Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/23**

Paper 2 Multiple Choice (Extended) **October/November 2020**

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.

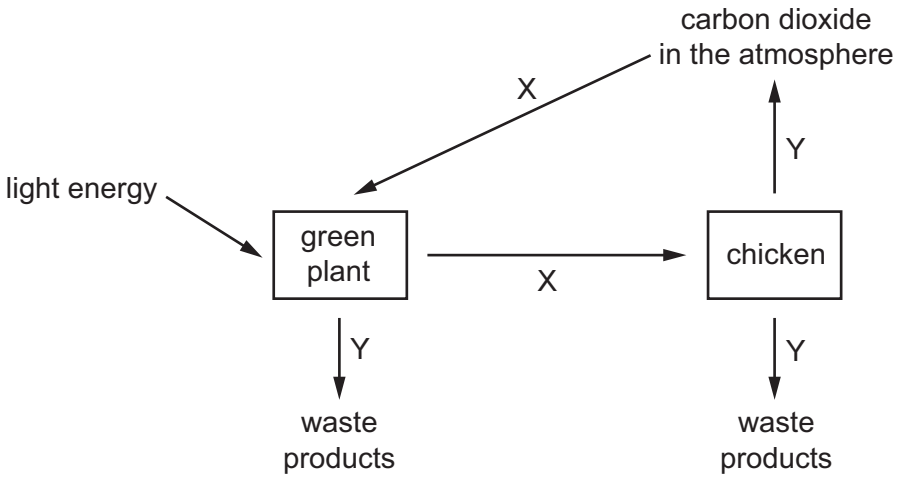
INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.

This document has **16** pages. Blank pages are indicated.

© UCLES 2020

1 The diagram shows some of the processes carried out by living organisms.



Which two characteristics of living organisms are represented by arrows X and Y?

A excretion and sensitivity

B nutrition and excretion

C respiration and growth

D sensitivity and reproduction

2 What are features of the leaves of a plant that is a dicotyledon?

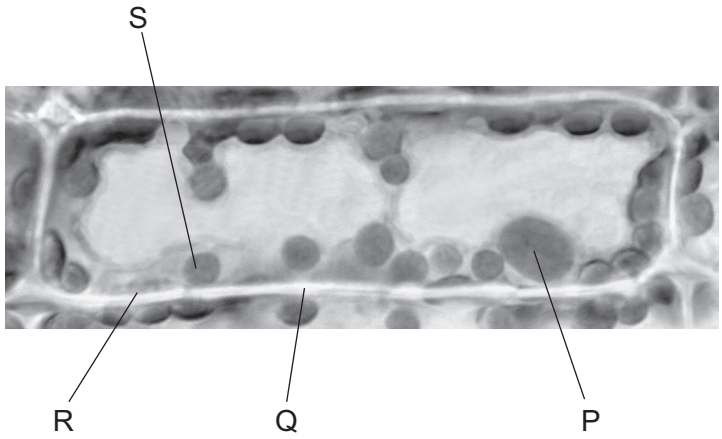
	broad leaves	parallel veins
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓= yes

✗= no

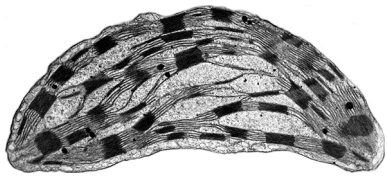
3 The photomicrograph shows a cell from a type of aquatic plant.



Which parts labelled on the photomicrograph indicate that this is a plant cell?

A P and R **B** P and S **C** Q and R **D** Q and S

4 The diagram shows an image of a chloroplast. The image is 5 cm long.



The actual length of the chloroplast is 5 μm.

What is the magnification of the image?

