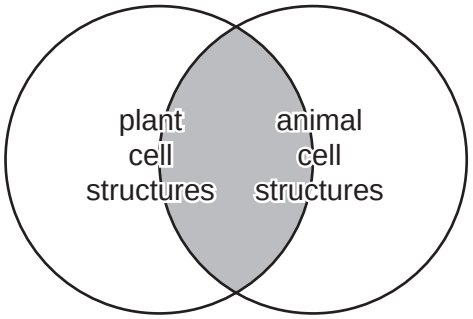
2 During the process of nutrition, all organisms need to absorb mineral ions and water from their environment.

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

© UCLES 2016

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?

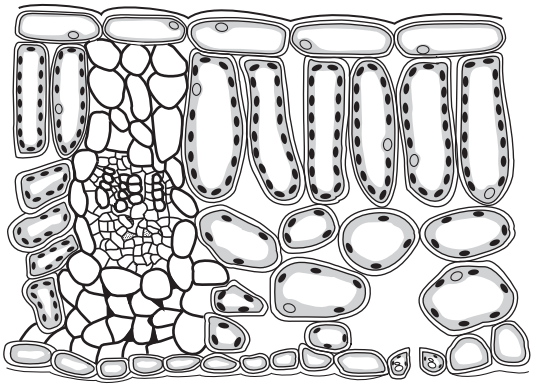
A chromosome → liver → white blood cell

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.

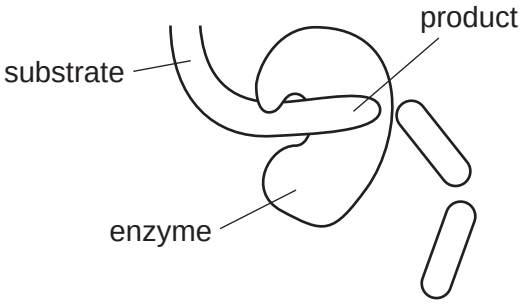
D Simple sugar is a basic unit of protein.

© UCLES 2016

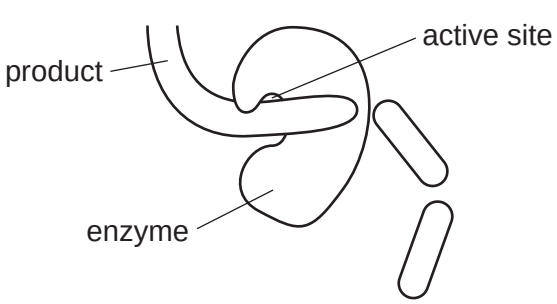
9 The diagrams show a protease enzyme catalysing the breaking of part of a protein molecule into smaller pieces.

Which diagram has three correct labels?

