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Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/22**

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)

* 1 7 2 5 5 4 7 0 9 6 *

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.

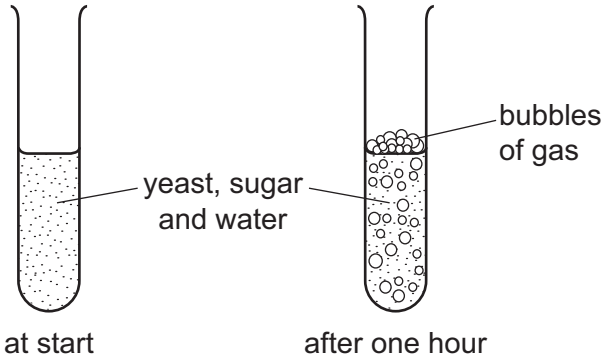
The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **15** printed pages and **1** blank page.

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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

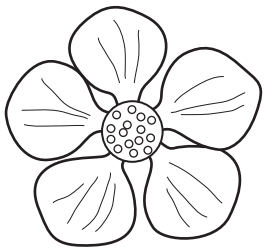
B reproduction

C respiration

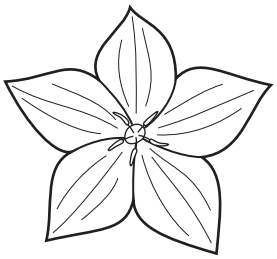
D sensitivity

2 Which diagram shows a flower from a monocotyledon?

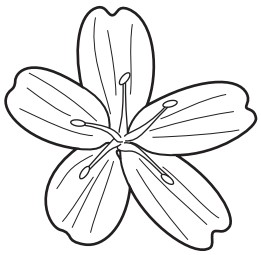
A



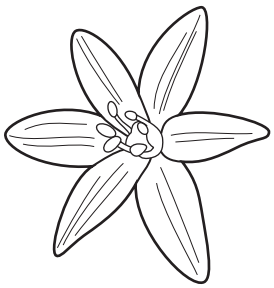
B



C



D



3 In which part of the cell is oxygen used to release energy from nutrient molecules?

A mitochondrion

B ribosome

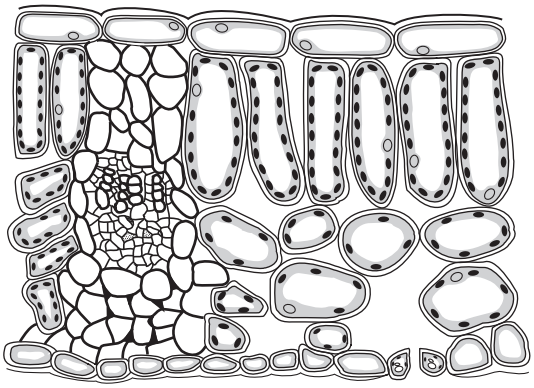
C rough endoplasmic reticulum

D vesicle

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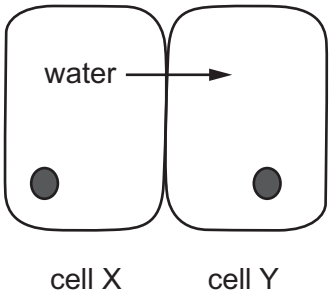
4 The actual thickness of the leaf shown in the diagram is 2000 μm, but its thickness in the diagram is 50 mm.



What is the magnification of the diagram?

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

5 The diagram shows two cells. The net movement of water is from cell X to cell Y.



What causes water to pass from cell X to cell Y?

A water potential is higher in cell X and active transport occurs

B water potential is higher in cell X and osmosis occurs

C water potential is lower in cell X and active transport occurs

D water potential is lower in cell X and osmosis occurs

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6 For the stomata of a leaf to open, the guard cells accumulate more potassium ions than the surrounding cells.

Which row describes what happens?

	movement of potassium ions	movement of water in relation to guard cells	final state of the guard cells
A	active transport	in	turgid
B	active transport	out	flaccid
C	diffusion	in	plasmolysed
D	diffusion	out	no change

7 The structures of antibodies, DNA molecules and enzymes are specific to their actions.

Which feature of each molecule makes it specific?

	antibody	DNA	enzyme
A	active site	binding site	base order
B	base order	active site	binding site
C	base order	binding site	active site
D	binding site	base order	active site

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 A food stain on a table cloth is where meat cooked in oil has been spilt.

It is washed in a biological washing powder.

