Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2014**

1 hour

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

9130719436

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.

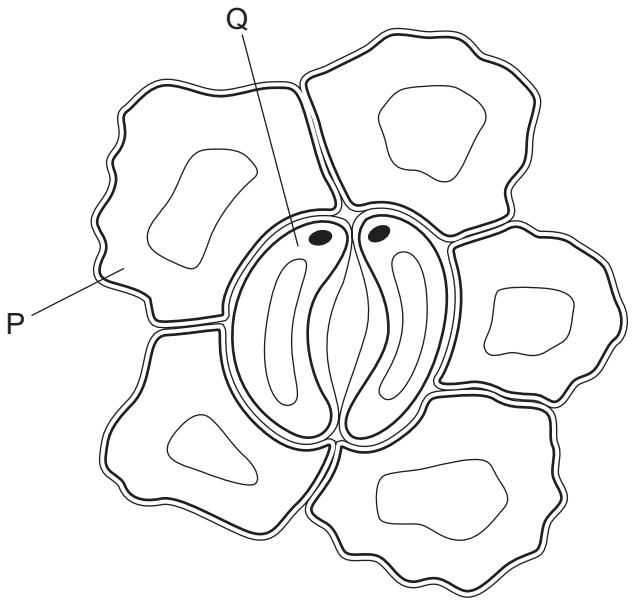
Read the instructions on the Answer Sheet very carefully.

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 document consists of **17** printed pages and **3** blank pages.

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1 The diagram shows cells in the epidermis of a leaf.



To complete the diagram, which structural features should be added to the cells P and Q?

	P		Q	
	chloroplasts	nucleus	chloroplasts	nucleus
A	✓	✓	✗	✗
B	✓	✗	✓	✓
C	✗	✓	✓	✗
D	✗	✗	✗	✓

2 The list shows the absorption of three different substances by organisms.

1 mineral ions entering a root hair cell from the soil

2 oxygen entering the blood from an alveolus

3 water entering a root hair cell from the soil

In each case, what is the mechanism of absorption?

	mineral ions	oxygen	water
A	active transport	active transport	diffusion
B	active transport	diffusion	osmosis
C	diffusion	active transport	diffusion
D	diffusion	osmosis	active transport

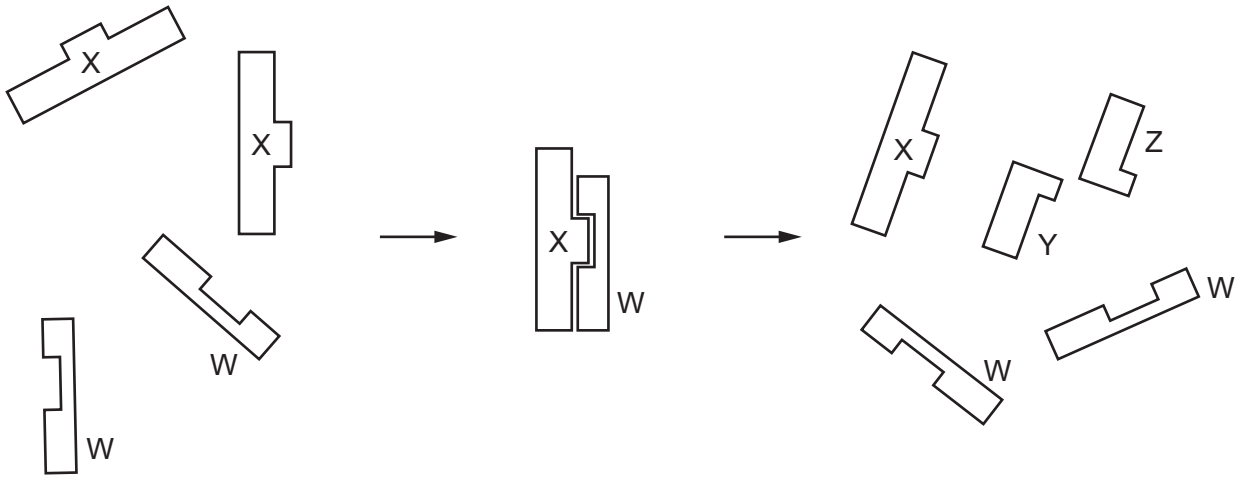
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3 A cube of fresh potato is weighed. It is then placed in a test-tube containing a dilute solution of sucrose. After an hour, its mass has increased.

