UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/01**

Paper 1 Multiple Choice **May/June 2009**

1 hour

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

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, highlighters, 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.

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.

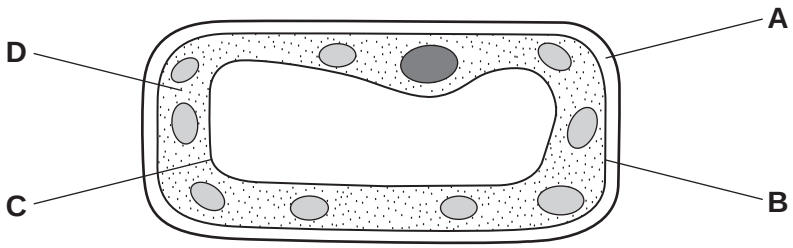
Read the instructions on the Answer Sheet very carefully.

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.

This document consists of **20** printed pages.

1 The diagram shows a plant cell.

Which structure controls the passage of substances into and out of the cell?



2 Which liquid has the highest water potential at atmospheric pressure?

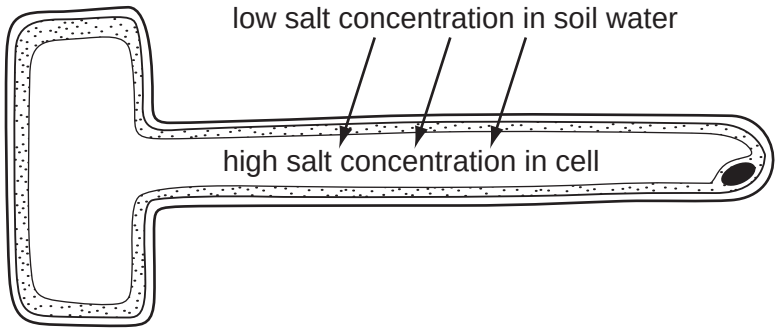
A distilled water

B leaf cytoplasm

C root hair cell sap

D soil water

3 The arrows represent the movement of salts into a root hair cell.



What describes the movement of the salts?

A active transport against the concentration gradient

B active transport down the concentration gradient

C diffusion against the concentration gradient

D diffusion down the concentration gradient

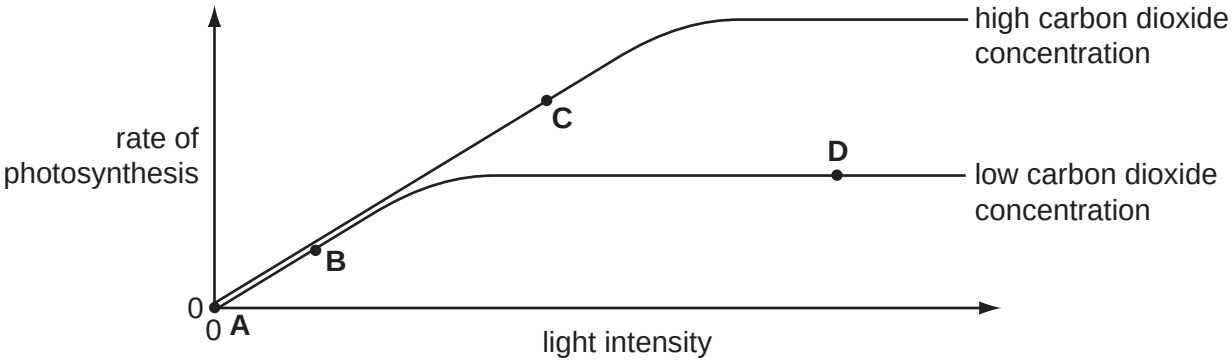
4 Four test-tubes containing egg white are incubated for ten minutes at 35 °C. Different substances are then added to the four test-tubes.

In which test-tube is the egg white first digested?

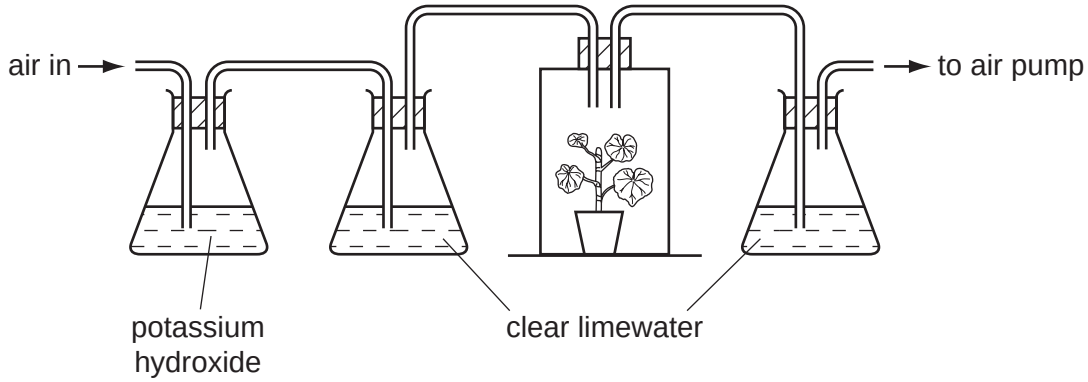
	substances added
A	1 cm^3 lipase solution and three drops of sodium hydroxide solution
B	1 cm^3 protease solution and three drops of dilute hydrochloric acid
C	1 cm^3 protease solution and three drops of water
D	1 cm^3 lipase solution and three drops of water

