Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/21**

Paper 2 Multiple Choice (Extended) **October/November 2016**

45 minutes

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

* 3 1 9 3 8 6 9 3 4 0 *

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.

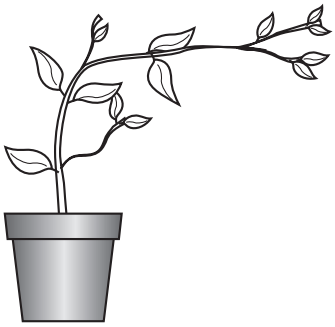
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

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 **16** printed pages.

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1 The diagram shows a plant that has been placed near a sunlit window for a few weeks.



Which two characteristics of living organisms have affected the shape of the plant?

A excretion and sensitivity

B growth and reproduction

C reproduction and excretion

D sensitivity and growth

2 What is a characteristic of amphibians but **not** of reptiles?

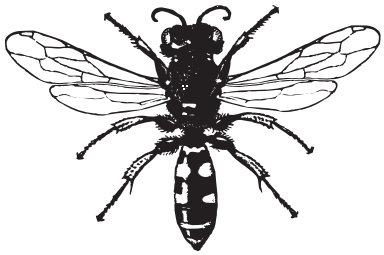
A four limbs

B laying eggs in water

C scaly skin

D using lungs for breathing

3 The diagram shows an insect.

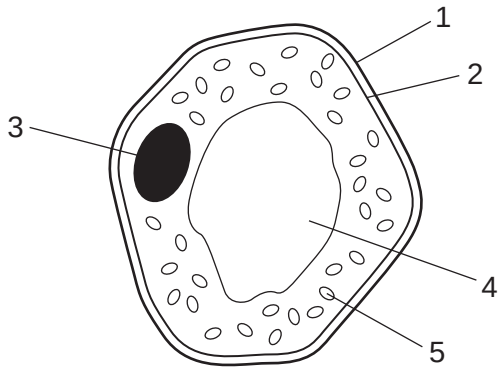


Use the key to identify the insect.

1	wings present	go to 2
	wings absent	**A**
2	two pairs of wings	go to 3
	one pair of wings	**B**
3	wings with circular markings	**C**
	wings without circular markings	**D**

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4 The diagram shows a spongy mesophyll cell from a green leaf.



Which labelled structures are **not** found in animal cells?

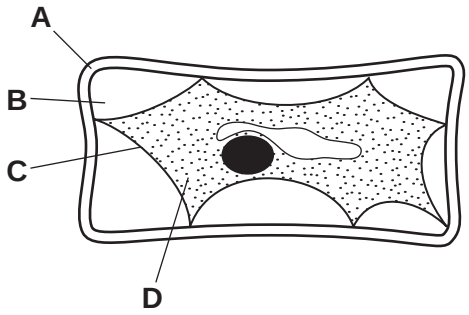
A 1, 3 and 4 **B** 1, 4 and 5 **C** 2, 3 and 4 **D** 3, 4 and 5

5 What are the features of the cell walls in a xylem vessel?

	end wall	side wall
A	absent	thick
B	absent	thin
C	present	thick
D	present	thin

6 The diagram shows a plant cell which has lost water to its surroundings by osmosis.

Which part is the partially permeable membrane?



7 Commercial fishermen use ice to store the fish that they catch.

How does the ice keep the fish fresh?

A Cells denature.

B Decomposer activity decreases.

C Decomposer activity increases.

D Proteins denature.