Which process has occurred and what has happened to the concentration of the sucrose in the solution in the test-tube?

	process	sucrose concentration
A	active transport	decreased
B	active transport	increased
C	osmosis	decreased
D	osmosis	increased

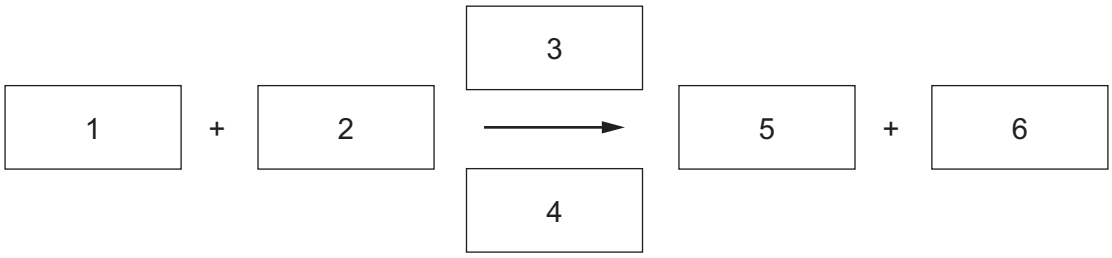
4 The diagram illustrates the 'lock and key' hypothesis of enzyme action.



What are the enzyme, product and substrate in this reaction?

	enzyme	product	substrate
A	W	X	Y and Z
B	W	Y and Z	X
C	X	W	Y and Z
D	X	Y and Z	W

5 The equation for photosynthesis is represented below.



Which words should be in the boxes?

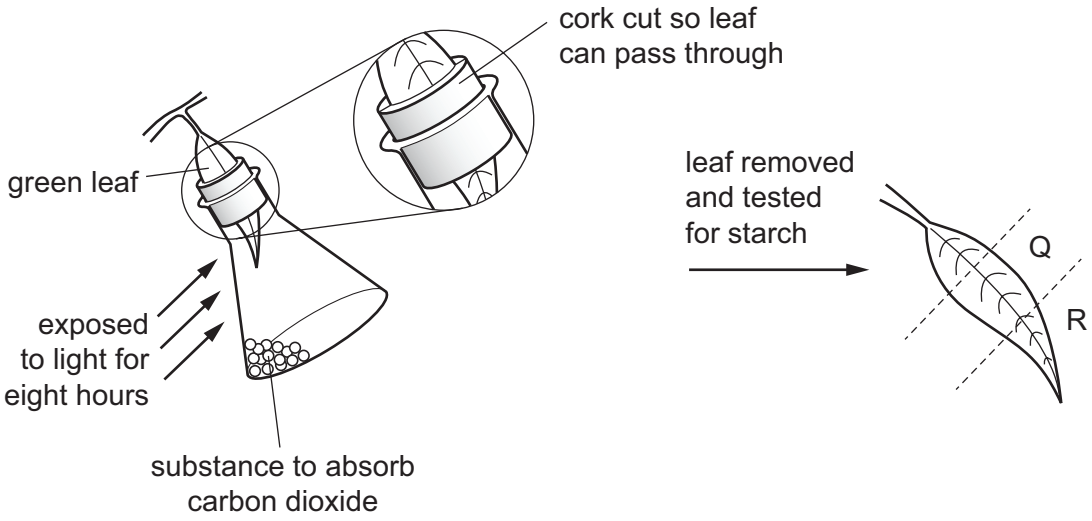
	1	2	3	4	5	6
A	oxygen	carbon dioxide	sunlight	chlorophyll	glucose	water
B	glucose	carbon dioxide	chlorophyll	sunlight	water	oxygen
C	carbon dioxide	water	sunlight	chlorophyll	glucose	oxygen
D	water	oxygen	chlorophyll	sunlight	glucose	carbon dioxide

