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Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/22**

Paper 2 Multiple Choice (Extended) **February/March 2018**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

* 3 2 6 5 3 3 5 4 7 5 *

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.

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

This document consists of **16** printed pages.

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1 Biology is the study of living things.

Which characteristic applies to all forms of life?

A able to move from place to place

B able to reproduce

C carry out photosynthesis

D possess a nervous system

2 Two animals have an identical sequence of amino acids in one of the proteins found in their cells.

What does this indicate about these animals?

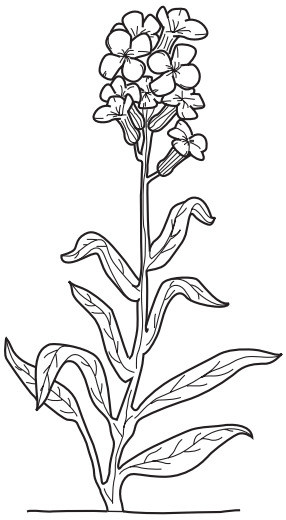
A They have been eating the same types of food.

B They have not been exposed to substances that cause mutation.

C They must be members of the same genus.

D They share a recent ancestor.

3 The diagram shows part of a flowering plant.



Using the key, identify this plant.

1 three petals ..... go to 2

more than three petals ..... go to 3

2 leaves longer than they are wide ..... **A**

leaves wider than they are long ..... **B**

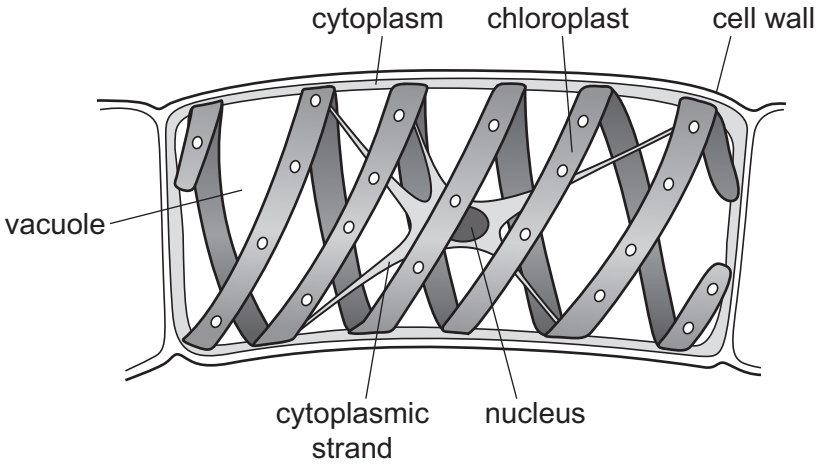
3 leaves parallel-veined ..... **C**

leaves not parallel-veined ..... **D**

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4 The diagram shows a single cell from an organism called *Spirogyra*.



Which features does *Spirogyra* share with plant cells?

	cell wall	chloroplast	cytoplasm	nucleus	vacuole
A	✓	✓	✓	✓	✓
B	✓	✓	✗	✗	✓
C	✓	✗	✓	✓	✗
D	✗	✓	✓	✗	✓

5 A student was told that a drawing of a bacterial cell had been magnified 30 000 times. The length of the drawing was 45 mm.

What was the actual length of the bacterium?