8 What controls the speed of chemical reactions in all living cells?

A enzymes

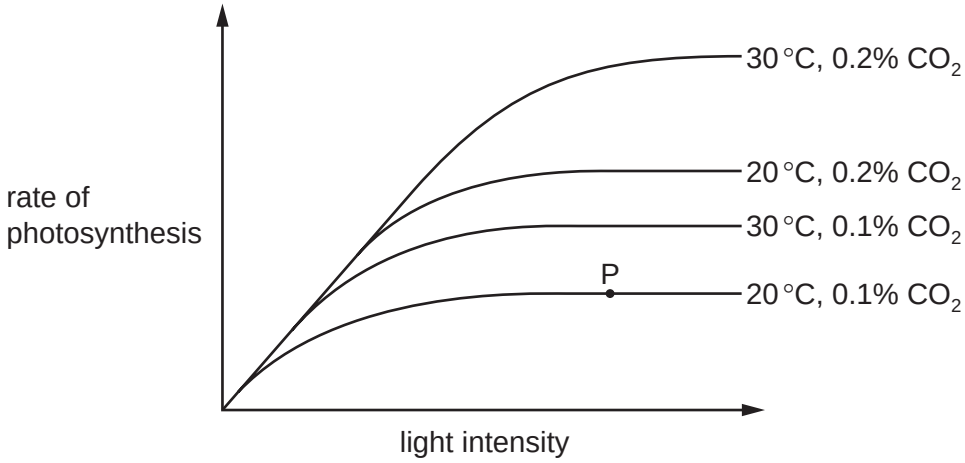
B hormones

C ions

D vitamins

9 The diagram shows how the rate of photosynthesis varies with light intensity.

The four curves show different conditions of temperature and carbon dioxide concentration.

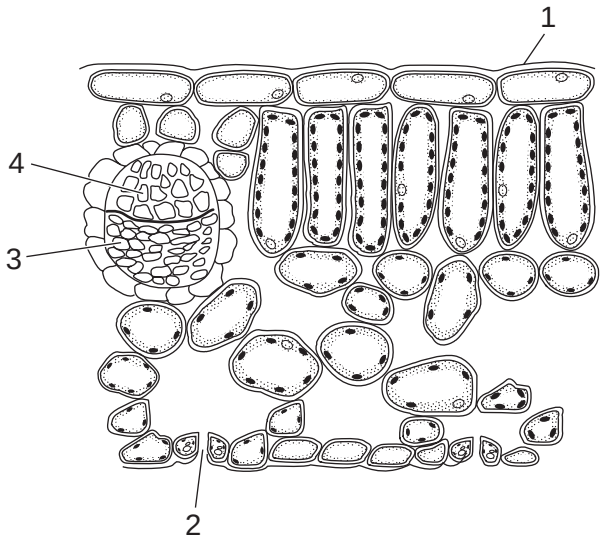


What limits the rate of photosynthesis at point P?

	light intensity	carbon dioxide concentration	temperature
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

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



What shows the correct function of a numbered part?

	part	functions
A	1	photosynthesis
B	2	gaseous exchange
C	3	transport of water from the root
D	4	transport of sugars to the root

11 The roots of plants take up nitrates from the soil.

What are the nitrates used to make?

A fat

B glucose

C protein

D starch

12 Which diseases are caused by a lack of iron and a lack of vitamin D?

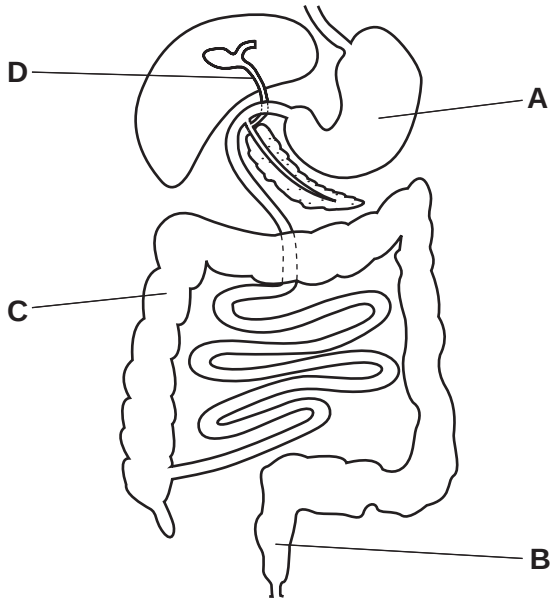
	lack of iron	lack of vitamin D
A	anaemia	soft bones
B	kwashiorkor	anaemia
C	kwashiorkor	soft bones
D	soft bones	anaemia

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[Turn over

13 The diagram shows the human alimentary canal.

Which labelled part absorbs the most water?



