Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **May/June 2018**

1 hour

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

* 9 3 0 9 6 0 6 0 7 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.

This document consists of **18** printed pages and **2** blank pages.

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CAMBRIDGE
International Examinations

1 Which feature indicates that a root cell is from a plant and **not** an animal?

A cell membrane

B cell wall

C chloroplast

D cytoplasm

2 Which process needs energy from respiration?

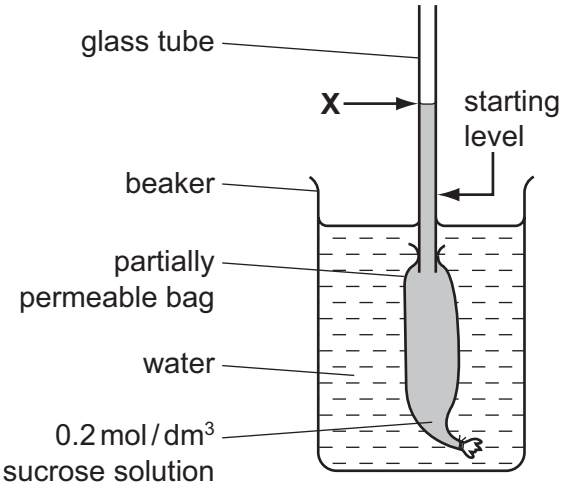
A movement of carbon dioxide into the alveoli

B movement of oxygen into red blood cells

C uptake of glucose by cells in the villi

D uptake of water by root hair cells

3 The diagram shows the result of an experiment. The liquid in the glass tube had risen to point **X** after three hours.



In a second experiment, which change could be made to cause the liquid to rise higher than **X**?

A a larger beaker

B a smaller bag

C water in the bag

D 0.4 mol / dm^3 sucrose solution in the bag

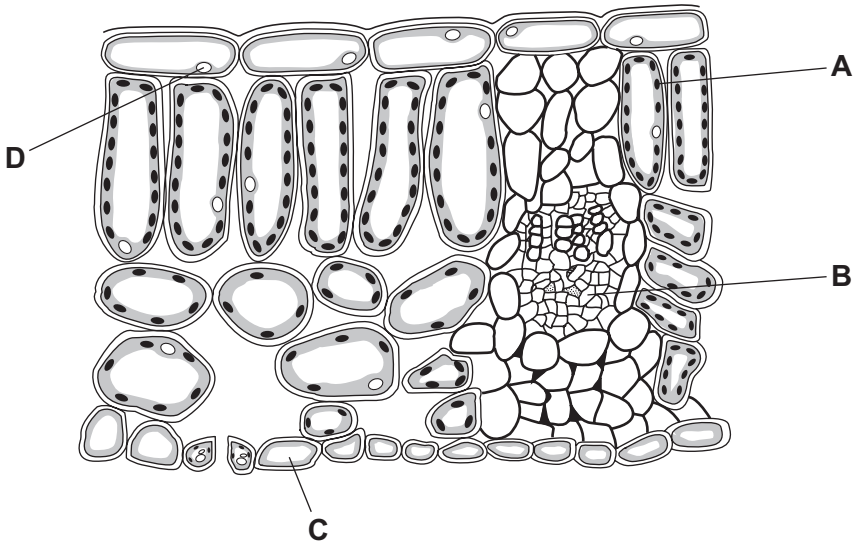
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4 In an enzyme's action, where is the active site and where are the lock and the key?

	active site	lock	key
A	on the enzyme	on the enzyme	on the substrate
B	on the enzyme	on the substrate	on the enzyme
C	on the substrate	on the enzyme	on the substrate
D	on the substrate	on the substrate	on the enzyme

5 The diagram represents a cross-section of part of a leaf as seen using a microscope.

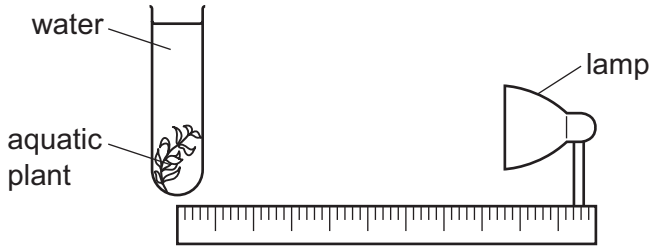
Where does translocation (movement of sucrose and amino acids) occur?