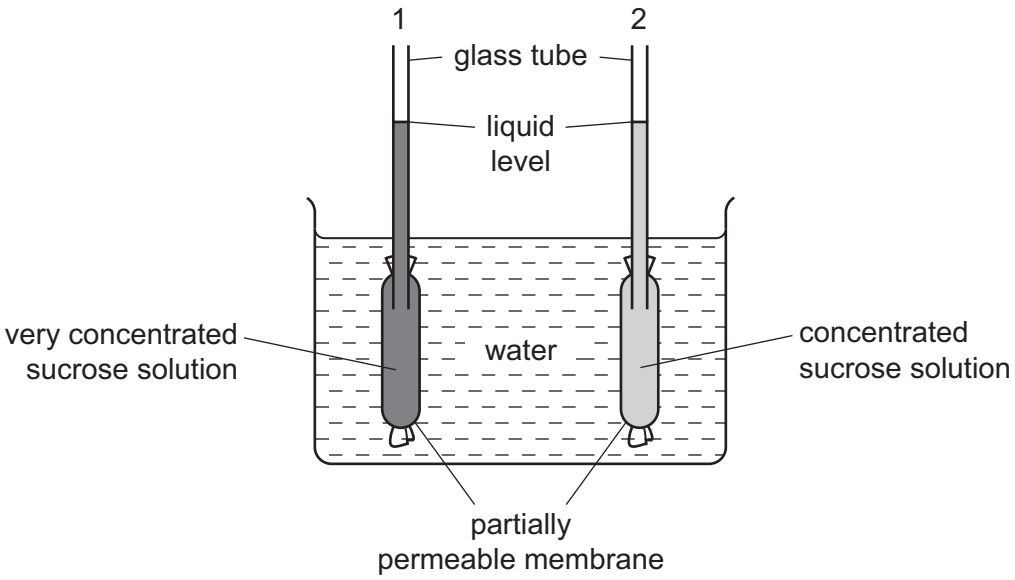
A ×10 **B** ×1000 **C** ×10 000 **D** ×100 000

5 What are features of osmosis?

	diffusion is involved	requires cell walls	requires a partially permeable membrane
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✓
D	✗	✓	✗

key
✓= yes
✗= no

6 The diagram shows apparatus which can be used to demonstrate osmosis.



After one hour, what would happen to the liquid levels in the glass tubes?

	liquid level in tube 1	liquid level in tube 2
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

7 Which substances are made by linking together glucose molecules only?

A cellulose, glycogen and starch

B fats, cellulose and proteins

C proteins, oils and glycogen

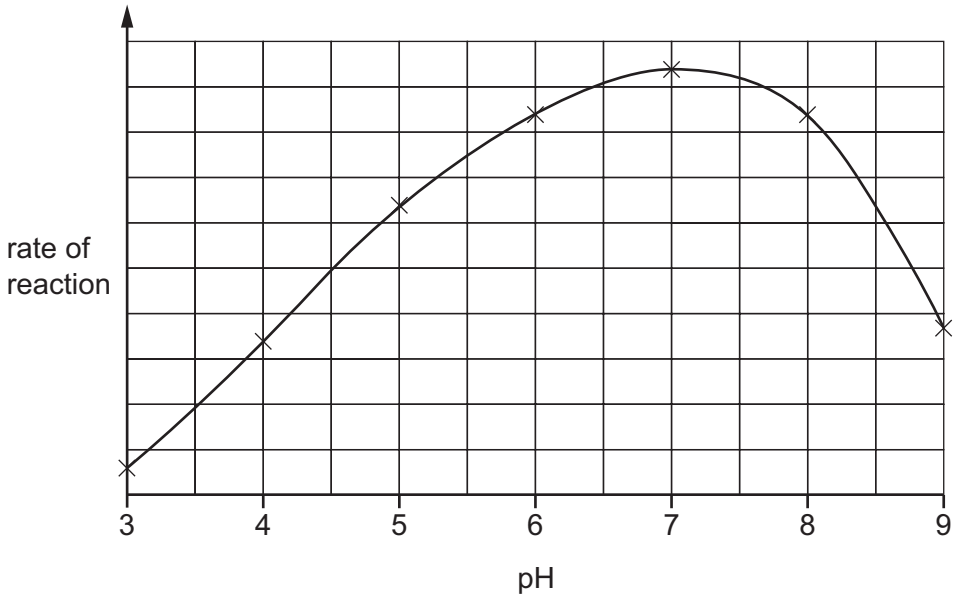
D starch, fats and oils

8 When bases pair up in the formation of DNA, what is one of the pairings?

A G with A **B** G with C **C** G with G **D** G with T

© UCLES 2020

9 The graph shows the effect of pH on the rate of reaction of an enzyme.



What does the graph show?

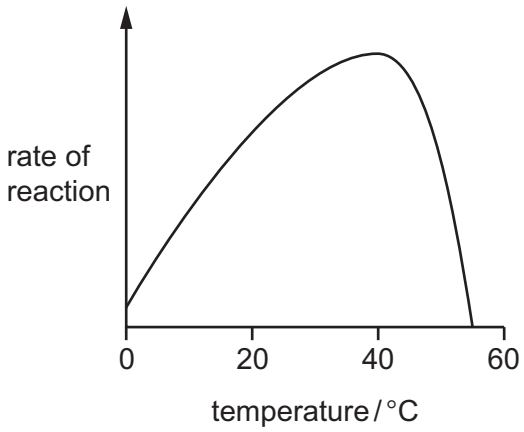
A The enzyme is destroyed at pH 9.