Which combination of enzymes should be in the washing powder to remove the stain?

A amylase and lipase

B lipase and protease

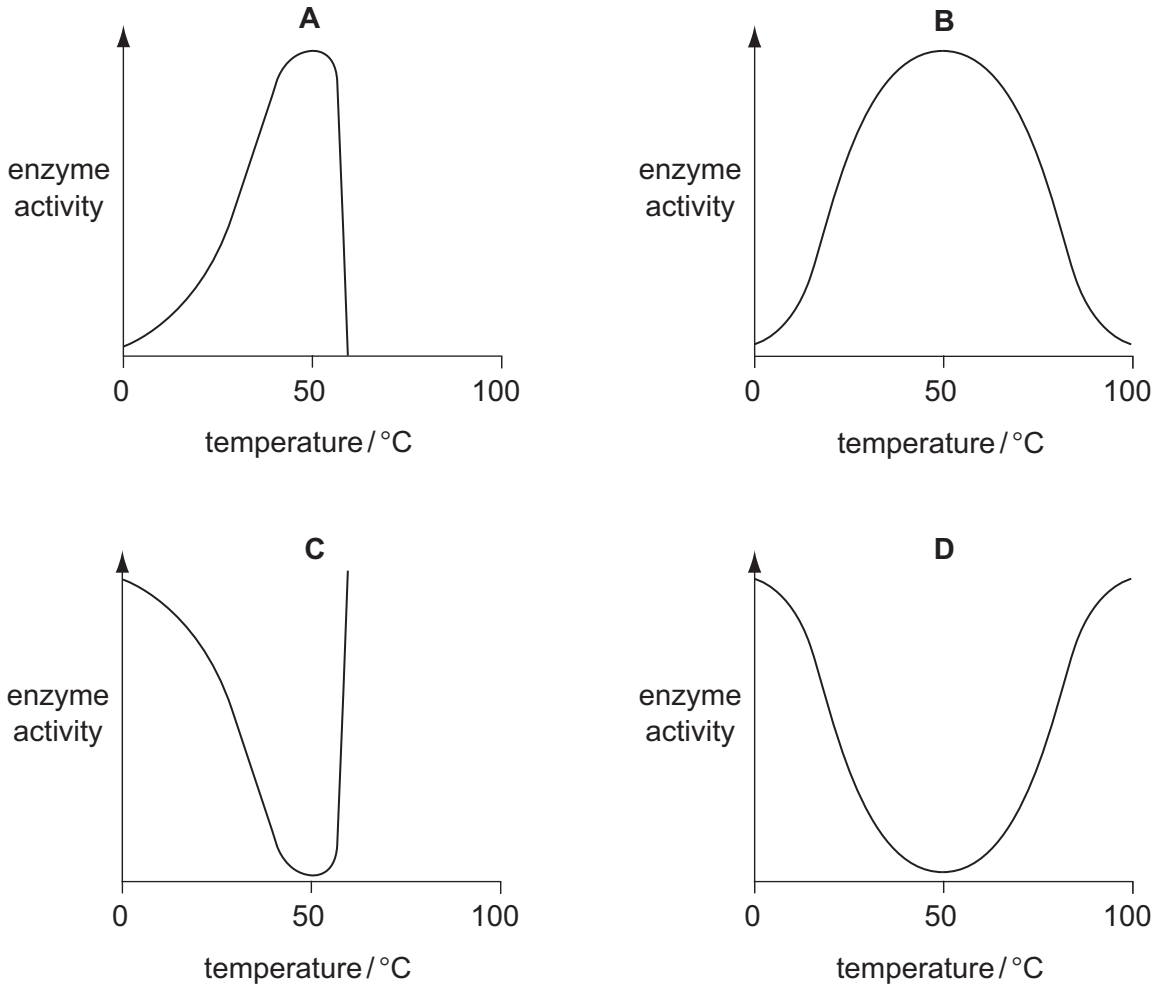
C pectinase and amylase

D protease and pectinase

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



11 When a tissue from a man is grafted onto a woman it may be rejected by the woman's body.

What is the main cause of this rejection?