5 The graph shows the rate of photosynthesis in a pea plant at different light intensities.

At which point is carbon dioxide concentration a limiting factor?



6 The apparatus in the diagram is used to investigate whether carbon dioxide is given off by a green plant.



Which precaution is **not** necessary?

A enclosing the soil and the pot in a sealed plastic bag

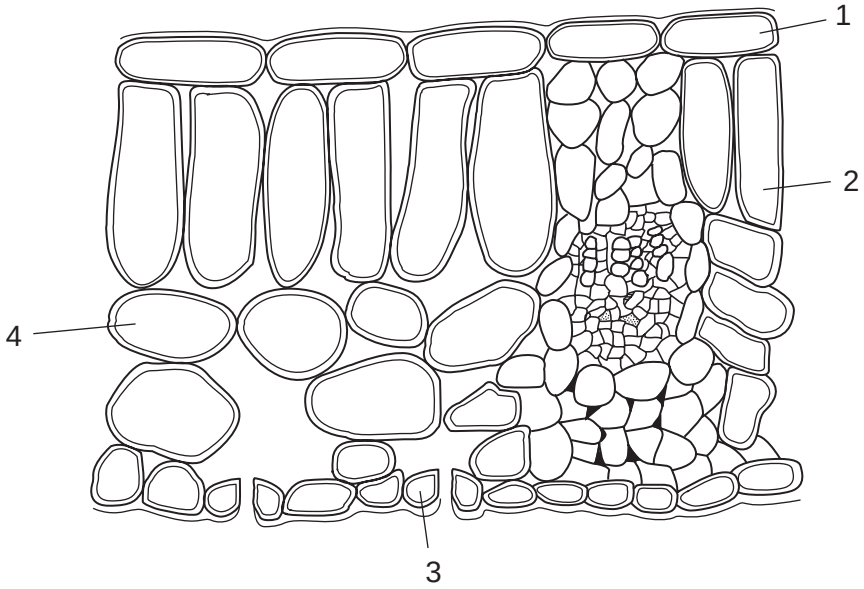
B placing the plant overnight in the dark before the experiment

C putting a light-proof cover over the plant during the experiment

D using fresh limewater

[Turn over

7 The diagram shows the shapes of the cells in a section of a leaf.



Which cells contain chloroplasts?

A 1 and 2

B 2 only

C 2 and 3 only

D 2, 3 and 4

8 Bread contains dietary fibre, fat, protein and starch.

Which substance contributes **least** to the energy obtained by a person eating the bread?

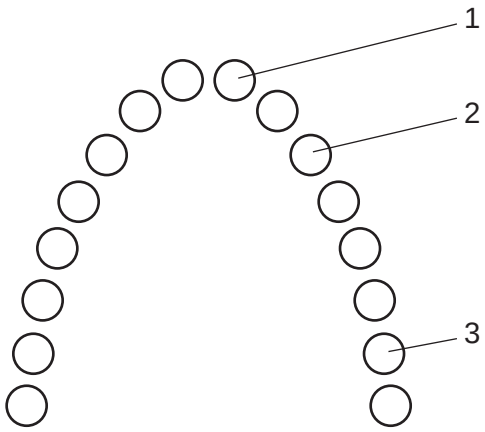
A dietary fibre

B fat

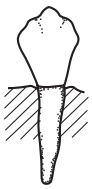
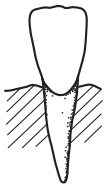
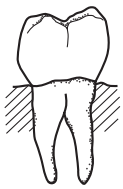
C protein