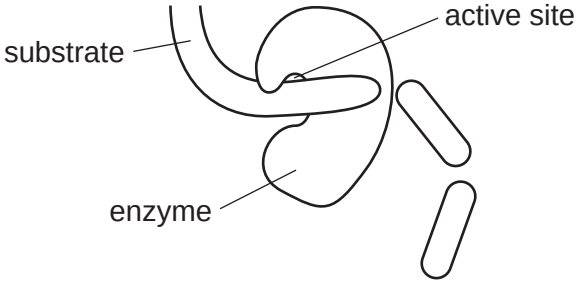
A



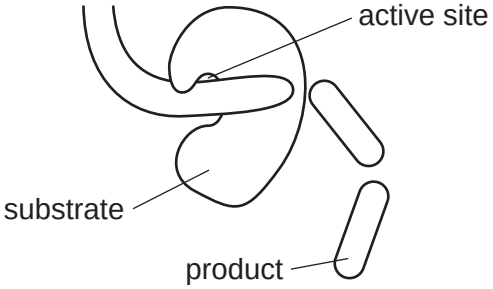
B



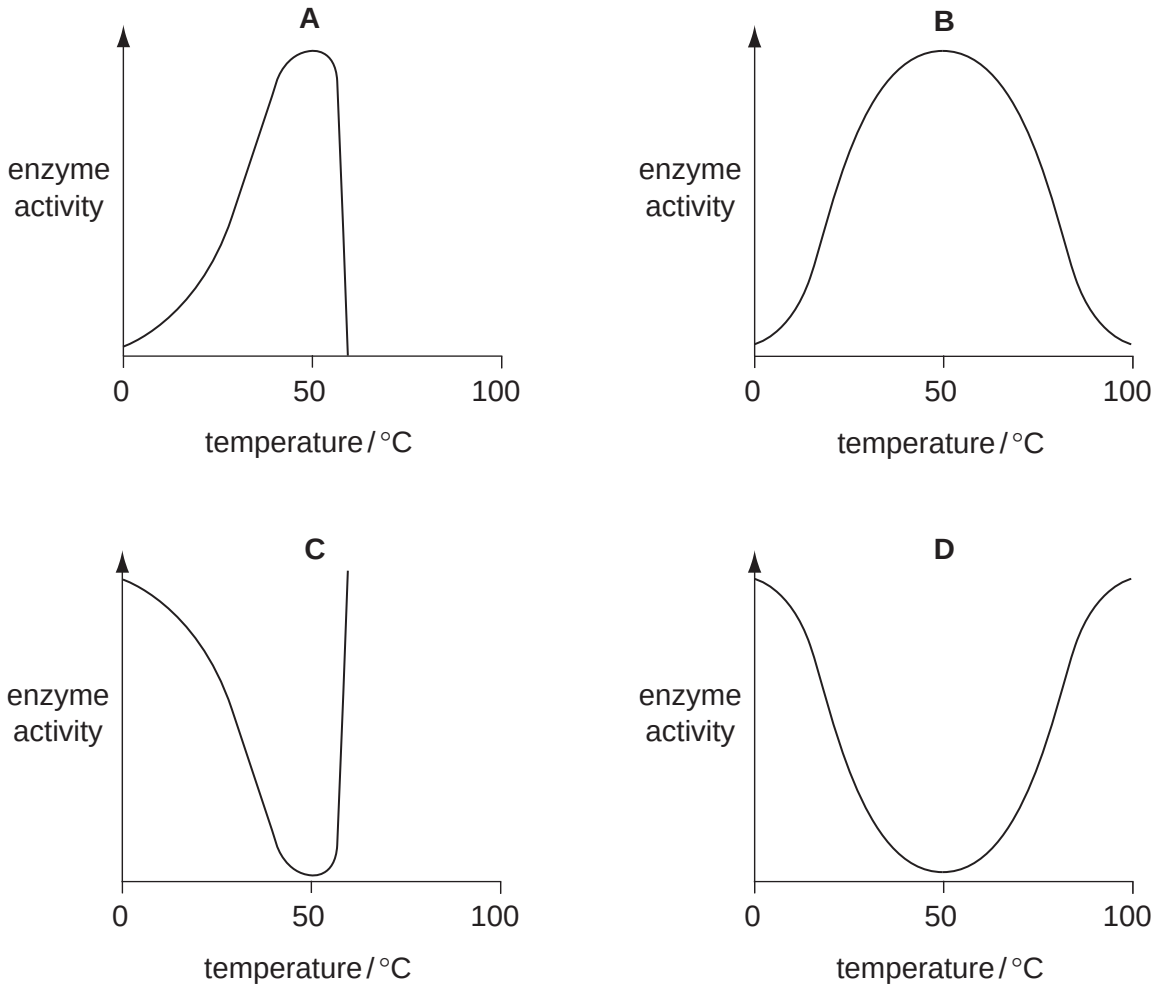
C



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

© UCLES 2016

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

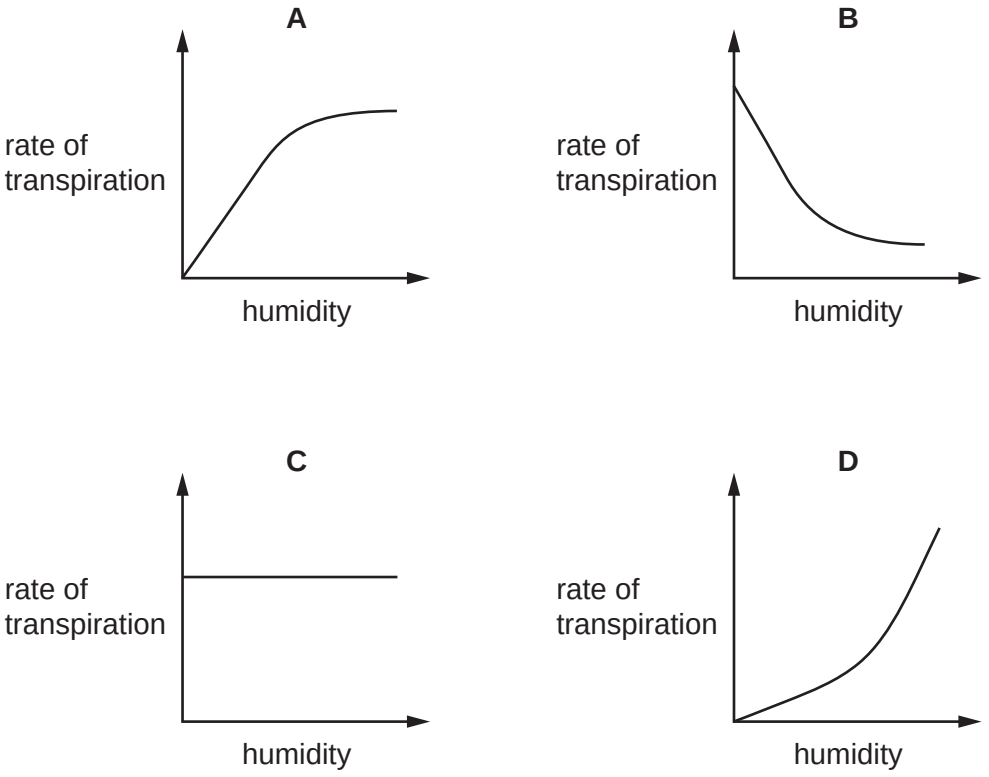


Q

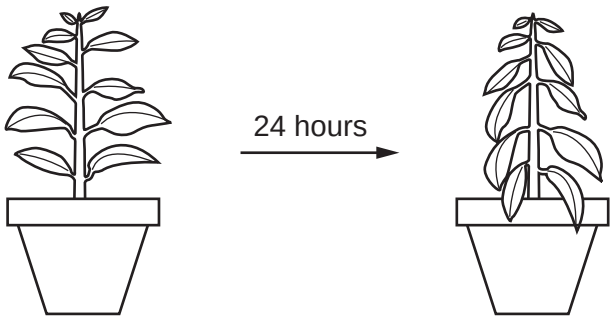
In which parts of the alimentary canal are P and Q found?

	P	Q
A	duodenum	stomach
B	ileum	oesophagus
C	oesophagus	ileum
D	rectum	ileum

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.