B The enzyme works best at pH 6.

C The rate of reaction halves as the pH changes from pH 5 to pH 7.

D The rate of reaction is the same at pH 5 and pH 8.5.

10 The graph shows how enzyme activity is affected by temperature.



How can the change in activity between 40 °C and 55 °C be explained?

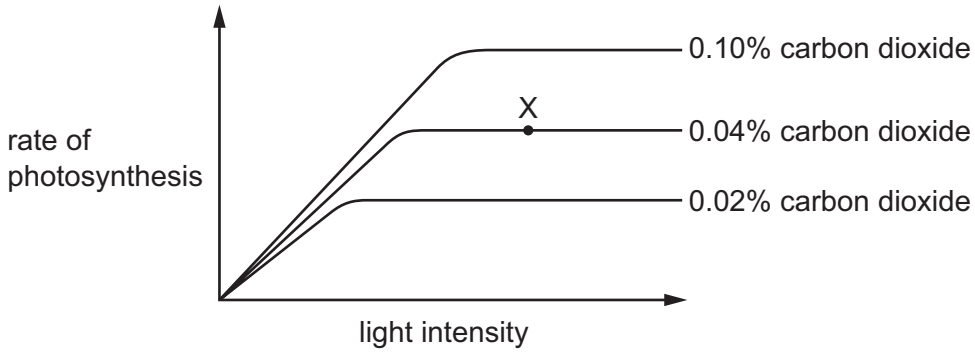
A Heat has killed the enzyme.

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.

11 The graph shows how the rate of photosynthesis of a plant changes with light intensity, at three different carbon dioxide concentrations. In each case the temperature is 15 °C.



What is the limiting factor for the rate of photosynthesis at point X on the graph?

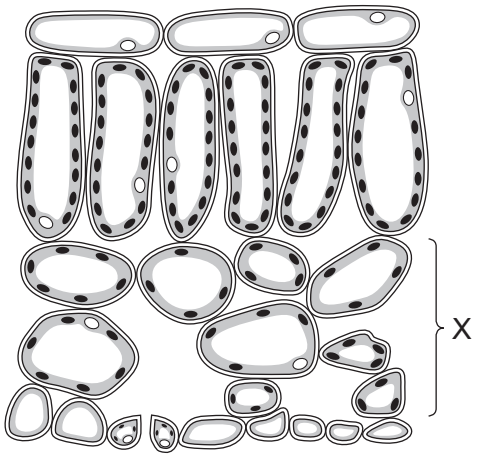
A carbon dioxide concentration

B light intensity

C surface area of the plant

D temperature

12 The diagram shows part of a leaf.



What is layer X?

A lower epidermis

B palisade mesophyll

C spongy mesophyll

D vascular bundle

© UCLES 2020

13 Which stage of nutrition takes place when food molecules become part of a body cell?

A absorption

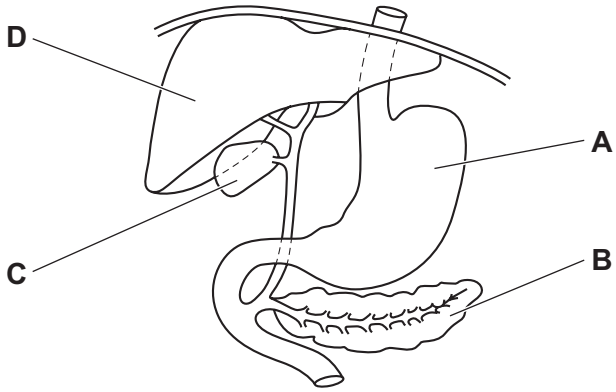
B assimilation

C digestion

D ingestion

14 The diagram shows part of the alimentary canal and associated organs.

Which labelled part stores bile?