D starch

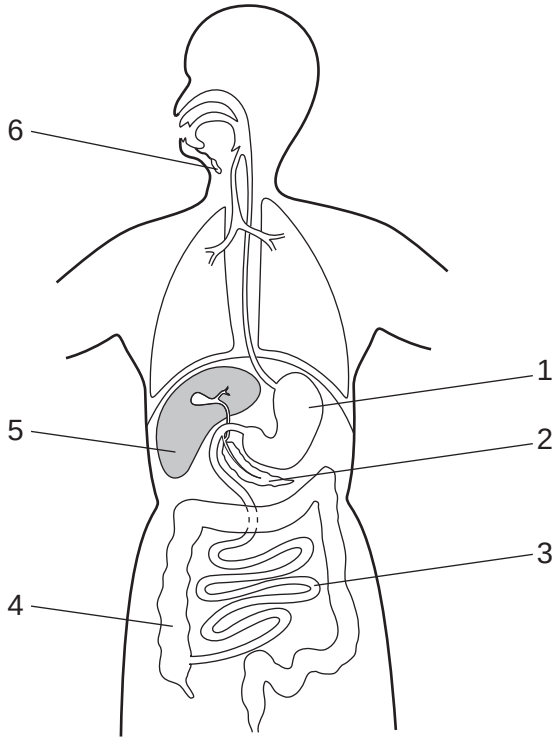
9 The diagram shows the position of the teeth in a human jaw.



Which teeth are found at the positions numbered 1, 2 and 3?

			
A	1	2	3
B	2	3	2
C	2	1	3
D	3	2	1

10 The diagram shows the human gut.



Which numbered structures secrete digestive enzymes?

A 1, 2, 3 and 4

B 1, 2, 3 and 6

C 2, 3, 4 and 5

D 2, 3, 5 and 6

11 What are the functions of the xylem?

	carrying sugars	carrying water	carrying mineral ions	giving support
A	✓	✗	✗	✓
B	✓	✓	✗	✗
C	✗	✓	✓	✗
D	✗	✓	✓	✓

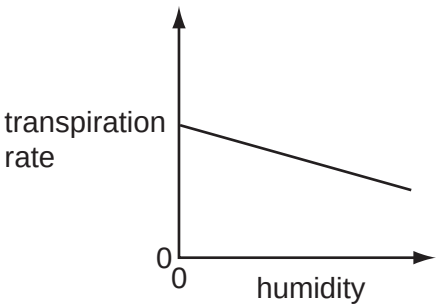
key

✓ = a function of xylem

✗ = not a function of xylem

12 Which graph shows the effect of increasing humidity on the transpiration rate of a plant?

A



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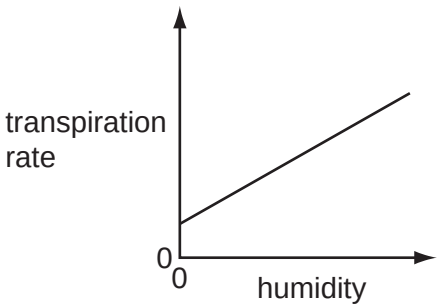

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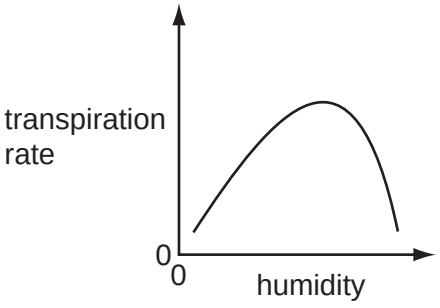
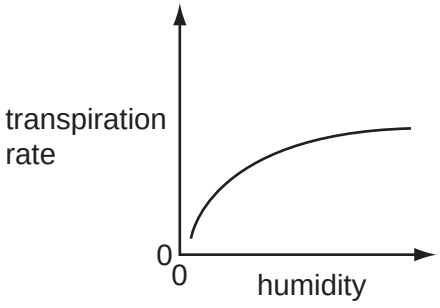
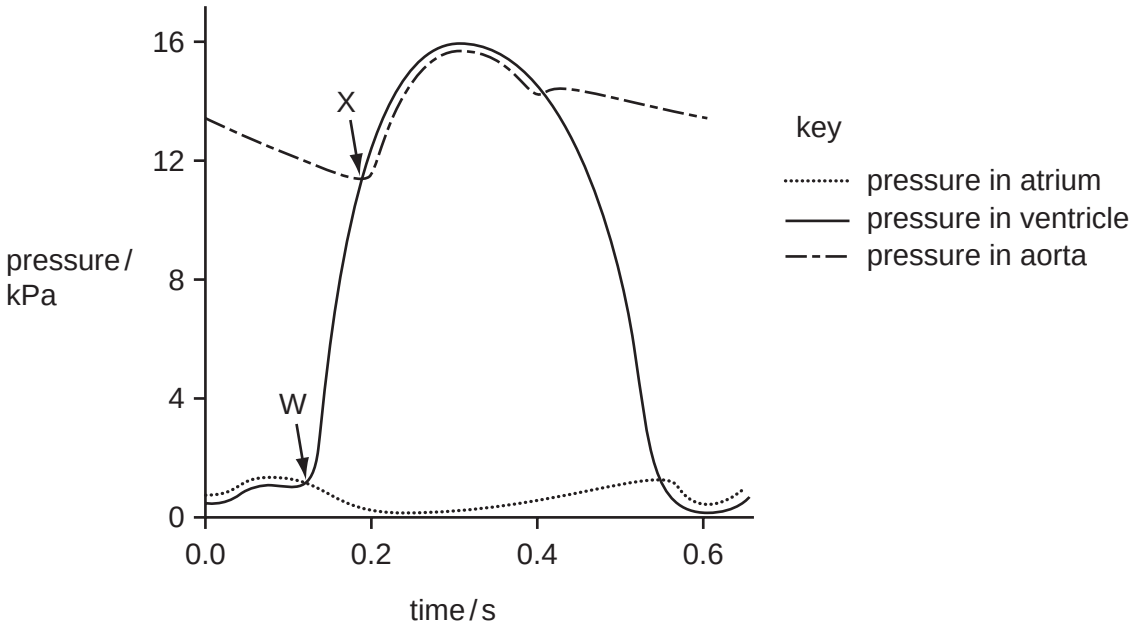