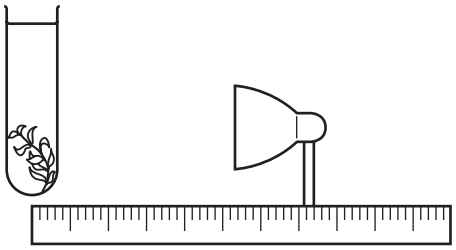
6 The diagrams show an experiment to find the rate of photosynthesis in an aquatic plant in different conditions.

Which plant produces the most bubbles per minute?

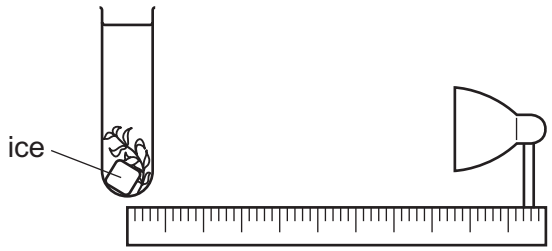
A



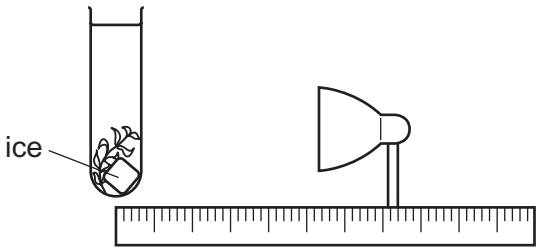
B



C



D

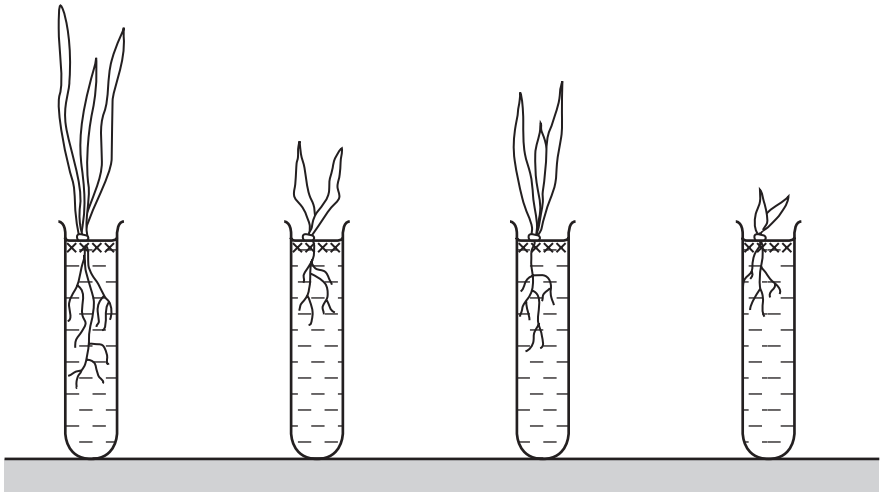


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7 A student grows seedlings in four different test-tubes.

Tube W contains all the mineral ions needed for healthy plant growth.

The diagram shows the appearance of these seedlings after two weeks.



W	X	Y	Z
healthy growth	little growth	poor growth and yellow leaves	hardly any growth

What do tubes X, Y and Z contain?