15 In which order does water pass through these structures in a plant?

A mesophyll → root hair → xylem

B mesophyll → xylem → root hair

C root hair → mesophyll → xylem

D root hair → xylem → mesophyll

16 A decrease in which factor normally causes the transpiration rate to increase?

A humidity

B light intensity

C number of stomata

D temperature

17 In a mammal, what ensures the blood flows one-way round the circulatory system?

A brain

B capillaries

C lungs

D valves

© UCLES 2020

18 Which row correctly identifies the blood vessels?

	largest internal space (lumen)	thickest muscular wall	transports blood towards the heart
A	pulmonary artery	capillary	pulmonary vein
B	pulmonary artery	pulmonary vein	capillary
C	pulmonary vein	capillary	pulmonary artery
D	pulmonary vein	pulmonary artery	pulmonary vein

19 A baby acquires protection from pathogens from its mother's breast milk.

What is this protection called?

A active immunity

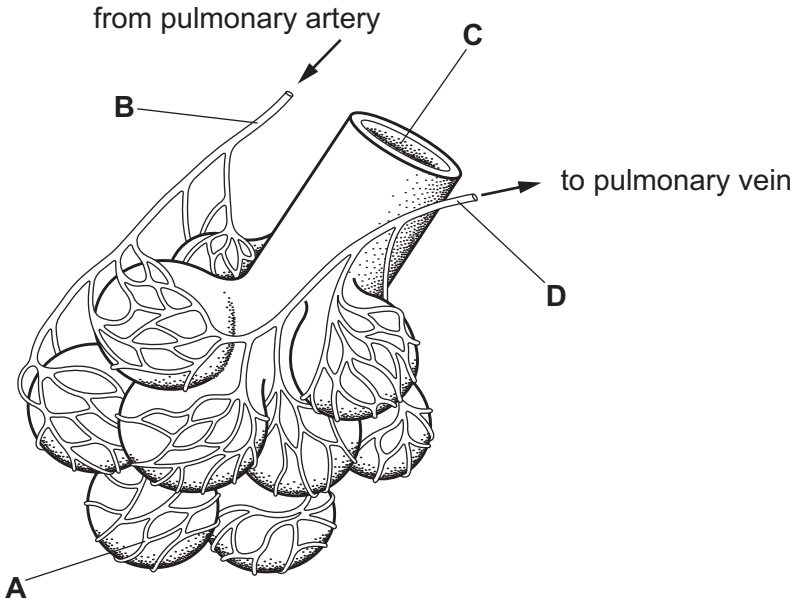
B immunisation

C vaccination

D passive immunity

20 The diagram shows some of the structures in a human lung.

Where is the carbon dioxide concentration highest?



21 What is produced by anaerobic respiration in yeast?

A alcohol, carbon dioxide and water

B alcohol and carbon dioxide only

C carbon dioxide and lactic acid

D lactic acid only

22 What happens as a result of deamination?

A Amino acids are converted to proteins.

B Glycogen is stored.

C Starch is produced.

D Urea is produced.

23 Sensory neurones conduct impulses from

A the brain and spinal cord to muscles.

B one sense organ to another sense organ.

C sense organs to the brain and spinal cord.

D muscles to sense organs.

24 What is a function of the cornea?

A carries impulses to the brain

B contains light-sensitive receptors

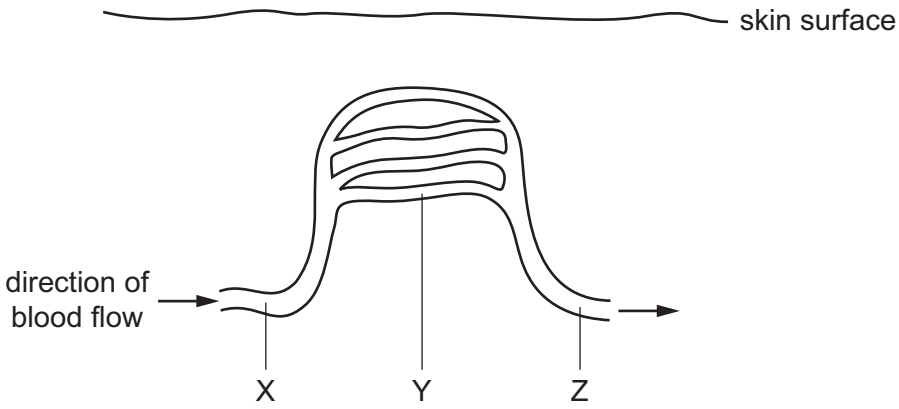
C controls how much light enters the eye

D refracts light

© UCLES 2020

[Turn over

25 The diagram shows some blood vessels near the surface of the skin.



If vasodilation occurs at X, what happens to the blood flow at Y and Z?