D



[Turn over

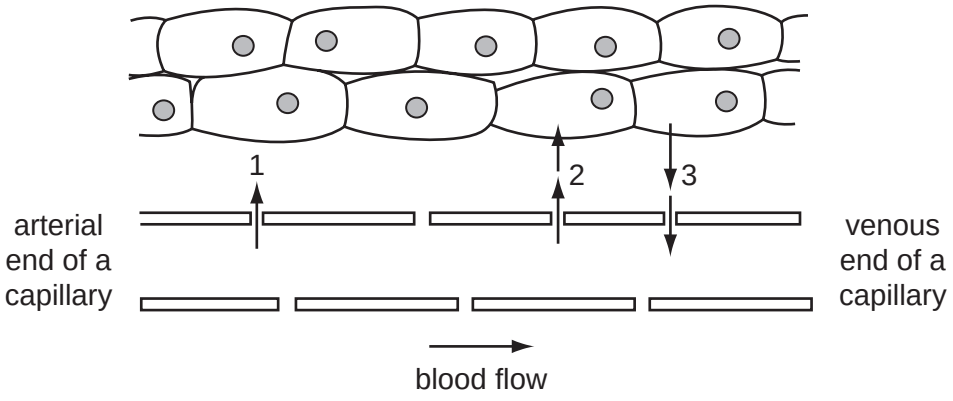
13 The graph shows pressure changes in the left side of the heart, during a single heart beat.



Between points W and X, are the following valves open or closed?

	atrio-ventricular	semi-lunar
A	closed	closed
B	closed	open
C	open	closed
D	open	open

14 The diagram represents a tissue with an adjacent capillary.



Which substances can 1, 2 and 3 represent?

	1	2	3
A	glucose	tissue fluid	carbon dioxide
B	oxygen	carbon dioxide	glucose
C	tissue fluid	glucose	oxygen
D	tissue fluid	oxygen	carbon dioxide

15 A vein has a wider lumen than an artery.

What is the advantage of this?

A bringing blood into close contact with the tissues

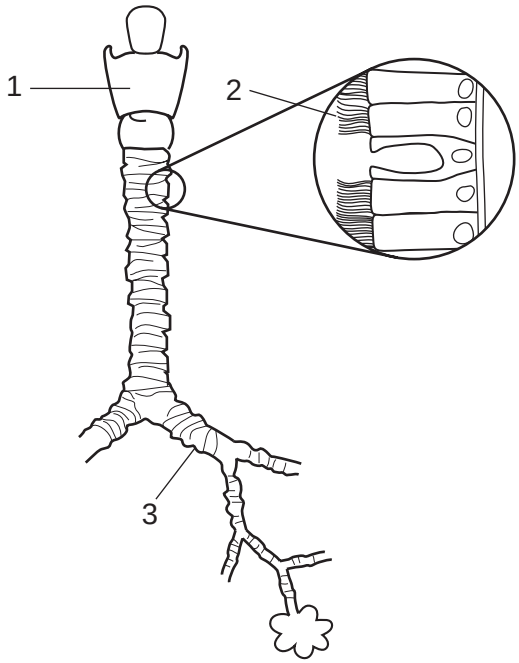
B offering less resistance to blood flow