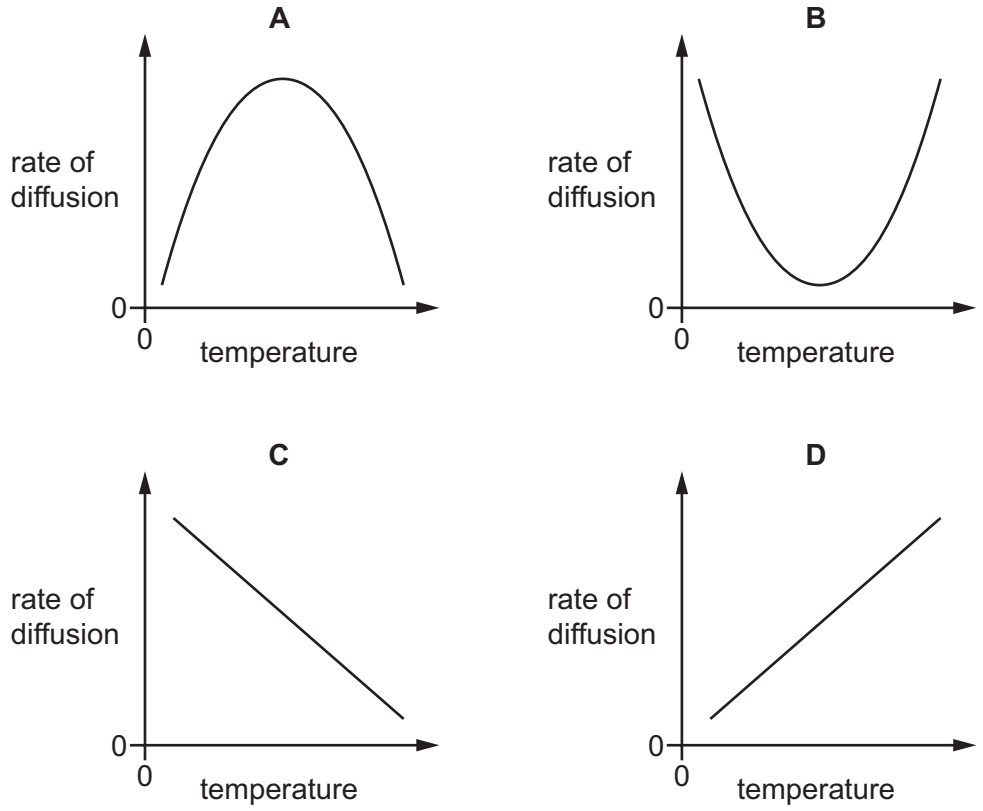
A 0.15 mm **B** 1.5 μm **C** 0.66 mm **D** 0.66 μm

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6 Which graph represents the effect of increasing temperature on the rate of diffusion?



7 Protoplasts are plant cells that have had their cell walls removed.

What happens if plant protoplasts are placed in distilled water?

A They get larger and become turgid.

B They get larger and burst.

C They get smaller and become plasmolysed.

D They get smaller and shrivel up.

8 When a food substance is tested with iodine solution, which colour shows the presence of starch?

A blue-black

B brown

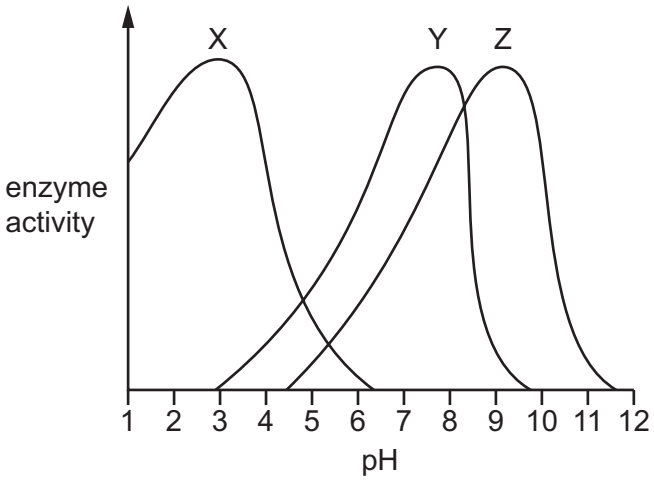
C orange

D purple

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9 The graph shows the activity of three digestive enzymes at differing pH levels.



Which statement is correct?

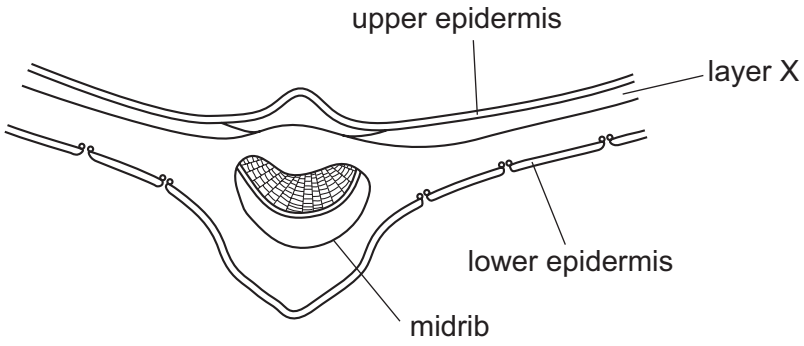
A Enzymes X and Y are both active at pH 7.