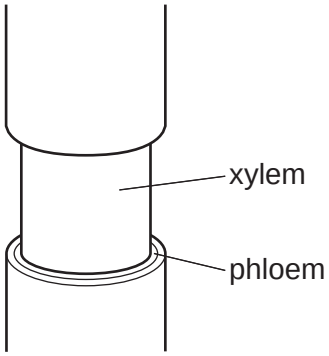
14 The cholera bacterium produces toxins that cause chloride ions to be secreted into the small intestine.

How does this affect the water potential of blood in the intestinal capillaries and the intestinal contents?

	water potential	
	blood in capillaries	contents of small intestine
A	lowered	lowered
B	lowered	raised
C	raised	lowered
D	raised	raised

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15 The diagram shows the stem of a plant. A strip of the outer tissue including the phloem has been removed.



How is transport in the plant affected?

A Amino acids and sugar cannot pass to the roots.

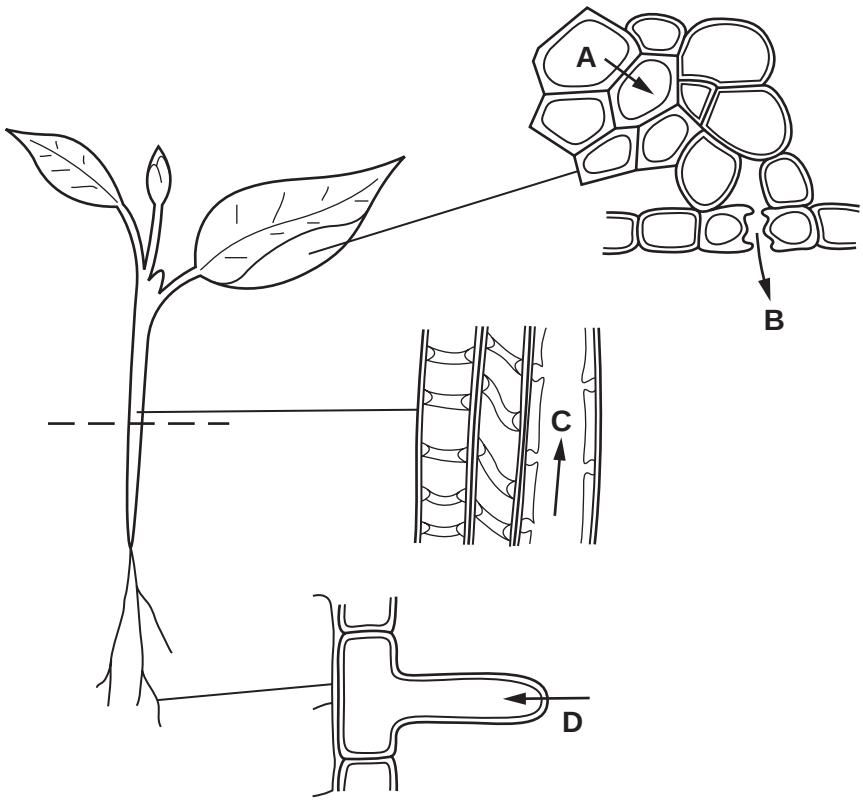
B Dissolved salts cannot pass to the leaves.

C Water cannot pass to the leaves.

D Water cannot pass to the roots.

16 The diagrams show stages in the passage of water through a plant.

Which arrow shows water moving in the form of water vapour?