	X	Y	Z
A	all minerals except magnesium ions	all minerals except nitrate ions	water
B	all minerals except magnesium ions	water	all minerals except nitrate ions
C	all minerals except nitrate ions	all minerals except magnesium ions	water
D	water	all minerals except magnesium ions	all minerals except nitrate ions

8 Which type of molecule is used to synthesise glycogen?

A amino acid

B fatty acid

C simple sugar

D starch

9 What is most likely to cause rickets?

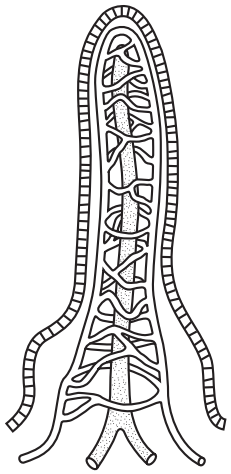
A a diet of meat, low in wholemeal cereal and grain products

B a diet of polished rice, low in leafy green and yellow vegetables

C a diet lacking in fresh fruit, with only overcooked vegetables

D a diet low in dairy products and eggs and little exposure to sunlight

10 The diagram shows a structure that forms part of the wall of the alimentary canal.



In which part of the alimentary canal is this structure found?

A colon

B ileum

C oesophagus

D rectum

11 The following paragraph describes water uptake by roots.

Root hair cells have ……1…… cell walls to allow them to absorb water. Cell cytoplasm has a ……2…… water potential than soil water so water moves by ……3…… from the soil to the root hair cell.

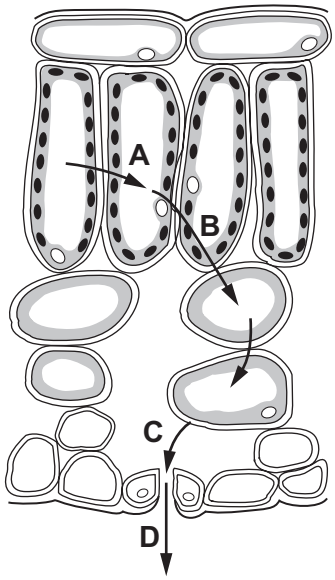
Which words correctly complete gaps 1, 2 and 3?

	1	2	3
A	large	larger	diffusion
B	permeable	higher	diffusion
C	permeable	lower	osmosis
D	rigid	higher	active transport

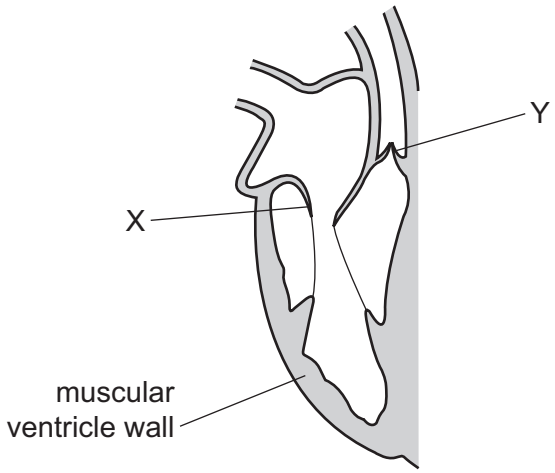
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12 The diagram shows the pathway of water molecules through part of a leaf, seen under a microscope, in transverse section.

Where does water evaporate?