C preventing back flow of blood

D resisting high blood pressure from the heart

[Turn over

16 The diagram shows some structures in the thorax.

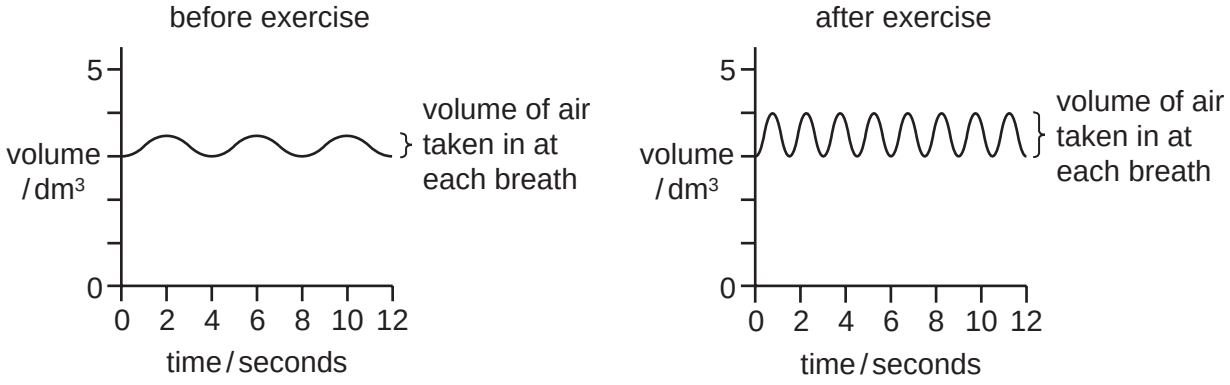


Which row in the table identifies the structures labelled 1, 2 and 3?

	1	2	3
A	larynx	cilia	bronchus
B	larynx	bronchus	bronchiole
C	trachea	bronchus	bronchiole
D	trachea	cilia	bronchus

17 A student's rate and depth of breathing are measured before exercise and then after exercise.

The results are plotted on two graphs showing the volume of air breathed in and out in 12 seconds.



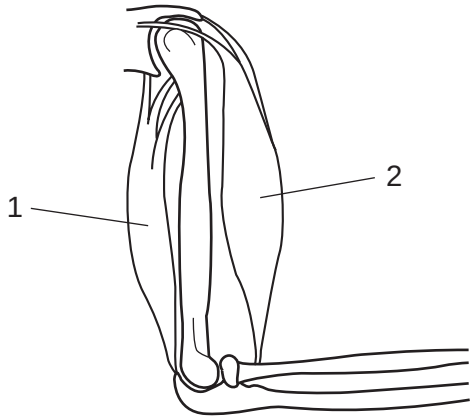
After exercise, how much air does the student take in during 12 seconds?

A 0.5 dm^3 **B** 1 dm^3 **C** 1.5 dm^3 **D** 8 dm^3

18 When yeast cells respire anaerobically, which substance is used and which substances are produced?

	substance used	substances produced
A	alcohol	carbon dioxide and water
B	alcohol	lactic acid and water
C	sugar	alcohol and carbon dioxide
D	sugar	carbon dioxide and water

19 The diagram shows the bones and muscles of the forelimb.

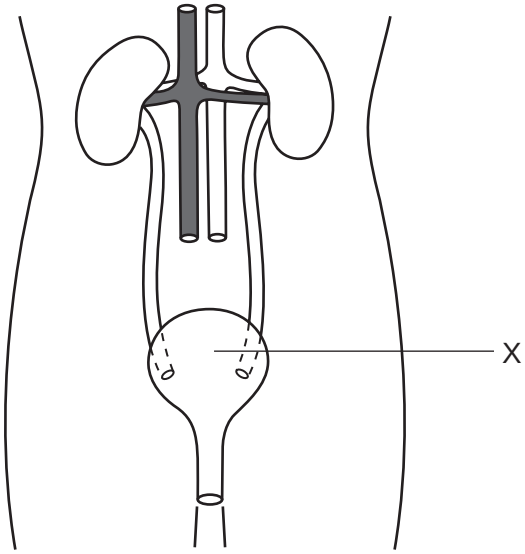


Which structures and functions are used in the straightening of the forelimb at the elbow joint?

	type of joint used	muscle 1	muscle 2
A	ball and socket	contract	relax
B	ball and socket	relax	contract
C	hinge	contract	relax
D	hinge	relax	contract

[Turn over

20 The diagram shows the human excretory system.



What is the function of X?

A to excrete urea

B to produce urea

C to produce urine

D to store urine

21 A person walks from a warm room into a cold one.

Which of these reactions occurs first?

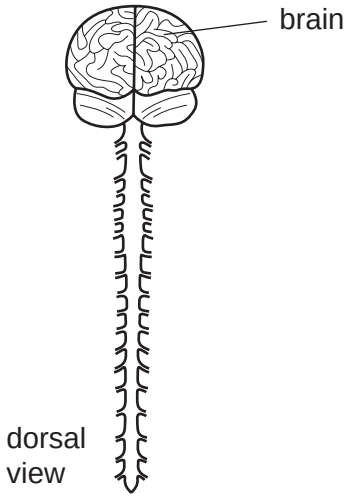
A cold receptors in the skin are stimulated

B cooler blood reaches the brain

C deep arterioles in the skin dilate

D shivering begins

22 The diagram shows the dorsal view of the central nervous system.



Which structures are visible?