A antibody production

B phagocytosis

C the action of antibiotics

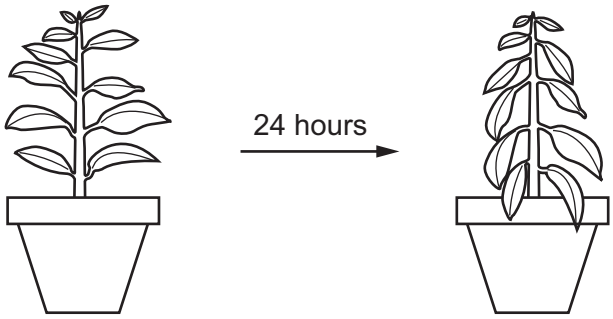
D the presence of a Y chromosome

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12 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.

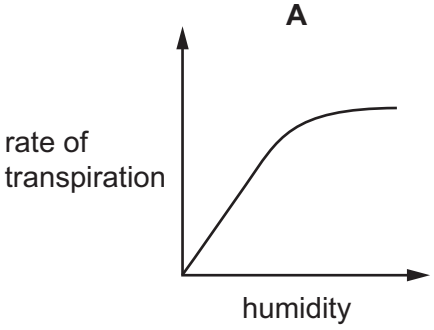
B Water moves from the leaves to the stem.

C Water uptake is equal to water loss.

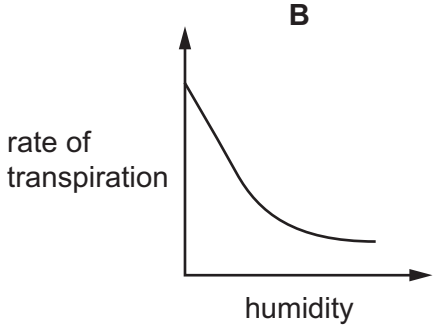
D Water uptake is greater than water loss.

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

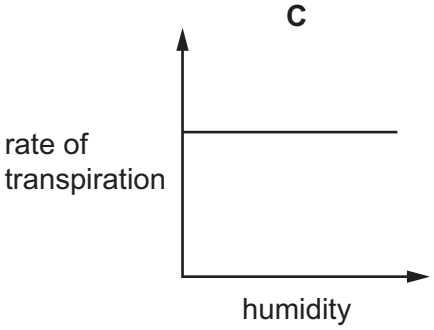
A



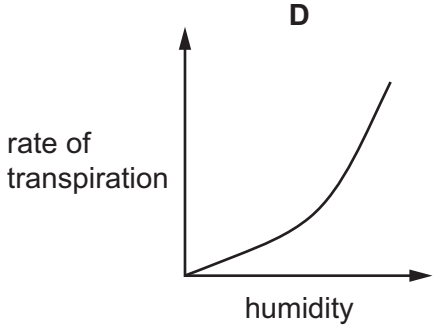
B



C



D



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14 Which process is an example of translocation?

A absorption of water by the roots and its movement through the xylem to the leaves

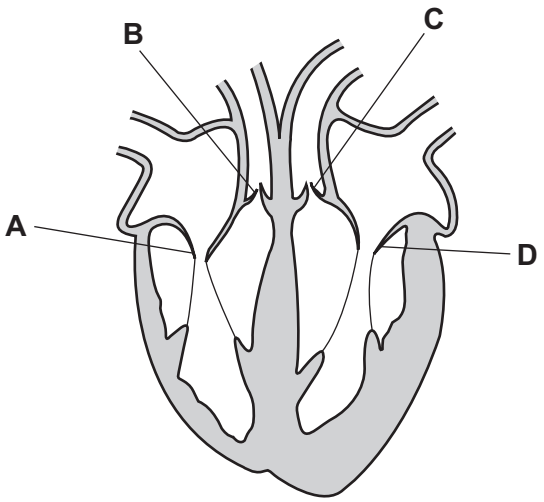
B loss of water from the leaves as it evaporates into the air

C movement of sucrose from the leaves through phloem to other parts of the plant

D the process by which plants use the food produced by photosynthesis to obtain energy

15 The diagram shows a section through the human heart.

Which is the right atrioventricular valve?



16 What is the fluid in the blood called?

A lymph

B mucus

C plasma

D tissue fluid

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17 The antibodies that give immunity to a disease can be acquired in the following different ways.

1 feeding on breast milk

2 infection by disease

3 vaccination

Which give active immunity?

A 1 and 2 only

B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3

18 Which actions increase the volume of the thorax during breathing?

	external intercostal muscles	internal intercostal muscles	muscles of the diaphragm
A	contract	contract	relax
B	contract	relax	contract
C	relax	contract	relax
D	relax	relax	contract

19 What are the approximate percentages of oxygen and carbon dioxide in atmospheric air?

	oxygen / %	carbon dioxide / %
A	16	4.00
B	16	8.00
C	20	0.04
D	20	4.00

20 Which processes depend on the action of enzymes?

1 digestion

2 osmosis

3 respiration

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

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21 Lactic acid builds up in the muscles during vigorous exercise.