13 The diagram shows the right side of the human heart when the ventricle is relaxed.



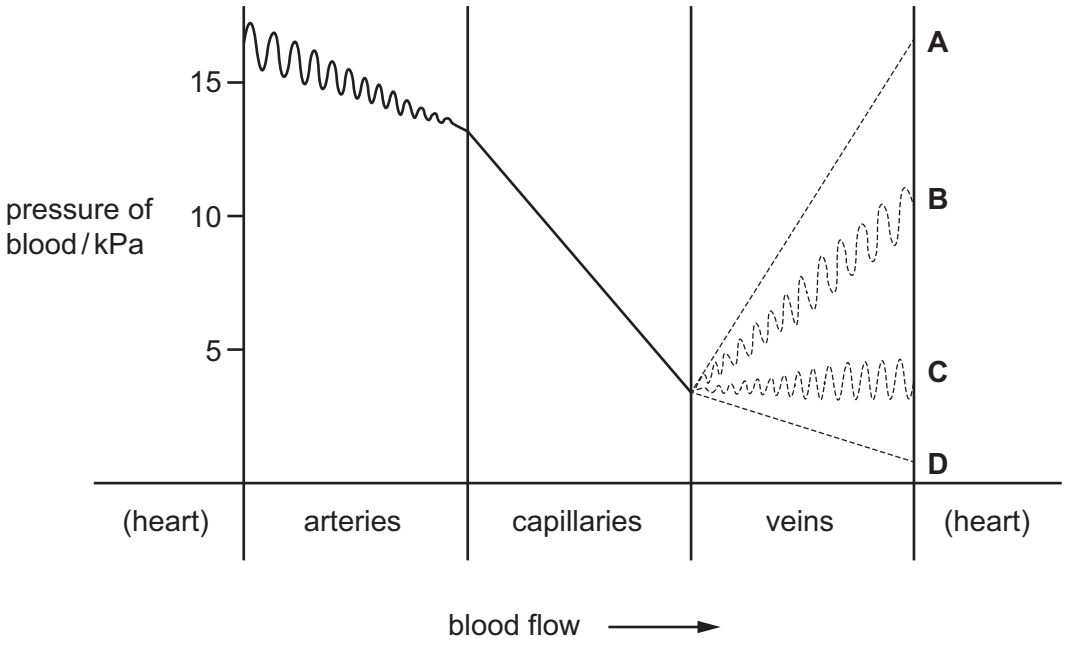
Which row correctly describes the positions of valve X and valve Y when the ventricle contracts?

	valve X	valve Y
A	closed	closed
B	closed	open
C	open	closed
D	open	open

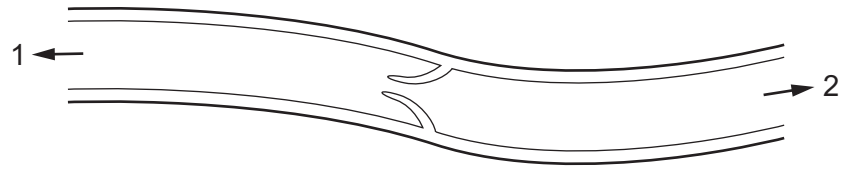
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14 The diagram shows the blood pressure of a person at rest as the blood leaves the heart and passes through arteries and then capillaries.

Which line shows the pressure of blood as it flows through veins before returning to the heart?



15 The diagram shows a section through part of a vein.



What could be the first organs found in the directions 1 and 2?

	1	2
A	heart	brain
B	intestine	liver
C	kidney	heart
D	lung	heart

16 Which chemicals are produced in anaerobic respiration by yeast cells?

A alcohol and carbon dioxide

B alcohol and lactic acid

C carbon dioxide and water

D lactic acid only

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17 Two people of equal body mass do the same amount of exercise.

One person is in good health. The other person has emphysema.

The rate of oxygen entering each person's blood in the lungs is measured.

The results are shown in the table.

	healthy person	person with emphysema
oxygen entering blood in cm^3 per minute	22	12

Which statement explains these results?

A The healthy person has a faster breathing rate.

B The healthy person has a smaller lung volume.

C The person with emphysema has damaged alveoli.

D The person with emphysema has larger alveoli**.**

18 The table shows the effect of exercise on the rate and depth of breathing.

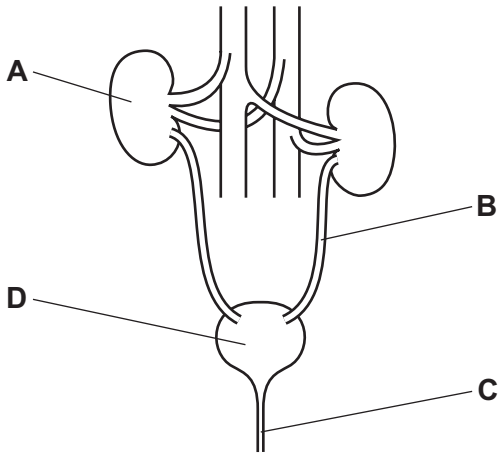
	breathing rate / breaths per minute	volume of each breath / cm^3
at rest	12	500
after exercise	24	1000

What is the increase in the volume of air exchanged per minute after exercise, compared to at rest?