A cerebrum, cerebellum, hypothalamus, spinal cord

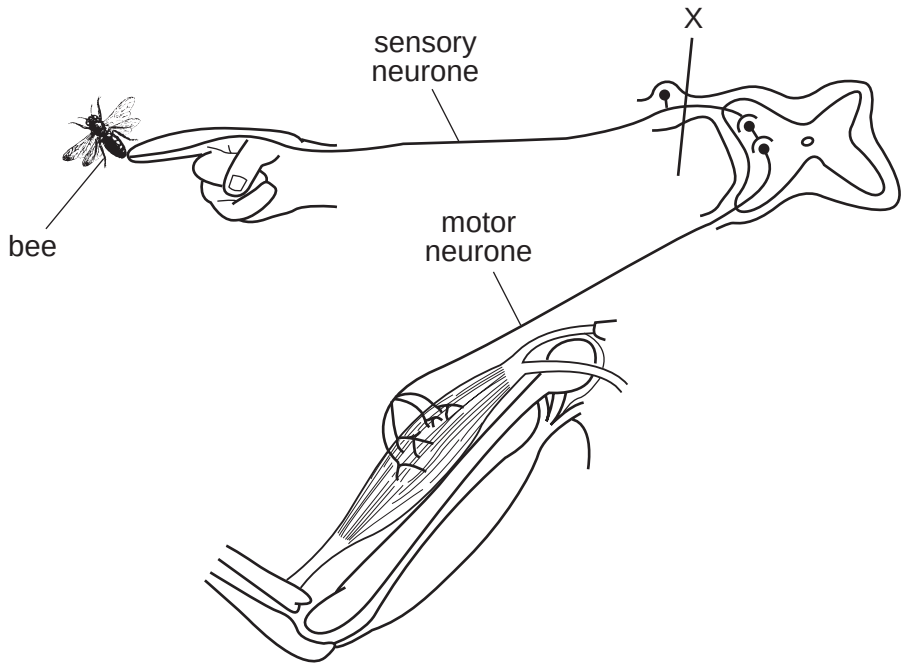
B cerebrum, spinal nerves, spinal cord, cerebellum

C spinal nerves, cerebrum, medulla, pituitary gland

D spinal cord, medulla, cerebrum, hypothalamus

[Turn over

23 The diagram shows part of a person's nervous system that has been cut at X.



A bee stings the finger, as shown.

What are the effects of this sting on the person?

	pain felt	arm moved
A	no	no
B	no	yes
C	yes	no
D	yes	yes

24 What is an effect of insulin?

A decreased cell respiration

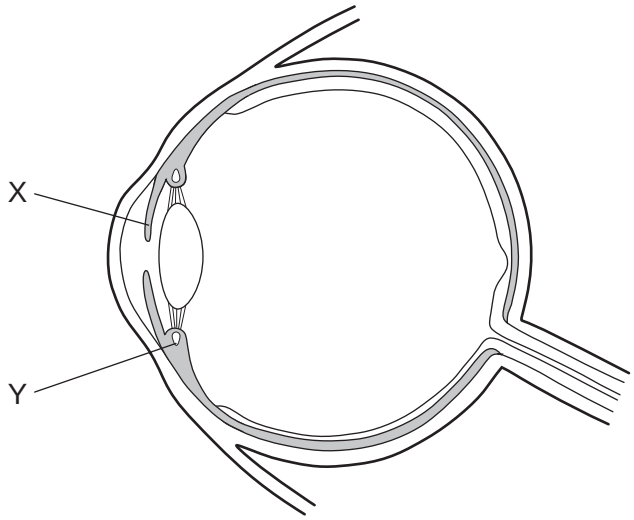
B decreased absorption of glucose by cells

C increased excretion of glucose

D increased synthesis of glycogen

25 The diagram shows the human eye in section.

There are circular muscles at X and Y.



What happens to the circular muscles at X and Y when the eye focuses on a near object in bright light?

	X	Y
A	contract	contract
B	contract	relax
C	relax	contract
D	relax	relax

26 Which substance is produced during cheese production and what is the effect of this substance on milk proteins?

	substance produced	effect on milk proteins
A	acid	solidifies
B	alcohol	digests
C	acid	digests
D	alcohol	solidifies

[Turn over

27 The table shows some structures found in four different cells.

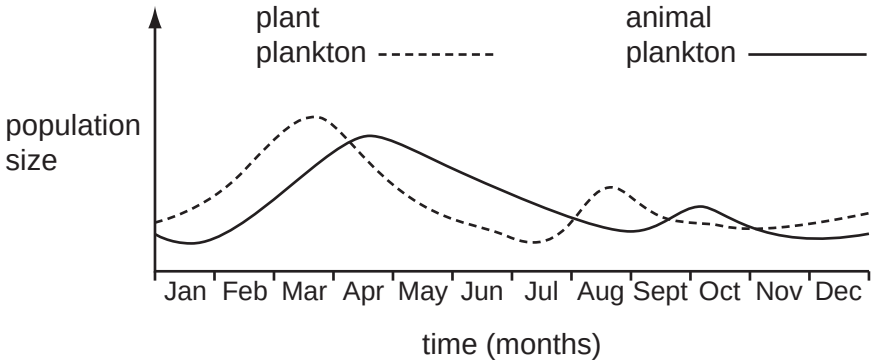
Which cell is from a fungus?