B Enzymes X and Z are both active at pH 4.

C Enzymes Y and Z are both active at pH 4.

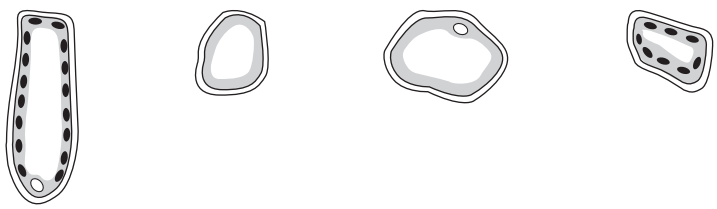
D Enzymes Y and Z are both active at pH 8.

10 The diagram shows a cross-section of part of a leaf.



Which type of cell is found in layer X?

A **B** **C** **D**



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11 Which molecule contains magnesium?

A chlorophyll

B fat

C glucose

D starch

12 In which part of the body of a mammal does mechanical digestion occur?

A gall bladder

B liver

C mouth

D pancreas

13 During growth, potato plants produce flowers and underground storage organs called tubers.

During this time, which parts of the plant act as sources and sinks for translocation?

	flowers	leaves	potato tubers
A	sink	sink	source
B	sink	source	sink
C	source	sink	source
D	source	source	sink

14 What is an advantage of a double circulatory system in mammals?

A Blood can flow down the body on the left and up the body on the right.

B Blood can flow more slowly along the circulatory system.

C Blood pressure stays the same throughout the circulatory system.

D Oxygenated and deoxygenated blood are kept separate.

15 The body has defences to protect itself from diseases.

What is a mechanical barrier to diseases?

A hairs in the nose

B plasma

C stomach acid

D white blood cells

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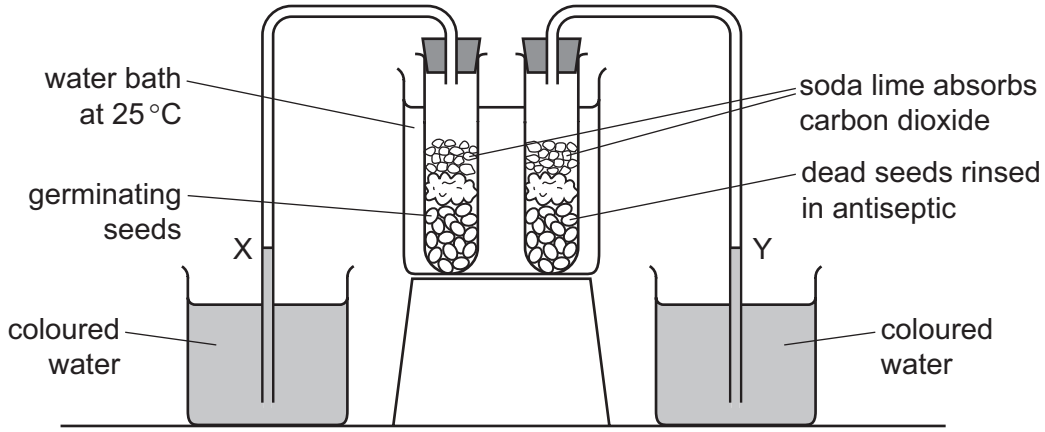
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16 During exercise, receptors detect a change in the blood and cause the breathing rate to increase.

What change do the receptors detect and where are they found in the body?

	change in blood	site of detection
A	carbon dioxide increases	brain
B	carbon dioxide increases	intercostal muscles
C	oxygen decreases	brain
D	oxygen decreases	intercostal muscles

17 An experiment is set up to investigate the uptake of oxygen by germinating seeds.



What happens to the levels of the coloured water at X and Y?

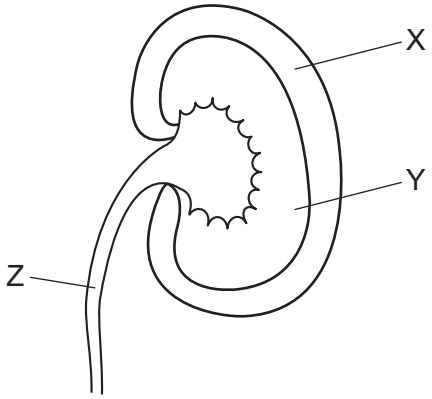
	X	Y
A	falls	rises
B	falls	unchanged
C	rises	falls
D	rises	unchanged

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18 The diagram shows a section of a kidney.