17 Which substance is moved by translocation in a flowering plant?

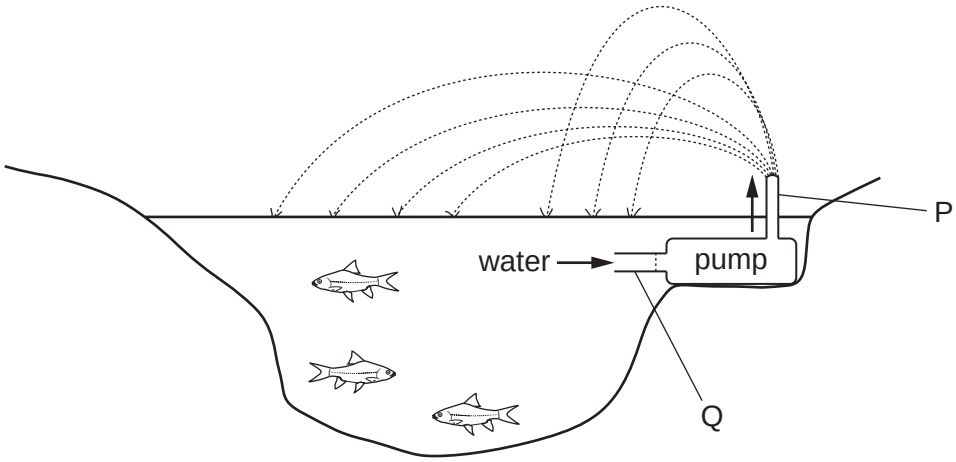
A amino acid

B cellulose

C fat

D starch

18 The diagram shows a garden pond with a fountain worked by a pump. The fountain brings oxygen from the air to fish in the pond.



The system can be compared with part of the human circulatory system. The pump is compared with the heart.

What are P and Q compared with?

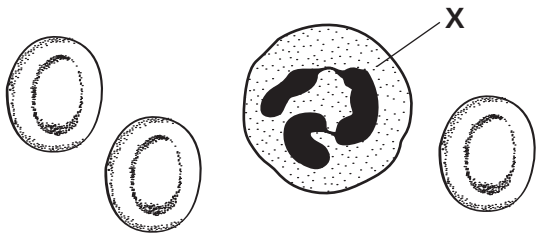
	P	Q
A	aorta	pulmonary artery
B	pulmonary artery	vena cava
C	pulmonary vein	vena cava
D	vena cava	aorta

19 What happens when the left ventricle contracts?

	atrioventricular valves	semilunar valves
A	closed	closed
B	closed	open
C	open	closed
D	open	open

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20 The diagram shows human blood cells, as seen under a microscope.



What is the function of cell **X**?

A to carry glucose

B to carry oxygen

C to defend against disease

D to make the blood clot

21 What is **not** a consequence of vaccination?

A Antigens trigger an immune response.

B Antibodies lock onto antigens.

C Memory cells are produced.

D Phagocytes produce antibodies.

22 Which sequence of changes takes place when we breathe in?

A diaphragm contracts → volume of thorax increases → pressure in lungs decreases

B diaphragm contracts → volume of thorax increases → pressure in lungs increases

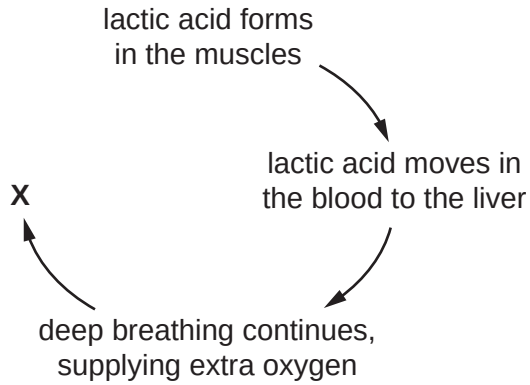
C diaphragm relaxes → volume of thorax increases → pressure in lungs decreases

D diaphragm relaxes → volume of thorax increases → pressure in lungs increases

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23 After a race, athletes experience oxygen debt.

The diagram shows how the oxygen debt is removed.