	cell wall	cell membrane	nuclear membrane	chloroplasts
A	✓	✓	✓	✓
B	✗	✓	✓	✓
C	✓	✓	✗	✗
D	✓	✓	✓	✗

key
✓ = present
✗ = absent

28 A lake in a temperate country has warm summers. It has cool winters from November to March.

The graph shows populations of plant and animal plankton during one year.



It was suggested that the plant population decreased due to a fall in water temperature.

Into which category does this suggestion fall?

A It is a reasonable interpretation of the evidence.

B It is a restatement of the evidence, not an interpretation.

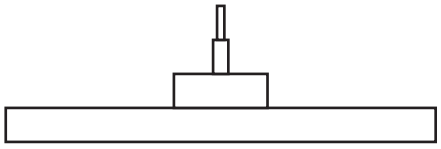
C It is contradicted or not supported by the evidence.

D More evidence is required to support this interpretation.

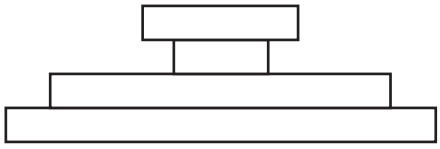
29 A sparrowhawk eats small birds that feed on caterpillars. Caterpillars feed on plant leaves.

Which diagram shows the pyramid of biomass for this food chain?

A



B



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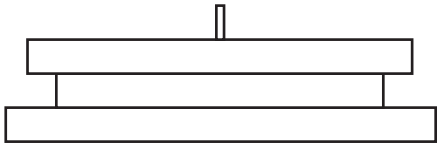

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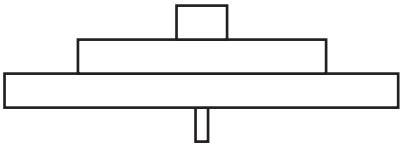


30 The change of nitrite ion (NO_2^-) to nitrate ion (NO_3^-) takes place by the action of

A bacteria in root nodules of leguminous plants.

B denitrifying bacteria.

C nitrifying bacteria.

D nitrogen-fixing bacteria in the soil.

31 Which method will **not** help to control the transmission of malaria?

A draining areas of open water

B ensuring that sewage does not contaminate water

C sleeping under a mosquito net

D spraying ponds and ditches with insecticide

32 Which term is used to describe both of these processes?

Process 1 In some towns, empty glass bottles are melted down. The new glass is used to make new bottles.

Process 2 Bacteria in the soil break down protein in dead animals and plants. The nitrates released by the bacteria are used by plants.

A conservation

B decomposition

C pollution

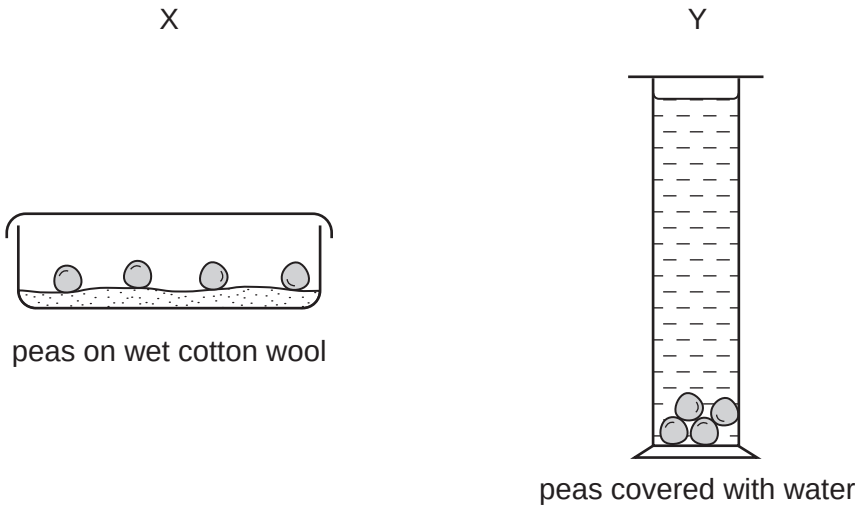
D recycling

33 The table shows some features of cell division.

Which line correctly describes the division of a cell by mitosis?

	number of chromosomes	number of daughter cells	new cells genetically identical to parent cell	used in growth
A	halved	2	no	no
B	halved	4	yes	no
C	stays the same	2	yes	yes
D	stays the same	4	no	yes

34 The diagram shows some peas that have been left to germinate.



The peas in X germinate. The peas in Y do **not** germinate.