What are the correct labels?

	X	Y	Z
A	cortex	medulla	ureter
B	cortex	ureter	medulla
C	medulla	cortex	ureter
D	medulla	ureter	cortex

19 A boy accidentally touches a very hot object and immediately takes his hand away.

In this reflex action, what is the effector?

A a heat receptor in his hand

B a motor neurone

C a muscle in his arm

D the spinal cord

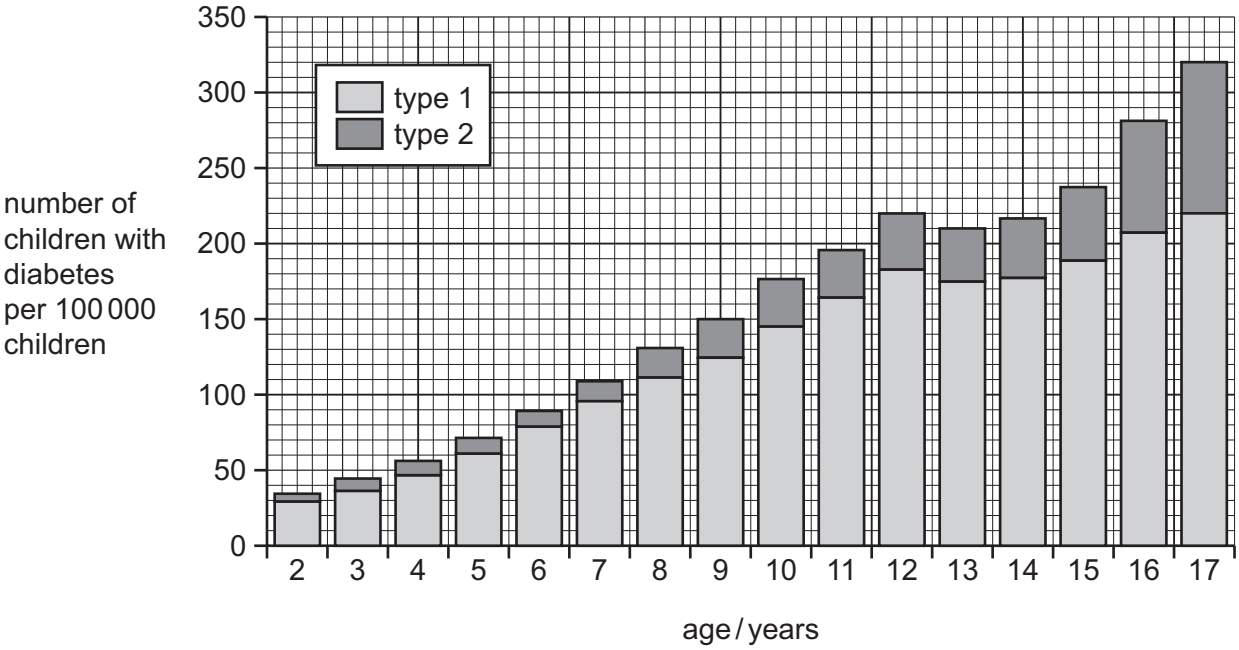
20 Which description of how the pupil of the eye gets smaller is correct?

	circular muscles	radial muscles
A	contract	contract
B	contract	relax
C	relax	contract
D	relax	relax

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21 There are two types of diabetes, type 1 and type 2.

The graph shows the number of children with each type of diabetes per 100 000 children, in one country.



Which conclusion can be made from the graph?

A 1.5% of 9-year-olds have diabetes.

B 31.3% of 17-year-olds with diabetes have type 2 diabetes.