6 What are the effects of a lack of magnesium ions and nitrate ions on plant growth?

	lack of magnesium ions	lack of nitrate ions
A	leaves go yellow between the veins	unable to form enzymes
B	roots lack root hairs	overall growth stunted
C	unable to form amino acids	unable to form glucose
D	unable to form cellulose	oldest leaves go yellow

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7 A plant is kept in the dark for two days. One of its leaves is used in an experiment to investigate photosynthesis as shown in the diagram.



What are the colours of Q and R, when the leaf is tested for starch using iodine solution?

	Q	R
A	blue / black	brown
B	brown	brown
C	blue / black	blue / black
D	brown	blue / black

8 Which foods can be eaten to prevent scurvy, anaemia and rickets?

	preventing scurvy	preventing anaemia	preventing rickets
A	cheese and milk	oranges and lemons	red meat
B	cheese and milk	red meat	oranges and lemons
C	oranges and lemons	cheese and milk	red meat
D	oranges and lemons	red meat	cheese and milk

9 Which blood vessels carry absorbed nutrients and oxygen into the liver?

	carries absorbed nutrients	carries oxygen
A	hepatic artery	hepatic vein
B	hepatic portal vein	hepatic artery
C	hepatic portal vein	hepatic vein
D	hepatic vein	hepatic artery

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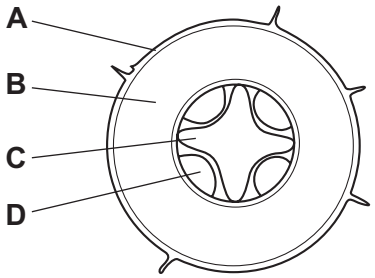
10 A piece of butter containing fat is eaten.

After the fat has been swallowed, which chemicals will enter the stomach and the ileum?

	stomach	ileum
A	fat	fatty acids and glycerol
B	fatty acids	glucose
C	fatty acids and glycerol	fatty acids and glycerol
D	glucose	fat

11 The diagram shows a section through a root.

Which tissue transports amino acids?



12 Which statement describes transpiration?

A evaporation of water from mesophyll cells and its loss through the stomata

B gaseous exchange between the leaves and the atmosphere

C movement of water by osmosis from the roots to the leaves

D movement of water up through the xylem and into the mesophyll cells

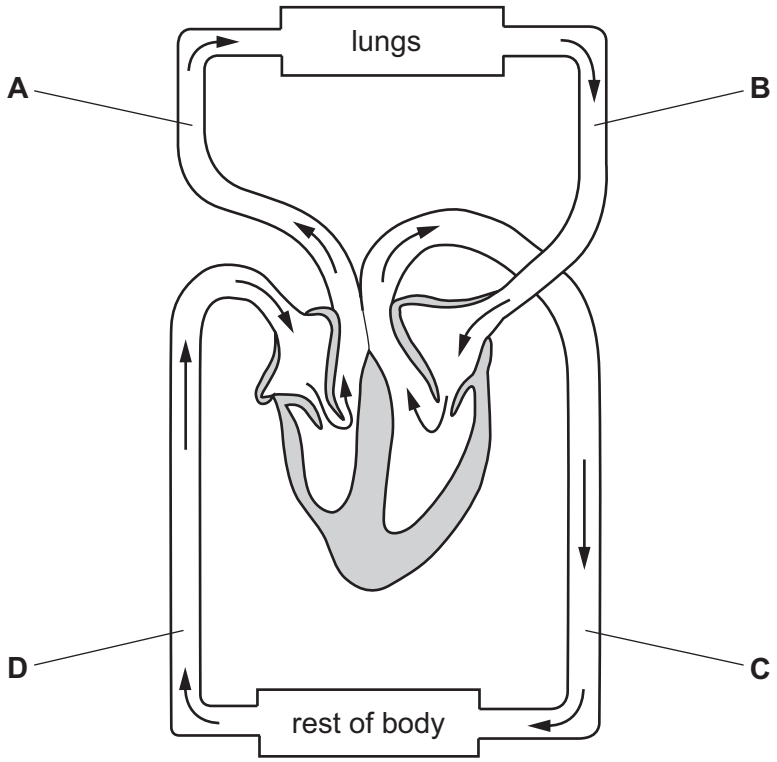
13 Which blood vessels contain valves?