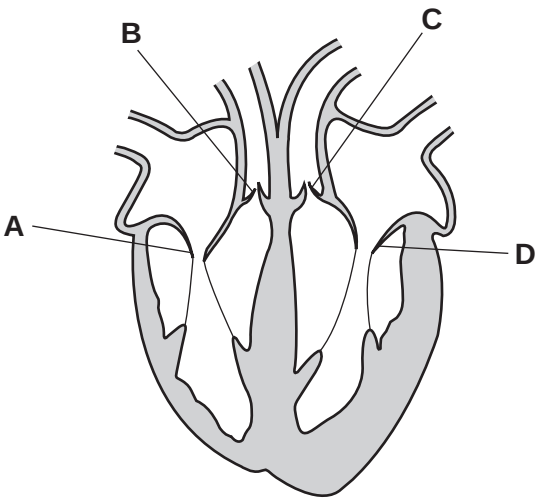
C Water uptake is equal to water loss.

D Water uptake is greater than water loss.

© UCLES 2016

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

© UCLES 2016

[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

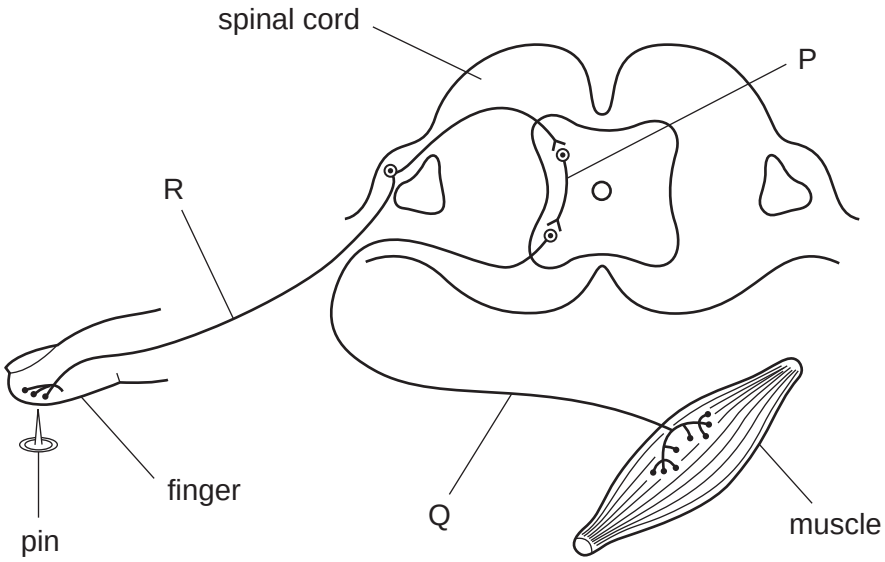
B the release of saliva into the mouth

C the removal of undigested food through the anus

D the removal of urea by the kidneys

© UCLES 2016

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?