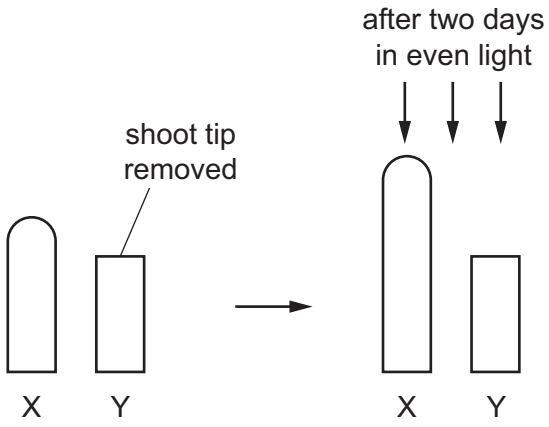
C There are 10 more 12-year-olds in the country with diabetes than 13-year-olds.

D Type 2 diabetes will cause more health problems than type 1.

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22 The diagram shows an experiment using wheat shoot tips to investigate plant growth.



Which statement is supported by the evidence provided by this experiment?

A Auxin moves through the plant by osmosis.

B Auxin is made in the shoot tip.

C Auxin is unequally distributed in response to light.

D Auxin inhibits cell elongation.

23 A wind-pollinated plant has which features?

A large anthers, coloured petals and produces nectar

B large petals, small anthers and a sticky stigma

C small petals, large anthers and a feathery stigma

D small petals, produces nectar and has a strong scent

24 Which describes a human male gamete?

	motile	relative size compared to female gamete	flagellum present
A	yes	larger	yes
B	yes	smaller	yes
C	no	smaller	no
D	no	larger	no

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25 What is a consequence of HIV infection on the human body?

A decreased lymphocyte numbers

B increased protection against bacterial infections

C increased haemoglobin production

D sickle-cell anaemia

26 Which sex chromosomes in the egg and the sperm will produce a male child?

	sex chromosome in egg	sex chromosome in sperm
A	X	X
B	X	Y
C	Y	X
D	Y	Y

27 Cell division has the following functions.

1 asexual reproduction

2 growth

3 production of gametes

4 repair of damaged tissue

5 replacement of cells

Which functions are specific to mitosis?

A 1, 2, 3 and 4

B 1, 2, 4 and 5

C 2, 3 and 4 only

D 3, 4 and 5 only

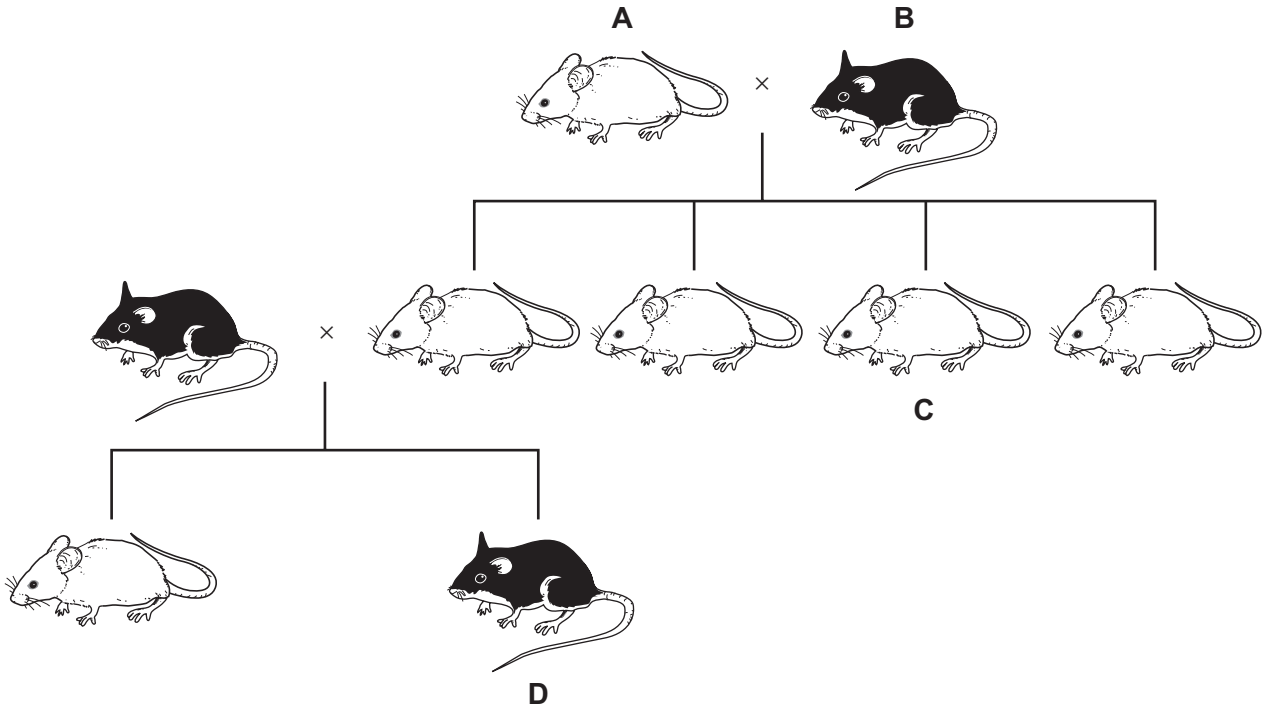
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28 The chart shows the inheritance of fur colour in a small mammal.