	aorta	capillaries	renal artery	renal vein
A	✓	✓	✗	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✗	✓	✓

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14 The diagram shows the circulatory system.

In which vessel is the blood pressure highest?



15 The table shows the characteristics of the blood in one blood vessel in the body.

oxygen concentration	carbon dioxide concentration	pressure
high	low	high

Which blood vessel contains blood with these characteristics?

A aorta

B pulmonary artery

C pulmonary vein

D vena cava

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[Turn over

16 Some characteristics of the human gas exchange system are listed.

1 a difference in temperature between the air in the alveoli and the blood

2 a large surface area of the alveoli and the blood capillaries

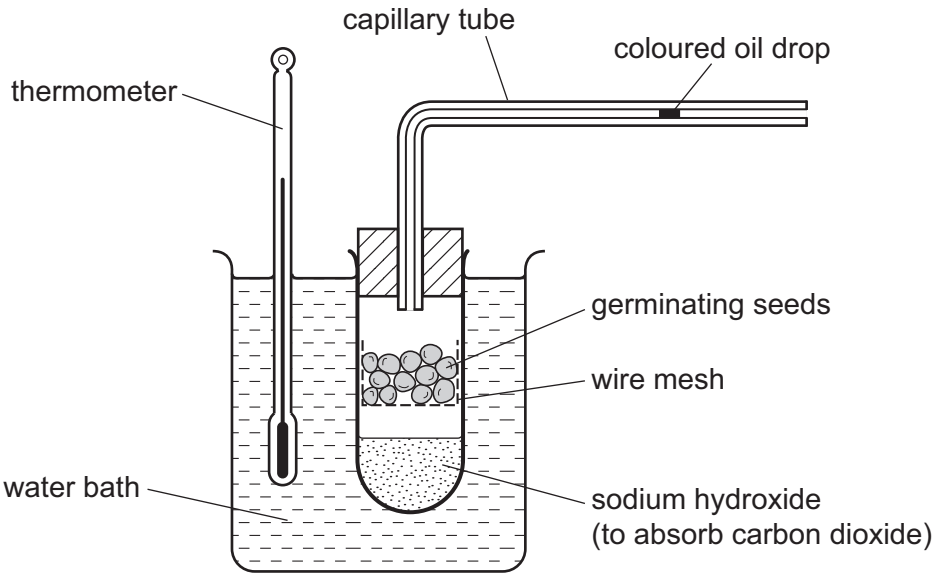
3 a short diffusion distance between the air and the blood

4 elastic fibres in the walls of the alveoli

Which factors affect the rate of oxygen uptake into the blood?

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

17 The diagram shows how some apparatus is set up to investigate respiration in germinating seeds.



The coloured oil drop moves along the capillary tube.

What causes the movement of the coloured oil drop?