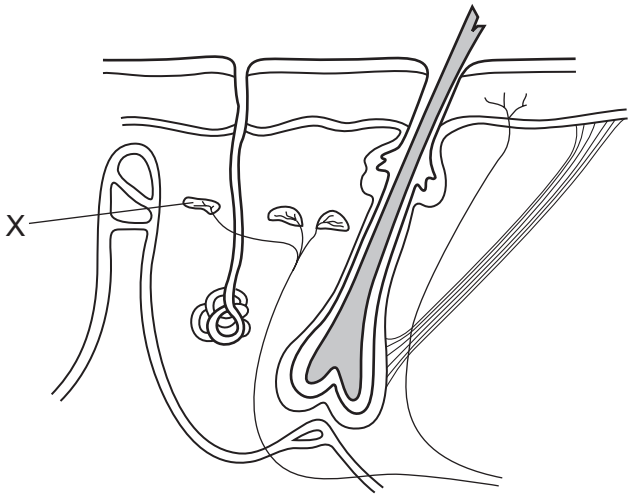
A 1000 cm^3 **B** 6000 cm^3 **C** 18 000 cm^3 **D** 24 000 cm^3

19 The diagram shows the human urinary system.

Which structure is the urethra?



20 The diagram shows some of the structures seen in a section through human skin.



What is the function of structure X?

A to cause capillaries to constrict

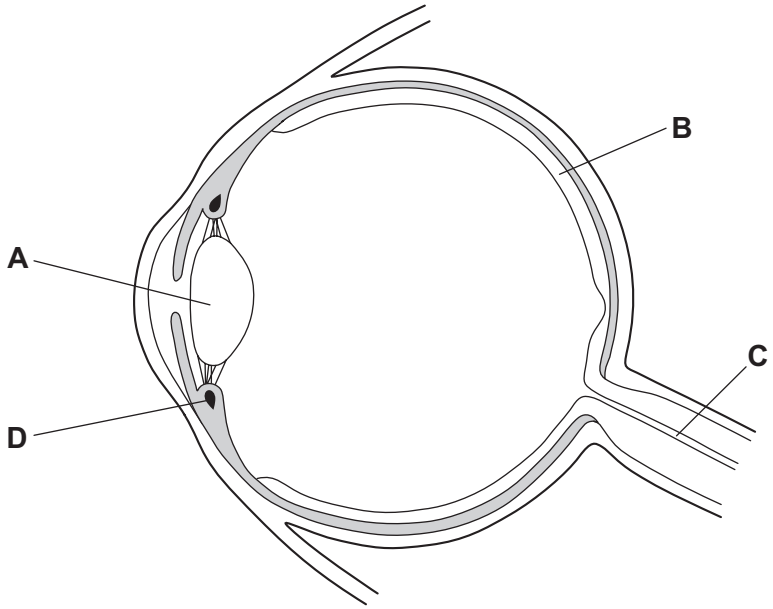
B to detect changes in temperature

C to receive impulses from the central nervous system

D to stimulate sweat glands to release sweat

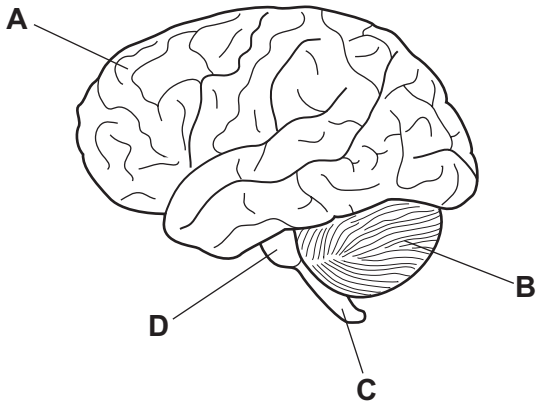
21 The diagram shows a horizontal section of a human eye.