During recovery, how is this lactic acid removed?

A aerobic respiration of lactic acid in the liver

B anaerobic respiration of lactic acid in the muscles

C excretion of lactic acid by the kidneys

D removal of lactic acid by the alimentary canal

22 Which diet will cause the liver to produce the most urea?

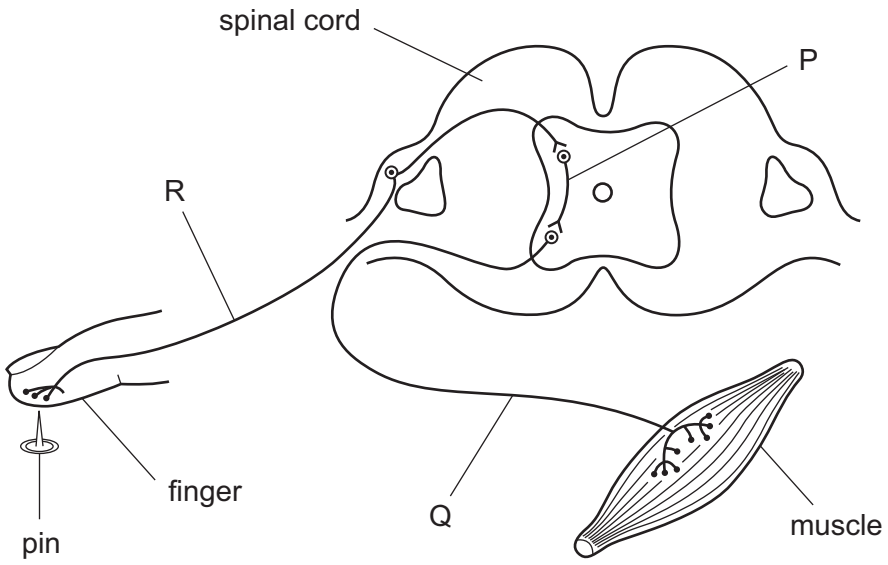
A high carbohydrate, low fat

B high fat, high fibre

C high fat, low protein

D high protein, low carbohydrate

23 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

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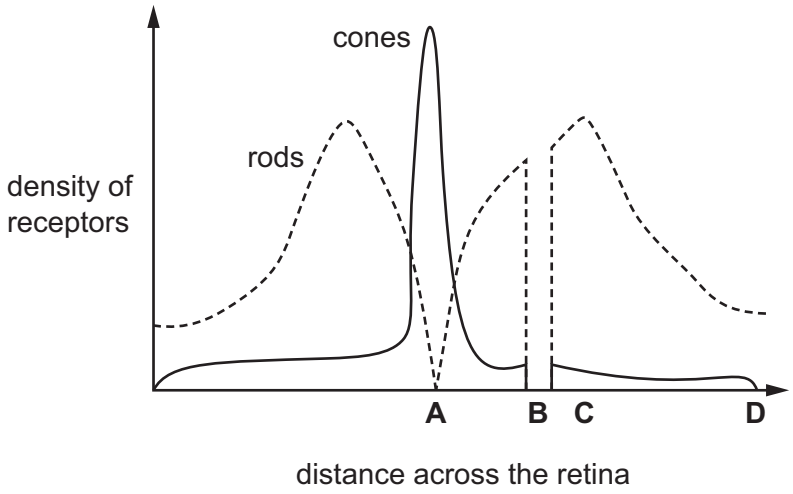
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24 What are the effects of adrenaline?

	breathing rate	pulse rate
A	decreased	decreased
B	increased	increased
C	increased	no effect
D	no effect	increased

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

What is the position of the optic nerve?



26 Which statement about antibiotics is **not** correct?

A Antibiotics are used to treat diseases caused by viruses.

B Some antibiotics are produced by fungi.

C Some bacteria are resistant to antibiotics.

D When taking antibiotics for an infection, the treatment should be completed.