A carbon dioxide released

B heat released

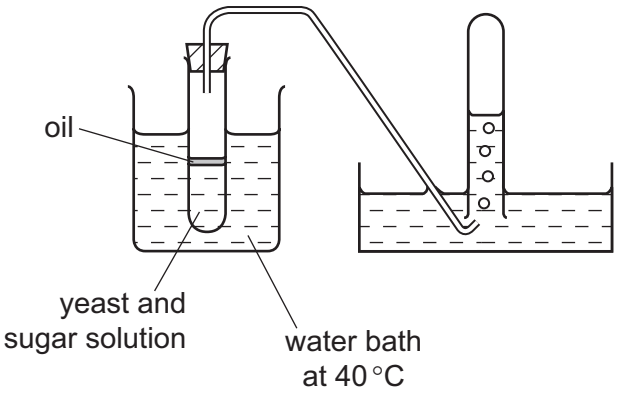
C oxygen used

D water used

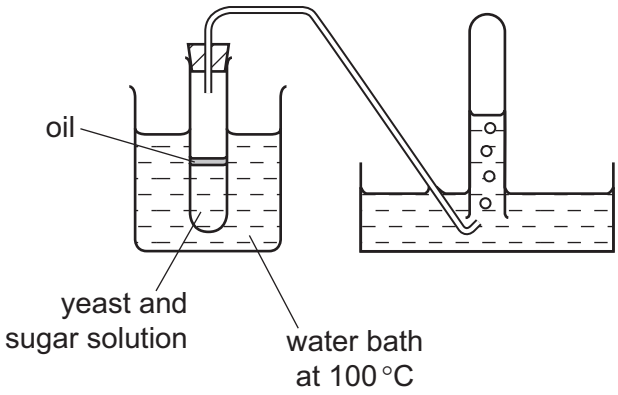
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18 Which apparatus can be used to investigate the production of carbon dioxide by anaerobic respiration of yeast?

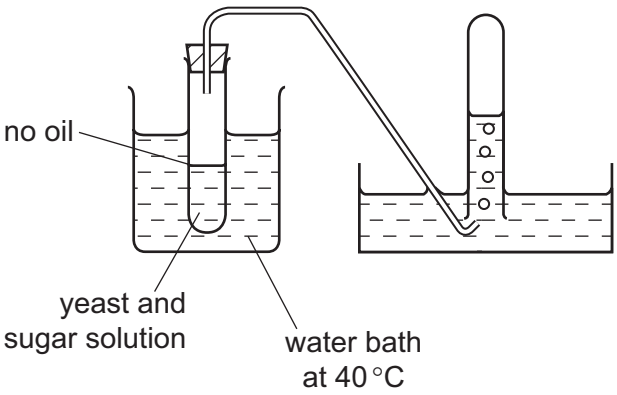
A



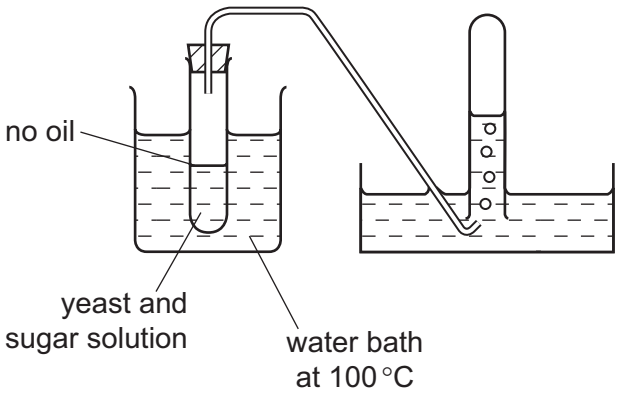
B



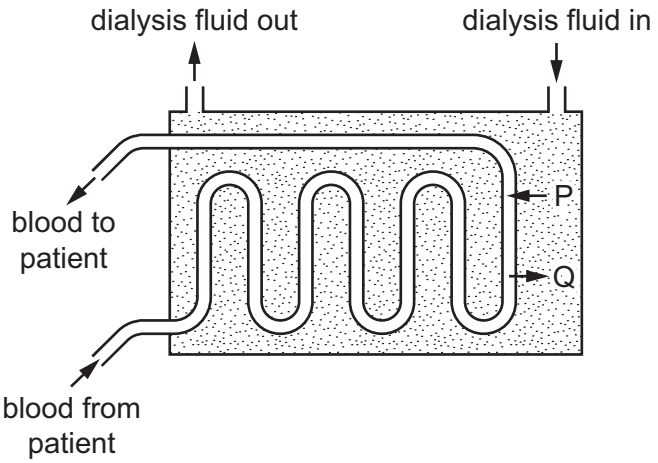
C



D



19 The diagram shows a dialysis machine.



In a person whose health problems affect only the kidneys, which substances will move as shown at P and Q?