What happens at **X**?

A aerobic respiration of glucose

B aerobic respiration of lactic acid

C anaerobic respiration of glucose

D anaerobic respiration of lactic acid

24 What happens as a result of deamination in the liver?

A Alcohol is broken down.

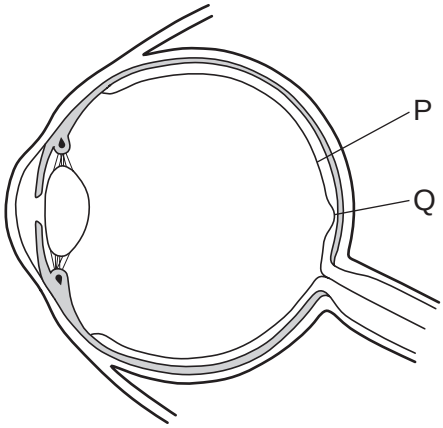
B Glycogen is stored.

C Glucose is produced.

D Urea is produced.

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25 The diagram shows a section through a human eye.



Good colour vision is a result of a high concentration of which type of cells at which position?

A cones at P

B cones at Q

C rods at P

D rods at Q

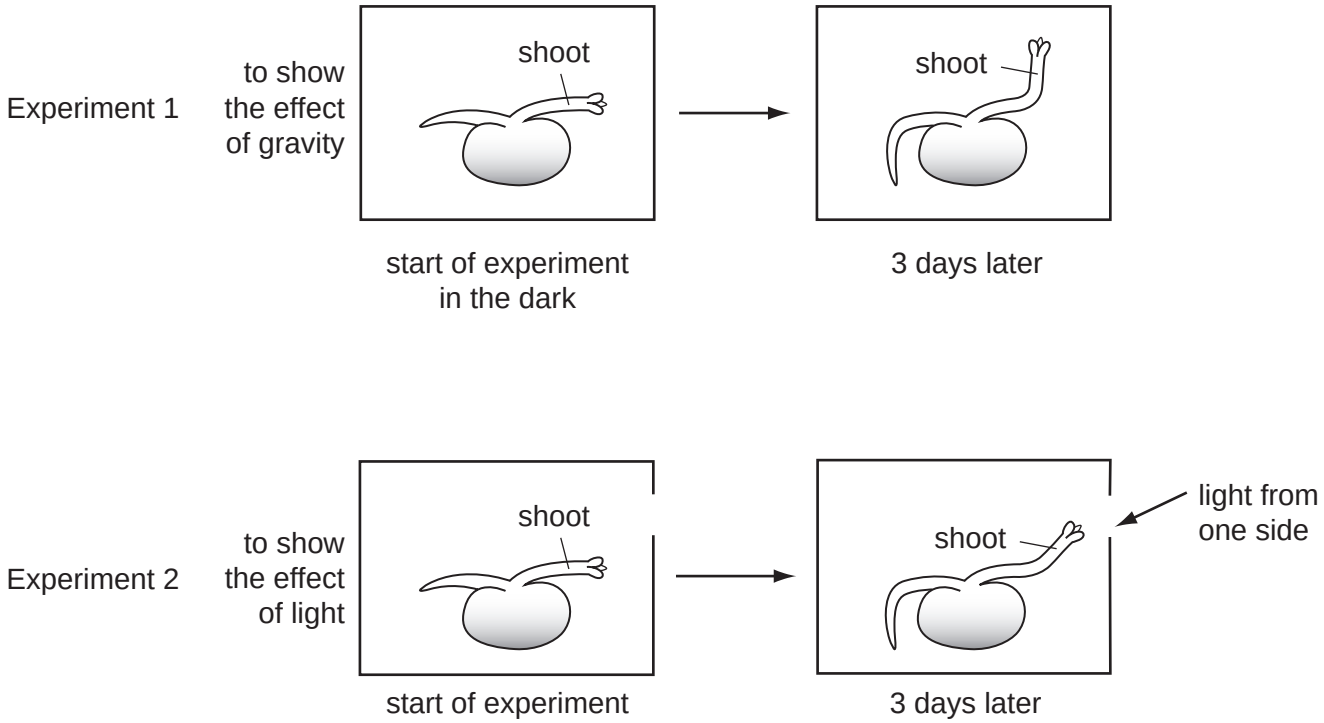
26 When the blood glucose concentration is low, which hormone is released and which organ releases it?