Which part contains receptor cells sensitive to light?



22 The diagram shows the external view of a brain.

Which part of the brain is concerned with thinking and making decisions?



23 In diabetes, glucose appears in the urine.

How does insulin prevent this?

A increasing the amount of water in the urine

B increasing the uptake of glucose into body cells

C preventing starch being digested into glucose

D raising blood pressure

24 Which bones meet at the elbow joint and what kind of movement do they allow?

	bones	movement
A	humerus and scapula	in one plane only
B	humerus and scapula	in three planes
C	ulna and humerus	in one plane only
D	ulna and humerus	in three planes

25 What are some effects of using heroin?

	ceasing its use causes withdrawal symptoms	injecting it can lead to AIDS	it stimulates the nervous system
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key
✓ = yes
✗ = no

26 Antibiotics, such as penicillin, are produced in fermenters on a large scale.

Which substance is **not** needed for production of penicillin in this way?

A carbon dioxide

B mineral ions

C oxygen

D sugar

27 Some young plants were put into the soil and grew well for a few weeks. They then began to show signs of disease. Samples of the diseased leaves were examined using a microscope.

Which observations of the organism causing the disease show that it could be a fungus?

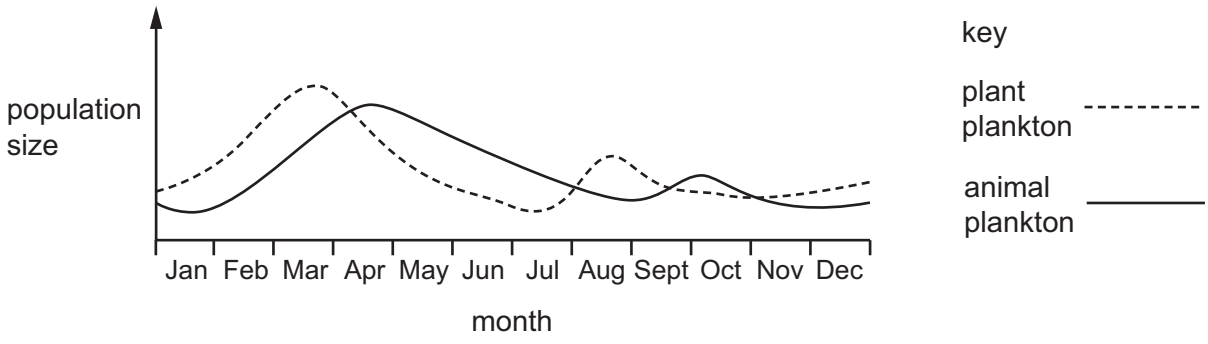
	long and thread-like structure	chloroplasts not present	cell walls present	nuclei surrounded by a membrane
A	✓	✓	✓	✓
B	✓	✓	✓	✗
C	✓	✗	✗	✓
D	✗	✓	✓	✓

key

✓ = yes

✗ = no

28 The graph shows changes in the populations of plant and animal plankton in a lake.



Consider the following statement in relation to the data provided by the graph.

'Population changes in animal plankton lag behind similar changes in plant plankton because the animals feed on the plants.'

Into which category does the statement fall?

A It is a reasonable interpretation of the data.

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

C It is contradicted or not supported by the data.

D More data are required in order for this interpretation to be made.

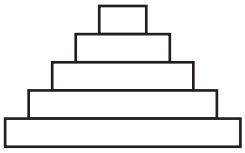
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29 A food chain is shown.

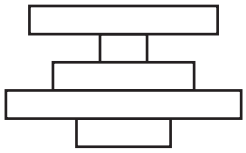
grain → insects → small birds → owls → lice

What is the pyramid of numbers for this food chain?