	P	Q
A	glucose	protein
B	glucose	urea
C	some salts	protein
D	some salts	urea

20 A person's kidneys remove waste from the blood and help to keep the composition of the blood constant.

Which word describes these functions?

A absorption

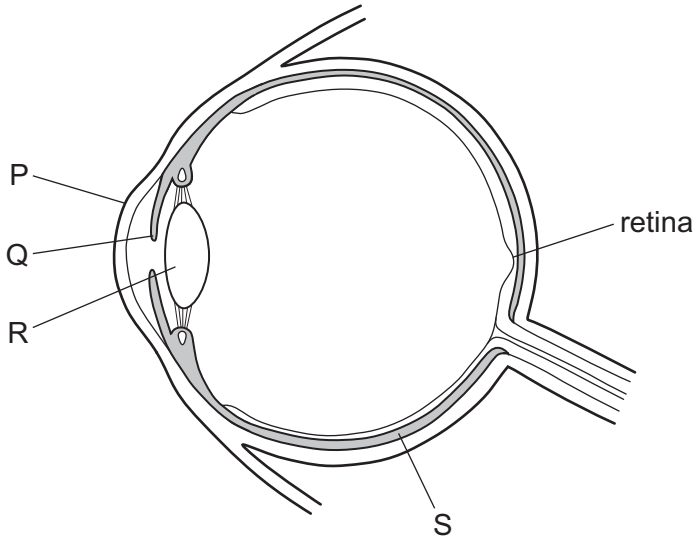
B assimilation

C diffusion

D homeostasis

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21 The diagram shows a section through the eye.



Which pair of structures focus light rays onto the retina?

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

22 Which hormone causes an **increase** in blood glucose concentration?

A adrenaline

B FSH

C insulin

D oestrogen

23 In what way is the pupil reflex different from some other reflexes?

A A change in the environment causes impulses in the sensory neurone.

B The function of the reflex is protective.

C The relay neurones are in the brain.

D The response occurs quickly.

24 What happens when the arm is straightened at the elbow?

A The biceps pushes on the radius.

B The biceps pushes on the ulna.

C The triceps pulls on the radius.

D The triceps pulls on the ulna.

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25 The table lists the effects of four different drugs.

Which drug is heroin?

	addiction	cancer	depression	liver damage
A	✓	✓	✗	✓
B	✓	✗	✓	✗
C	✗	✓	✓	✓
D	✗	✗	✓	✓

26 Which statement about penicillin is correct?

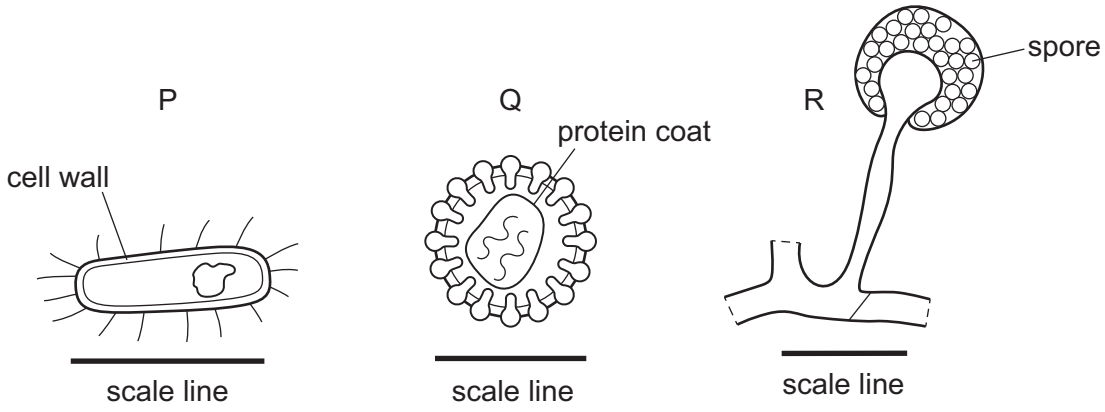
A *Penicillium* bacteria can secrete substances that inhibit the growth of some fungi.