27 In which conditions will seeds germinate most quickly?

A dry and cold

B dry and warm

C wet and cold

D wet and warm

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28 What are the characteristics of asexual reproduction?

	fusion of gamete nuclei	genetic variety in the offspring
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

29 Where are oestrogen and progesterone produced during the menstrual cycle?

	oestrogen	progesterone
A	hypothalamus	ovary
B	ovary	ovary
C	ovary	placenta
D	placenta	pituitary gland

30 Which structure will be found in the nucleus of a body cell in a woman?

A X allele

B X chromosome

C Y allele

D Y chromosome

31 When a cell divides, these events occur.

1 The DNA inside the cell is duplicated exactly.

2 Daughter cells are produced with the same chromosome number as the parent cell.

Which type of division has occurred?

A meiosis producing genetically different cells

B meiosis producing genetically identical cells

C mitosis producing genetically different cells

D mitosis producing genetically identical cells

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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?

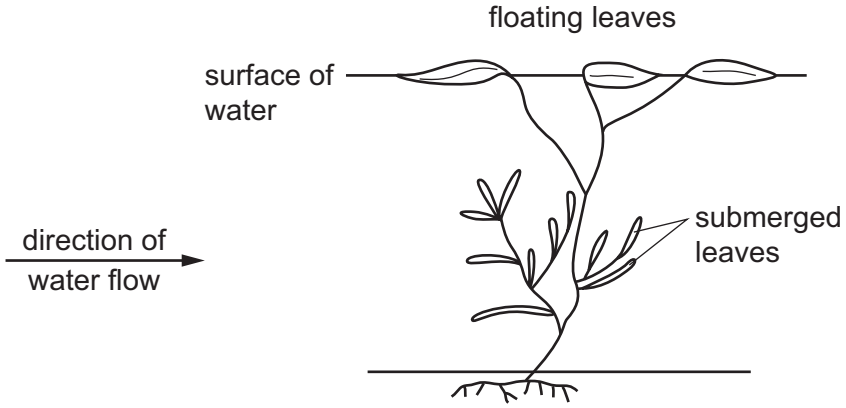
A group A

B group AB

C group B

D group O

33 The diagram shows a hydrophyte in a river.



Which statement about the submerged leaves is correct?

A They cannot photosynthesise.

B They have a thick cuticle.

C They offer little resistance to water flow.

D They require many xylem vessels for support.

34 Some disease-causing bacteria survive treatment with an antibiotic.

Which statement about the surviving bacteria is correct?

A The antibiotic will work better on the next generation of bacteria.

B The bacteria have undergone a process of natural selection.

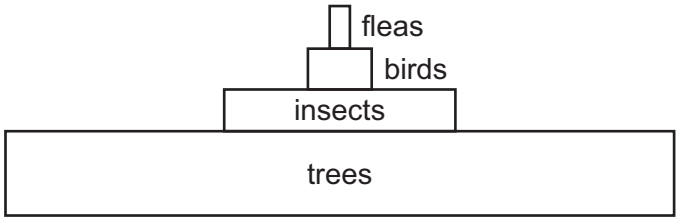
C The bacteria will now be resistant to all antibiotics.

D The resistance of the bacteria is a result of selective breeding.

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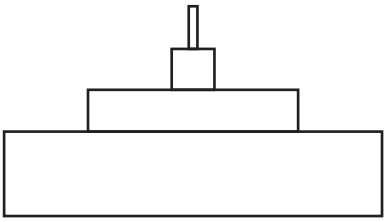
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35 The diagram shows a pyramid of biomass for a food chain in a woodland ecosystem.

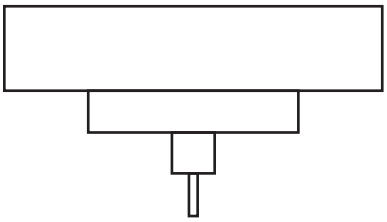


What is the pyramid of numbers for this food chain?

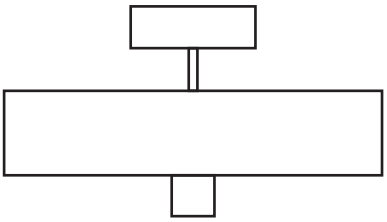
A



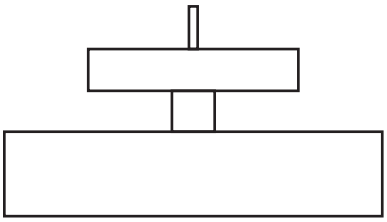
B



C



D



36 In the food chain below, the population of snakes is halved owing to a viral disease.

grass → locusts → snakes → eagles

What effect does this have on the other members of the food chain?

	grass	locusts	eagles
A	decrease	increase	decrease
B	decrease	increase	increase
C	increase	decrease	decrease
D	increase	increase	decrease