	hormone	organ
A	glucagon	liver
B	glucagon	pancreas
C	insulin	liver
D	insulin	pancreas

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[Turn over

27 The diagram shows seedlings in two experiments on the tropic response of seedlings to gravity and light.



How have the seedlings responded?

	to gravity	to light
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = tropic response shown

✗ = no tropic response shown

28 When does fertilisation occur in humans?

A when an egg is released

B when implantation occurs

C when sperm and egg nuclei fuse

D when sperm are released

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29 What is the function of the many mitochondria in a sperm cell?

A to help penetrate the egg cell

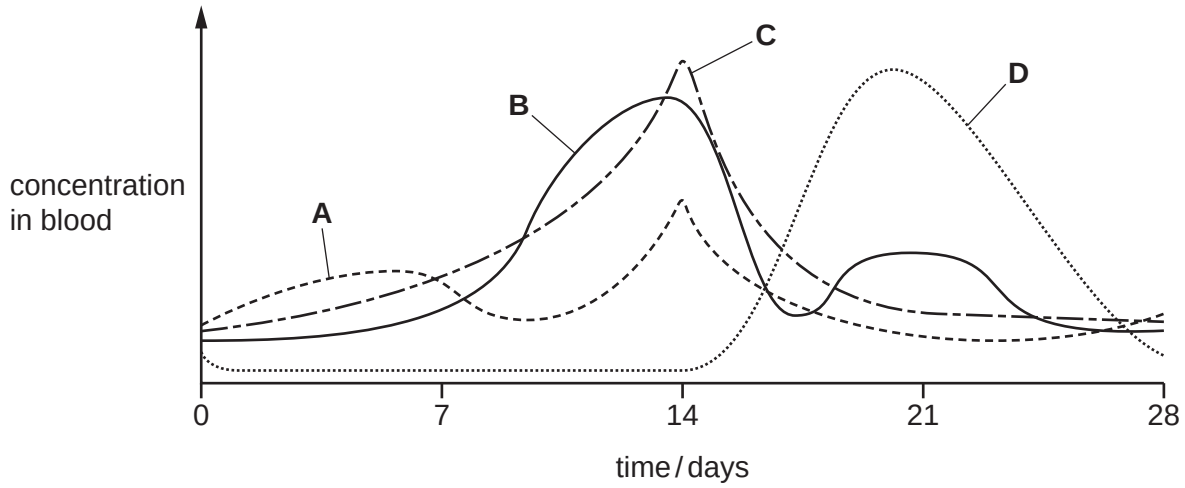
B to provide energy for movement

C to store food molecules

D to synthesise enzymes

30 The graph shows changes in the concentrations of four hormones during the menstrual cycle.

Which hormone is progesterone?



31 One parent has blood group A and the other parent has blood group B.

Their first child has blood group O.

What are the possible blood groups of their next child?

	group A	group B	group AB	group O
A	✓	✓	✓	✓
B	✓	✓	✓	✗
C	✓	✓	✗	✓
D	✗	✗	✓	✗

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[Turn over

32 Hb^A is the allele for normal haemoglobin and Hb^S is the allele for abnormal haemoglobin that causes sickle-shaped red blood cells.