B *Penicillium* fungus secretions can be used to treat some virus infections.

C The antibiotic penicillin is a waste product of some bacteria.

D The fungus *Penicillium* produces a substance that can inhibit some bacteria.

27 The diagrams show three organisms, **not** drawn to the same scale. Each diagram has its own scale line.



Using the same units (μm) in each diagram, what length is the scale line for each organism?

	P	Q	R
A	0.1	2.0	80–100
B	0.1	80–100	2.0
C	2.0	0.1	80–100
D	80–100	2.0	0.1

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28 What is the main source of energy for green plants?

A carbon dioxide

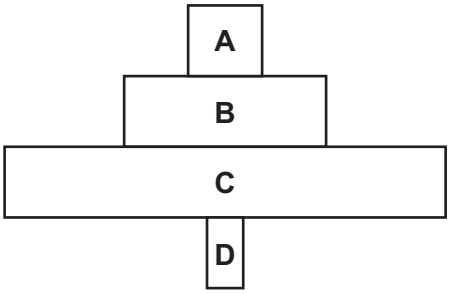
B chlorophyll

C heat

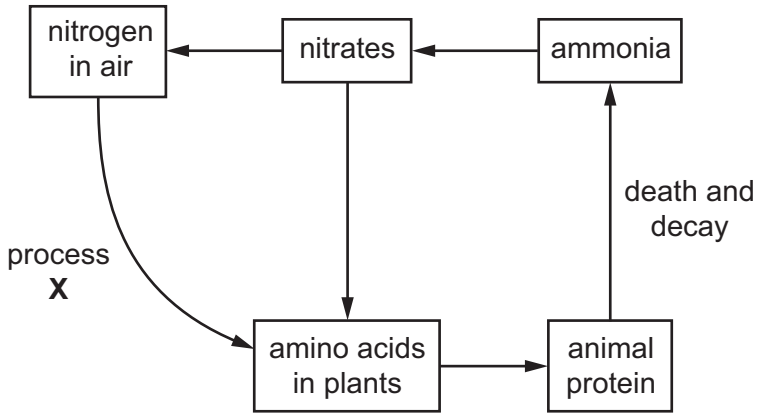
D light

29 The diagram shows a pyramid of numbers in a woodland ecosystem.

At which trophic level are the individual organisms **largest in size**?



30 The diagram shows some of the stages in the nitrogen cycle.



What is process **X**?

A decomposition

B nitrification

C nitrogen fixation

D photosynthesis

31 Three statements about malarial parasites are listed.

1 Insecticides are used to kill the vectors.

2 Netting is used to keep the vectors away from people.

3 People take drugs that stop the malarial pathogen developing.

Which methods can be used to control malaria?

A 1, 2 and 3

B 1 and 2 only

C 1 only

D 2 and 3 only

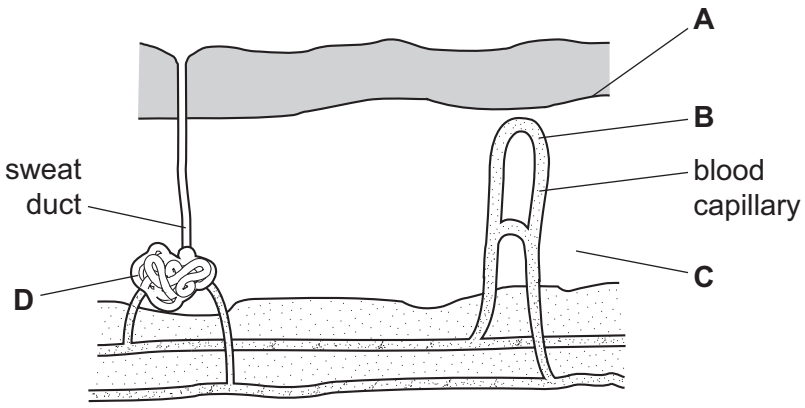
32 In conservation the aim can be to maintain a large number of individuals within a species.