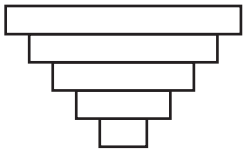
A



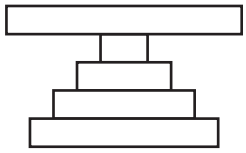
B



C



D



30 In the carbon cycle, which process returns carbon to a food chain?

A combustion

B decomposition

C photosynthesis

D respiration

31 Which action will **not** help to reduce the spread of the malarial vector in the human population?

A draining swamps and marshes

B releasing infertile male mosquitoes into an area where mosquitoes breed

C sleeping under mosquito nets treated with insecticide

D using antibiotics to kill the malarial parasite

32 Which change would lead to an increase in biodiversity in an area?

A building a large number of blocks of family dwellings in a city

B increasing the number of cows in a pedigree herd

C replacing a forest with a large palm oil plantation

D stopping fishing in an area of sea for several years

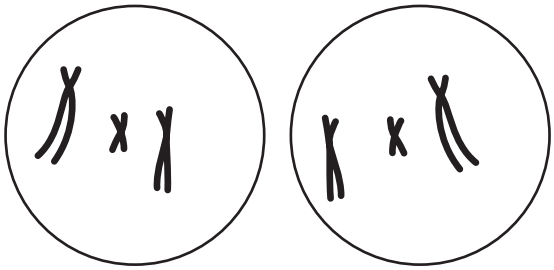
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33 The diagram shows the chromosomes in a cell.

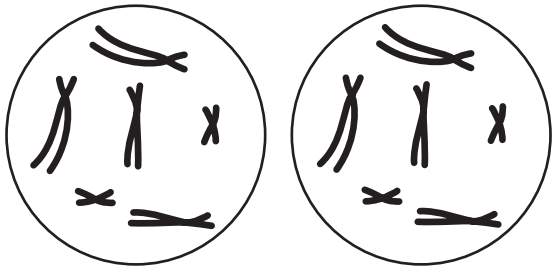


Which diagram shows the product of **one** division of the cell by mitosis?

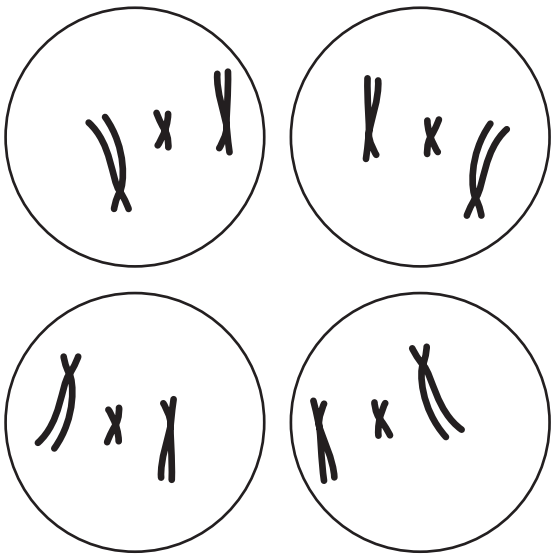
A



B



C

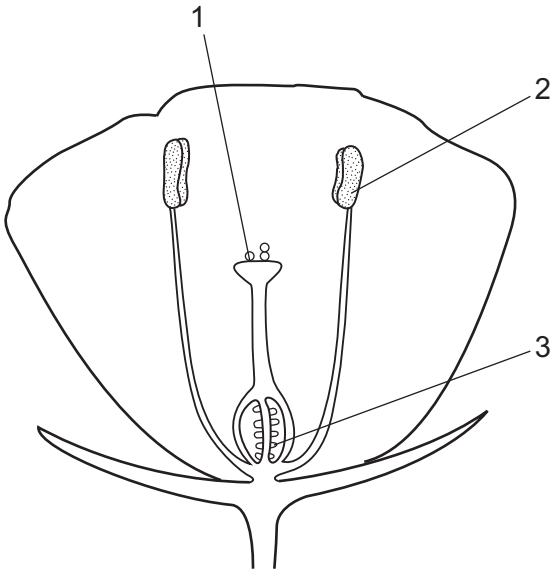


D



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34 The diagram shows a section through a flower.



Which statement is correct?