What is the reason for this difference?

A The water in Y does not contain enough dissolved carbon dioxide.

B The water in Y does not contain enough dissolved oxygen.

C The water in Y does not contain enough nitrates.

D The water in Y does not let enough light through.

35 When a fetus is in the uterus, what carries oxygen away from the placenta?

A the amniotic fluid

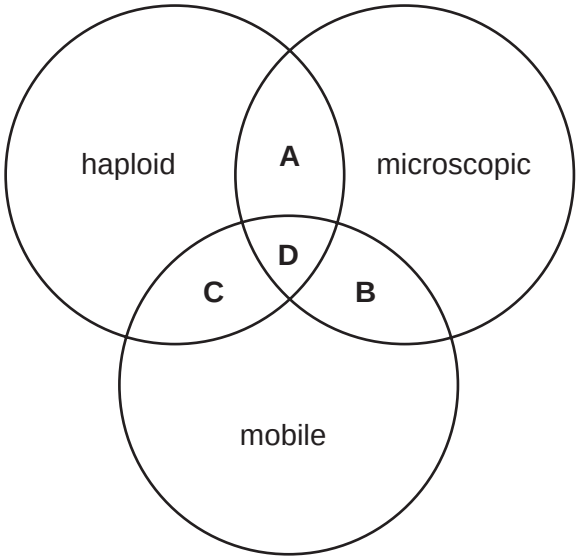
B the amniotic sac

C the lining of the uterus

D the umbilical cord

36 The diagram represents three properties of gametes.

Which area describes all male gametes of animals?



37 Down's syndrome and sickle cell anaemia are both genetic diseases.

How are they caused?

	Down's syndrome	sickle cell anaemia
A	chromosomal mutation	chromosomal mutation
B	chromosomal mutation	gene mutation
C	gene mutation	chromosomal mutation
D	gene mutation	gene mutation

38 A couple have three children. The table shows some of the children's characteristics.

child	sex	blood group	sickle-cell / normal
1	male	B	sickle-cell
2	female	AB	normal
3	male	O	normal

What do the characteristics show?

A continuous variation only

B discontinuous variation only

C both continuous and discontinuous variation

D neither continuous nor discontinuous variation

[Turn over

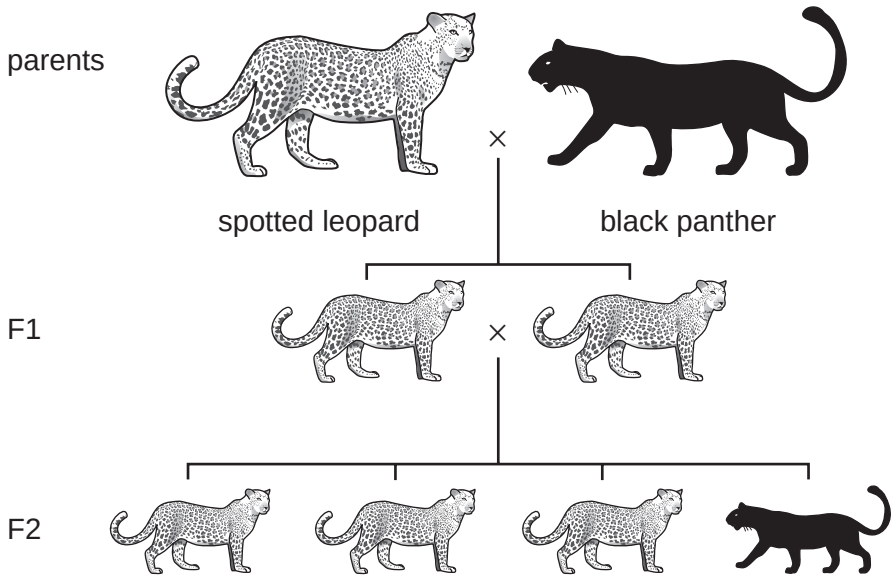
39 A pure-breeding red-flowered plant was crossed with a pure-breeding white-flowered plant. All the plants of the first generation had pink flowers.

If the pink flowered plants were self-pollinated and allowed to develop, which percentage of red-flowered plants would be expected in the second generation?

A 25 % **B** 60 % **C** 75 % **D** 100 %

40 In the leopard, coat colour is controlled by a single gene with two alleles, H and h. There are two varieties - black panthers and spotted leopards.

The diagram shows a cross between a spotted leopard and a black panther. All the offspring in the F_1 generation were spotted leopards. The results of a cross between two animals of the F_1 generation are also shown.



What are the genotypes of the original two parents?

	spotted leopard	black panther
A	HH	hh
B	HH	Hh
C	Hh	hh
D	hh	HH