What will result from this?

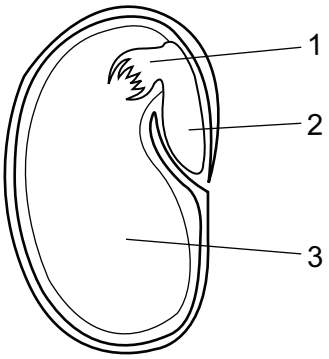
	more genetic variety in the species	species more likely to survive environmental change
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

33 The diagram represents a section through the human skin.

In which part is mitosis occurring most rapidly?



34 The diagram shows a section of a seed.



What are the numbered parts?

	1	2	3
A	cotyledon	plumule	radicle
B	plumule	cotyledon	radicle
C	plumule	radicle	cotyledon
D	radicle	plumule	cotyledon

35 What is the role of progesterone in the menstrual cycle?

A maintains the lining of the uterus

B stimulates FSH secretion

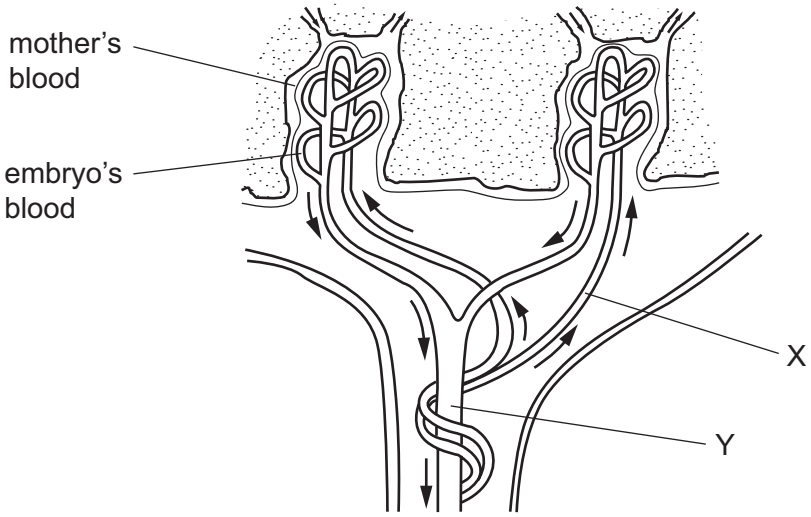
C stimulates LH secretion

D triggers menstruation

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[Turn over

36 The diagram shows how the blood of a human embryo flows close to the mother's blood in the placenta.



Which substances are present at X in higher concentrations than at Y?

A carbon dioxide and glucose

B carbon dioxide and urea

C glucose and oxygen

D glucose and urea

37 Which characteristic shows continuous variation?

A blood group phenotypes

B body weight

C sex

D sickle cell anaemia

38 In the ABO blood grouping system, which genotype is homozygous dominant?

A $I^A\ I^O$ **B** $I^A\ I^B$ **C** $I^B\ I^B$ **D** $I^O\ I^O$

39 Bacteria can be genetically modified to produce human insulin.

What is a possible danger of this procedure?

A Bacterial insulin is less effective in treating diabetes than animal insulin.

B The genetically modified bacteria may become insulin resistant.

C The genetically modified bacteria may produce too much insulin.

D The presence of a new gene in the bacteria may alter the way that existing genes work.

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40 If a homozygous recessive is crossed with a heterozygous individual, what would be the ratio of dominant to recessive individuals in the offspring?

A 1 : 1 **B** 2 : 1 **C** 3 : 1 **D** 4 : 1

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