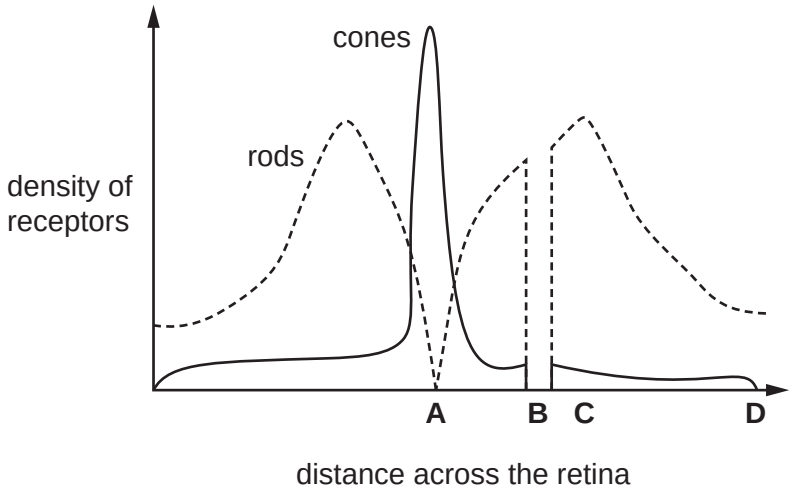
	blood glucose concentration	pulse rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

© UCLES 2016

[Turn over

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

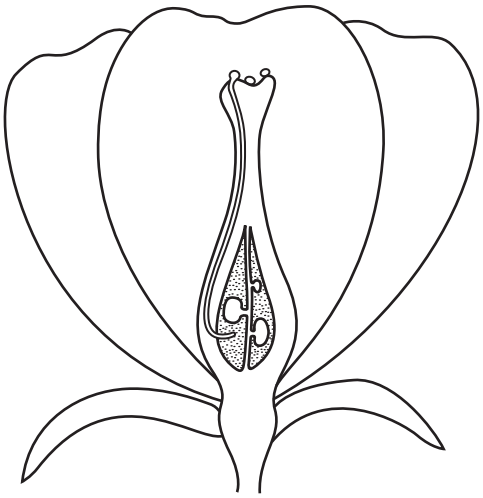
B male and female gametes

C red and white blood cells

D xylem and phloem cells

© UCLES 2016

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

© UCLES 2016

[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 $Hb^A\ Hb^A$ $Hb^A\ Hb^A$

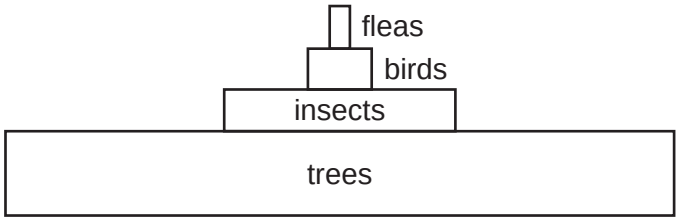
B $Hb^A\ Hb^A$ $Hb^A\ Hb^S$

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

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

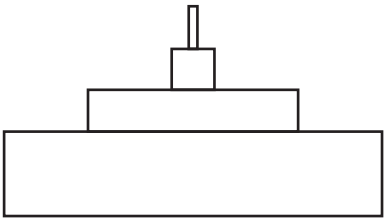
© UCLES 2016

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

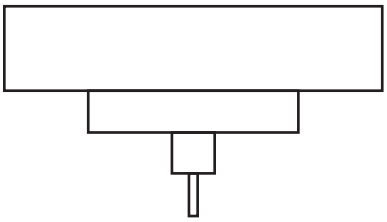


What is the pyramid of numbers for this food chain?