	Y	Z
A	decreases	decreases
B	decreases	stays constant
C	increases	increases
D	increases	stays constant

26 Which substances can be misused to improve athletic performance?

1 alcohol

2 anabolic steroids

3 testosterone

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

© UCLES 2020

27 Scientists investigated the amount of genetic variation found within different crop plants. They grew large numbers of each crop and measured the genetic variation within the species of crop. The results are shown in the table.

crop	percentage genetic variation
banana	0
pea	65
carrot	54

Which crop or crops have been produced by sexual reproduction?

A banana only

B banana, pea and carrot

C pea only

D pea and carrot only

28 Which organ secretes progesterone?

A ovary

B pancreas

C salivary gland

D testis

29 Which statement explains why the hormone FSH is used in fertility treatment?

A It causes the formation of a zygote during *in vitro* fertilisation (IVF).

B It stimulates ovulation for artificial insemination (AI).

C It stimulates the production of large numbers of eggs for use in *in vitro* fertilisation (IVF).

D It is used to maintain the uterus wall ready for artificial insemination (AI).

30 Which substance is coded for by a length of DNA?

A base

B glucose

C glycerol

D lipase

© UCLES 2020

[Turn over

31 Some features of cell division are listed.

1 chromosome number is maintained

2 haploid cells are produced

3 new cells are genetically different

4 results in variation

Which features are involved in meiosis?

A 1, 2 and 3 only

B 1, 2 and 4 only

C 2, 3 and 4 only

D 2 and 3 only

32 Which statement about the inheritance of red-green colour blindness is correct?

A The gene for red-green colour blindness is located on the X chromosome.

B Females are more likely to have red-green colour blindness than males.

C The allele for red-green colour blindness is the dominant allele.

D The gene for red-green colour blindness is located on the Y chromosome.

33 A couple are both heterozygous for the sickle-cell allele.

What is the probability that their first child will have sickle-cell anaemia?

A 25% **B** 33% **C** 50% **D** 75%

34 How does artificial selection differ from natural selection?

A Artificial selection changes the characteristics of living things.

B Artificial selection is based on genetic variation.

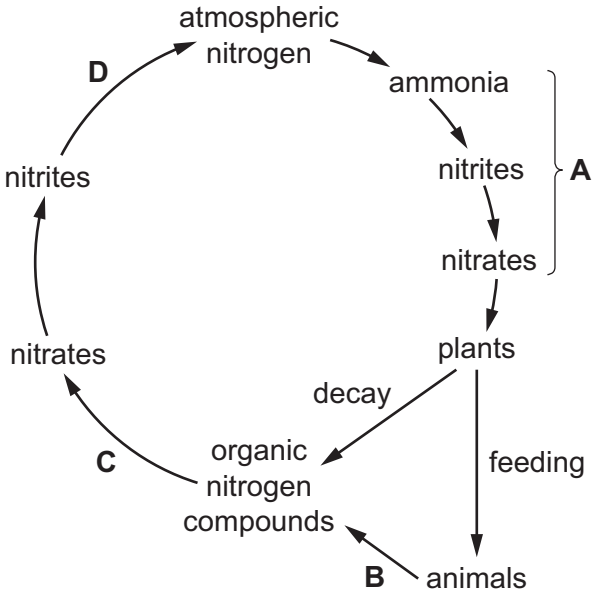
C Artificial selection does not involve competition for resources.

D Artificial selection occurs over many generations.

© UCLES 2020

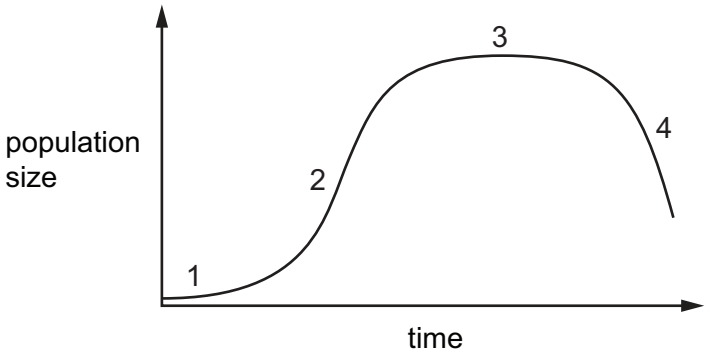
35 The diagram shows part of the nitrogen cycle.

Which letter represents denitrification?