Which row correctly matches a genotype to its phenotype?

	genotype	person has sickle-cell anaemia	person has resistance to malaria
A	$Hb^A\ Hb^A$	✗	✓
B	$Hb^S\ Hb^A$	✓	✗
C	$Hb^S\ Hb^A$	✗	✓
D	$Hb^S\ Hb^S$	✗	✗

33 How do the leaves of hydrophytes differ from those of xerophytes?

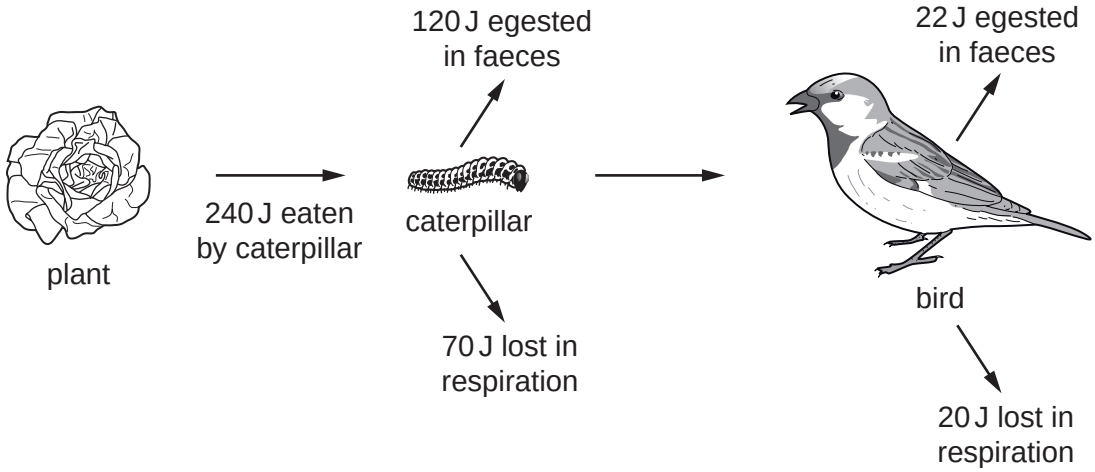
A smaller stomata

B smaller total surface area

C stomata on the undersides of the leaves

D thinner cuticle

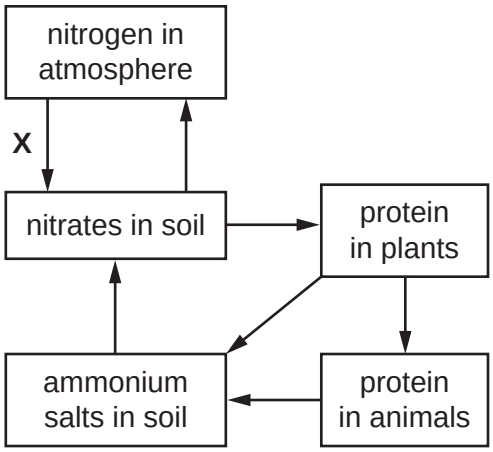
34 The diagram shows a food chain.



How much energy is transferred to the bird?

A 8 J **B** 42 J **C** 50 J **D** 240 J

35 The diagram shows part of the nitrogen cycle.



What could be responsible for process **X**?

A decomposers

B denitrifying bacteria

C lightning

D nitrifying bacteria

36 Which statement describes the effect of predation and disease on a population?

A They cause an exponential (log) increase in the population size.

B They control the rate of growth of the population.

C They decrease the food supply available to the population.

D They reduce the lag phase of the population.

37 Which structures, found in bacteria, make them useful in genetic engineering?

A cell walls

B membranes

C plasmids

D mitochondria

38 Why is yeast used in bread-making?

A Aerobic respiration produces alcohol.

B Aerobic respiration produces lactic acid.

C Anaerobic respiration produces alcohol.

D Anaerobic respiration produces carbon dioxide.

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[Turn over

39 An advantage of some genetically modified crop plants is that they will **not**

A be affected by herbicides.

B need carbon dioxide.

C need magnesium ions.

D need water.

40 What is **not** a reason for having conservation programmes?

A introducing species to new environments

B maintaining resources

C protecting vulnerable environments

D reducing extinction

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