If the allele for white fur is dominant, which animal **must** be heterozygous for the gene controlling fur colour?



29 In areas of the world where malaria is present, the sickle-cell allele is more common.

What is the reason for this?

A Both diseases are caused by the same allele.

B Heterozygous individuals with the sickle-cell allele are less likely to have malaria.

C Heterozygous individuals with the sickle-cell allele are more likely to have malaria.

D These are parts of the world with many diseases.

30 Which feature helps a xerophyte survive in its environment?

A flat leaves with a large surface area

B no cuticle

C short roots

D sunken stomata

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31 What is a feature of natural selection?

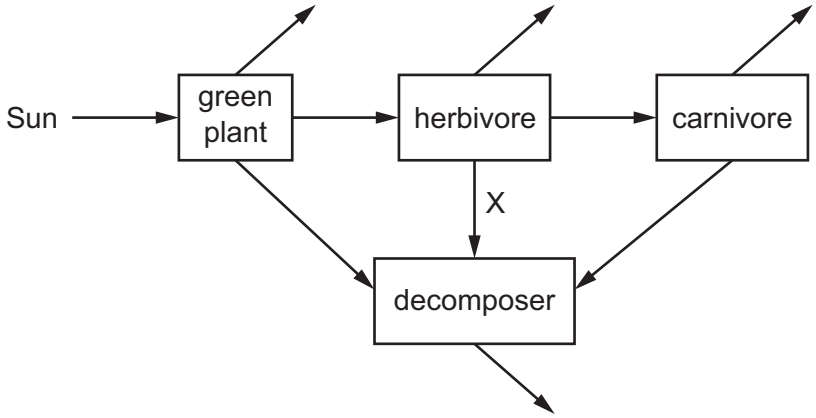
A It does not require a struggle for survival.

B It does not require variation in a population.

C It involves the selection of advantageous phenotypes.

D It involves the selection of disadvantageous genotypes.

32 The diagram shows energy flow through an ecosystem.



In what form is energy transferred at X?