36 A few yeast cells were placed in a container of nutrient solution.

The graph shows how their population size changed over time.

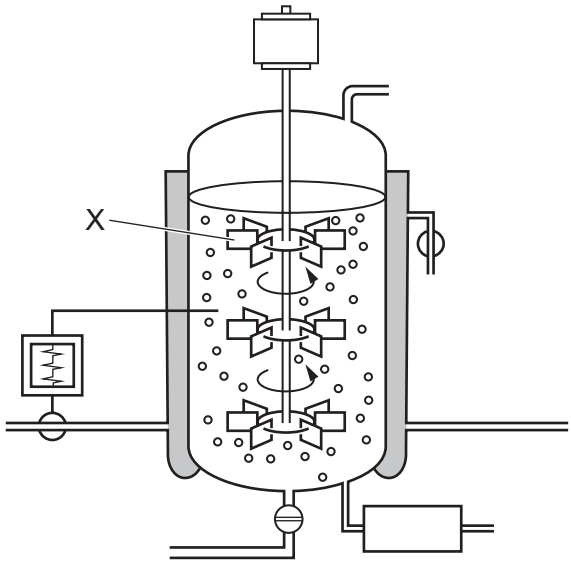


Which row shows when the reproduction rate was greater than the death rate for the numbered phases on the graph?

	reproduction rate greater than death rate			
	1	2	3	4
A	✓	✓	✓	✗
B	✓	✓	✗	✗
C	✓	✗	✗	✗
D	✗	✓	✓	✓

key
✓= yes
✗= no

37 The diagram shows a fermenter used to produce penicillin.



What is the function of part X?

A allow microorganisms to enter the fermenter

B maintain an even temperature inside the fermenter

C monitor the temperature inside the fermenter

D sterilise the contents of the fermenter

38 Bacteria are used to make insulin.

This happens in several stages.

1 bacteria synthesise insulin in fermenters

2 the insulin gene is inserted into a bacterial plasmid

3 removal of the insulin gene from a human chromosome

4 a section of a plasmid is removed

In which order do these stages occur?

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

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

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

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

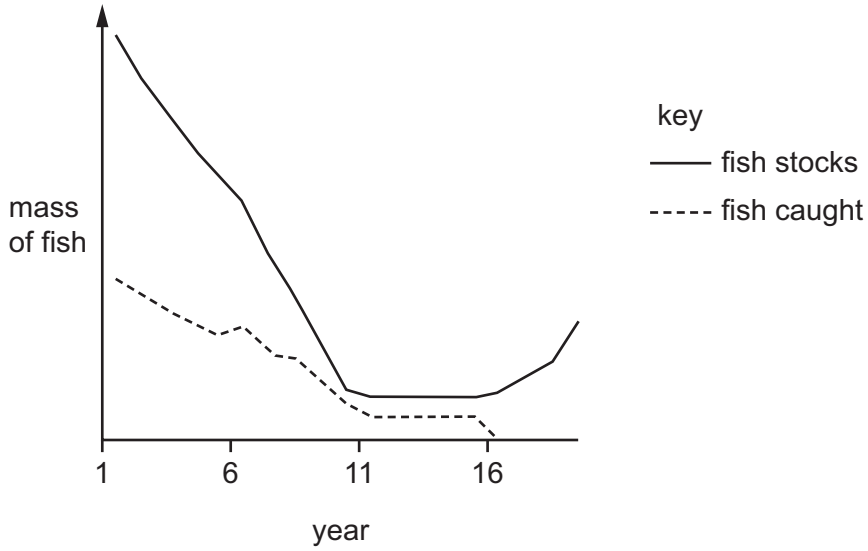
© UCLES 2020

39 The table shows some of the processes that occur during eutrophication.

Which row shows the correct increase or decrease of each process?

	nitrate ion availability in the water	light availability in the water	rate of respiration by decomposers	oxygen availability in the water
A	increases	decreases	decreases	increases
B	increases	decreases	increases	decreases
C	decreases	increases	increases	increases
D	decreases	increases	decreases	decreases

40 The graph shows the effect of fishing on fish stocks over 20 years. In year 11, a fishing quota was introduced followed by a total ban on fishing in year 16.



What effects did these conservation measures have on the fish population?

A The fish population became extinct.

B The fish population started increasing immediately after the fishing quota was introduced.

C The fish population started increasing only after a total ban on fishing was introduced.

D There was no effect on the fish population.

© UCLES 2020

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 Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

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

© UCLES 2020