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37 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

38 When human DNA is inserted into the plasmid DNA of bacteria, which enzyme is used to cut the DNA?

A DNA ligase

B lipase

C protease

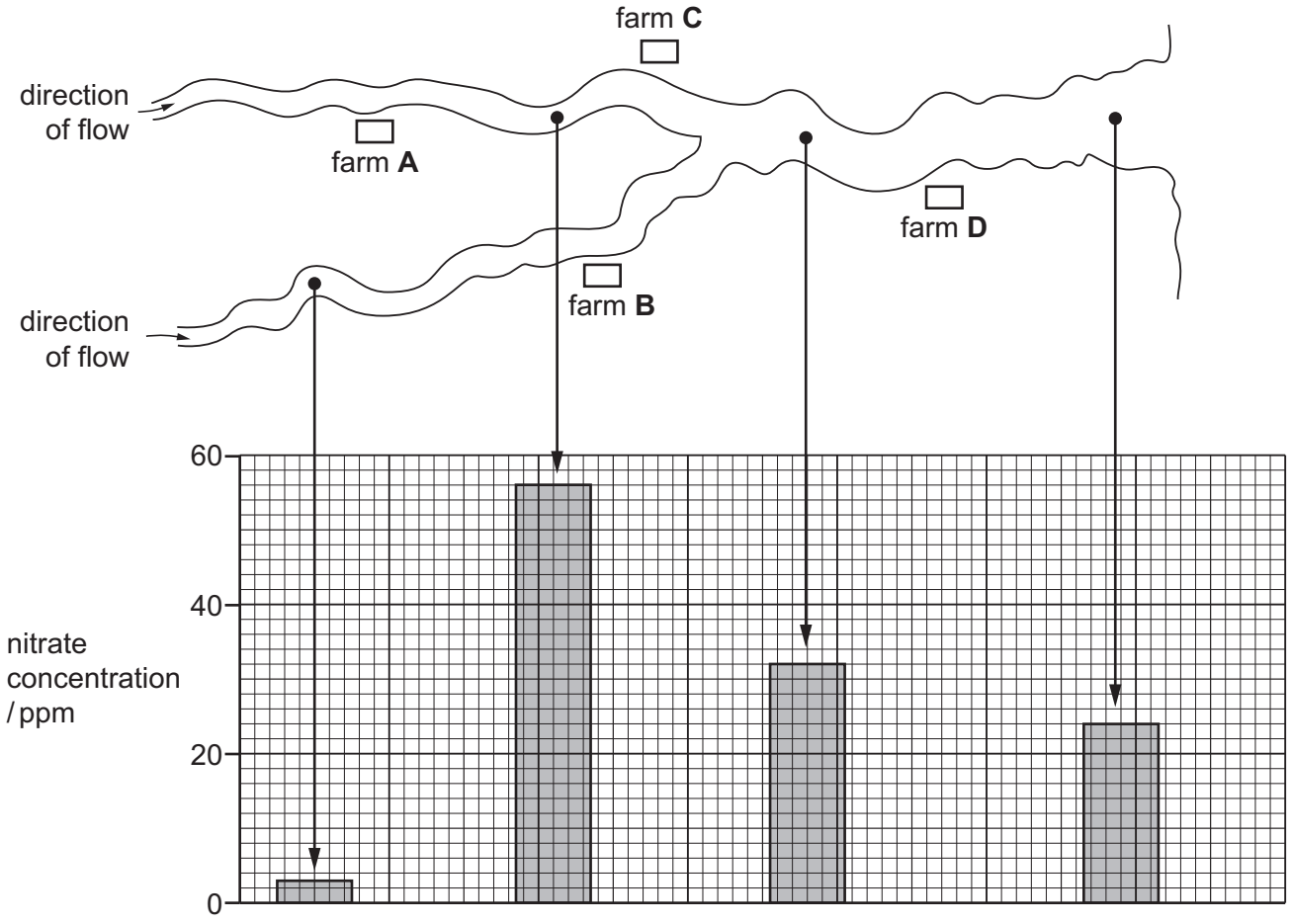
D restriction enzyme

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39 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?



40 A large amount of herbicide is applied to a field. However, some of the herbicide is washed into a nearby lake.

What is the effect of the herbicide on the weeds in the field and on the plants in the lake?

	weeds in field	plants in lake
A	less growth	less growth
B	less growth	more growth
C	more growth	less growth
D	more growth	more growth

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