A chemical

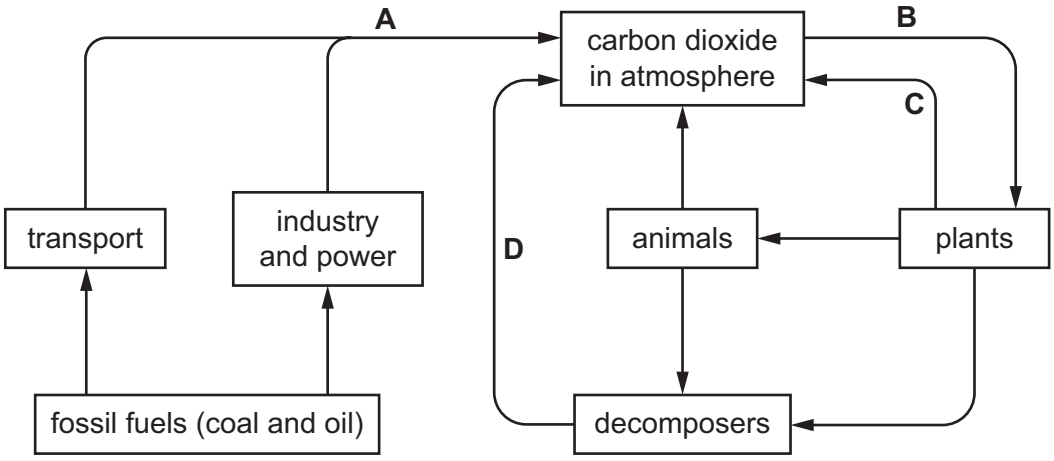
B heat

C kinetic

D light

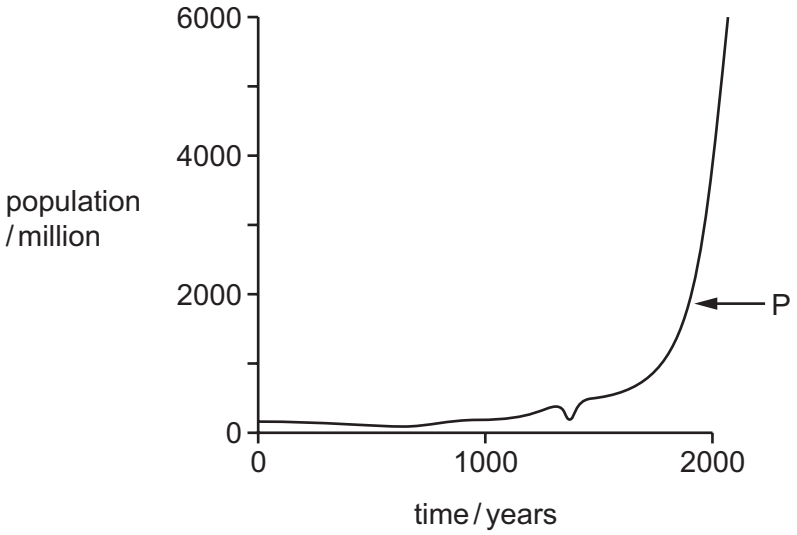
33 The diagram shows part of the carbon cycle.

Which process reduces the carbon dioxide content of the atmosphere?



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34 The graph shows the human population of the world for the last 2000 years.



What is the phase identified by P?

A death

B exponential (log)

C lag

D stationary

35 Some of the characteristics of bacteria are listed.

1 can make complex molecules

2 can reproduce quickly

3 have cytoplasm

4 may cause diseases

Which characteristics make bacteria useful in biotechnology and genetic engineering?

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

36 What is a requirement for the production of penicillin in a fermenter?

A adding bubbles of nitrogen gas to mix the nutrients and *Penicillium*

B adding the required amount of sugar as a nutrient

C ensuring no oxygen enters the fermenter so only anaerobic respiration occurs

D maintaining a constant temperature of 95 °C to prevent other microorganisms growing

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37 Human insulin can be produced in large quantities by modified *E. coli* bacteria.

Four of the steps in this production process are listed.

1 Insulin is removed from the bacterial culture.

2 An enzyme is used to cut out the insulin gene from a human chromosome.

3 The insulin gene is placed into the plasmid of the bacterium.

4 Bacteria with the insulin gene reproduce very rapidly.

What is the order of these steps?

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

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

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

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

38 What is a major contributor to the problem of worldwide famine?

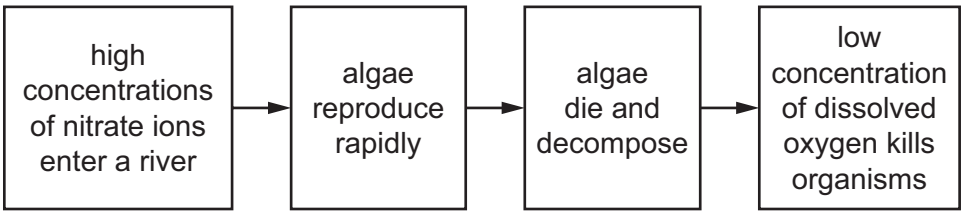
A equal distribution of food

B increasing population and life expectancy

C large-scale monoculture of crop plants

D use of herbicides and insecticides in farming

39 The flow diagram shows a process that can occur as a result of pollution in a river.



Which term describes the process shown in the flow diagram?

A aerobic respiration

B eutrophication

C nitrogen cycle

D photosynthesis

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40 Which stage in the treatment of sewage removes large floating objects, such as plastic bags?

A aeration

B discharge

C screening

D sedimentation

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