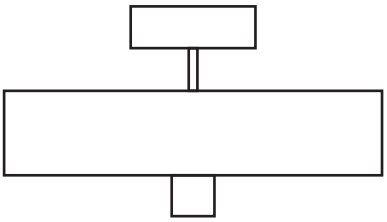
A



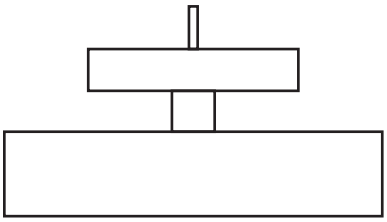
B



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

© UCLES 2016

[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

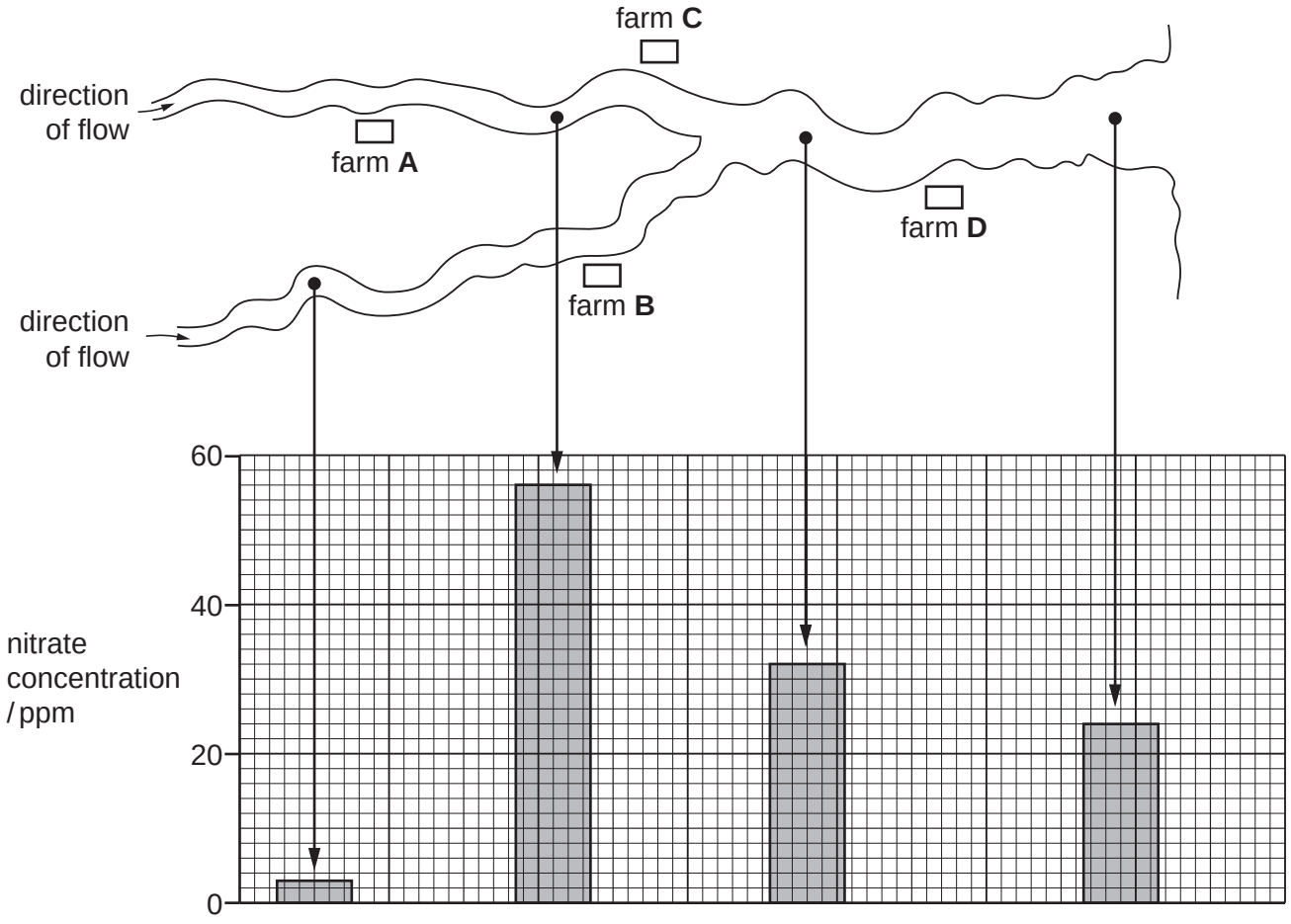
What is the correct sequence for these processes?

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

© UCLES 2016

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?



BLANK PAGE

© UCLES 2016

BLANK PAGE

© UCLES 2016

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.