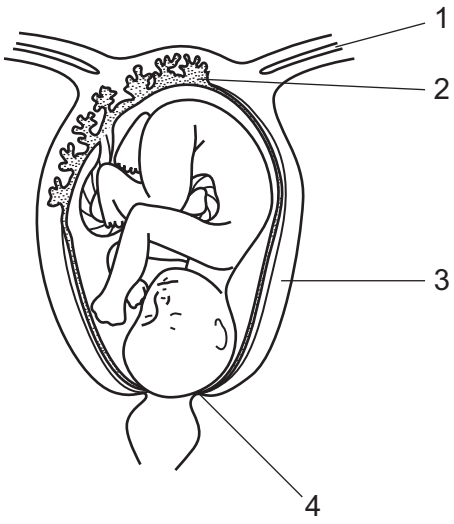
A Fertilisation occurs at 1.

B Haploid gametes are produced at 2 and 3.

C Pollen is transferred by insects to 3.

D The pollen grain fuses with the female nucleus at 2.

35 The diagram shows a baby about to be born.



Which labelled structures are the cervix and uterus?

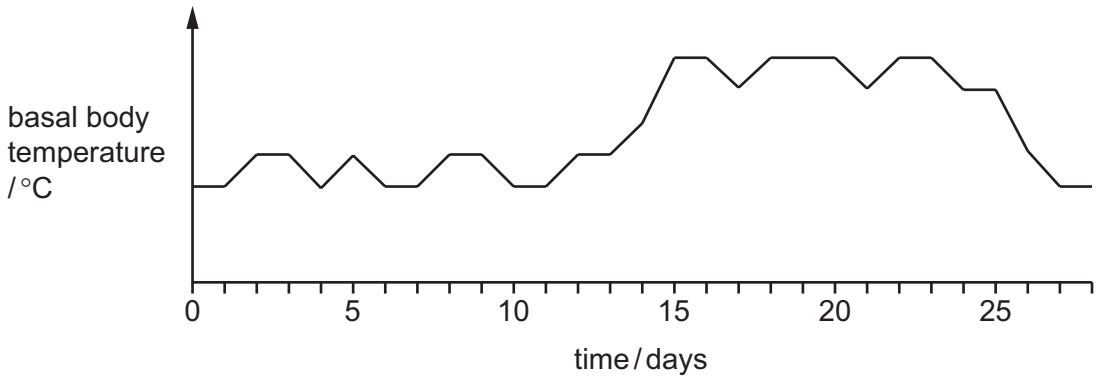
	cervix	uterus
A	1	2
B	2	1
C	3	4
D	4	3

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36 A person's basal body temperature is their temperature when they first wake up in the morning.

In women, an increase in blood progesterone concentration causes a small rise in basal body temperature.

The graph shows one woman's basal body temperature over a period of 28 days.



On which day did the woman ovulate?

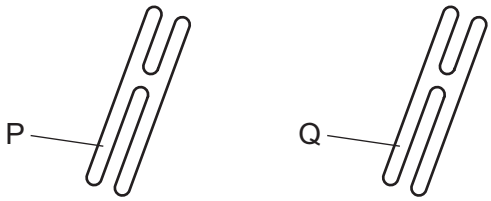
A day 1

B day 5

C day 11

D day 27

37 The diagram shows a pair of chromosomes from the same cell.



A gene is found at the point labelled P.

In a heterozygous individual, what will be found at the equivalent position labelled Q?

A a different allele of a different gene

B a different allele of the same gene

C a different gene of the same allele

D the same gene of the same allele

38 The table shows the variation in foot length in a number of students.

foot length / cm	number of students
20.0–20.9	0
21.0–21.9	5
22.0–22.9	12
23.0–23.9	15
24.0–24.9	17
25.0–25.9	8
26.0–26.9	0

Which row identifies this type of variation and states its cause?

	type of variation	cause
A	continuous	genes and the environment
B	continuous	genes only
C	discontinuous	environment only
D	discontinuous	genes and the environment

39 The colour of the fruit of tomato plants is determined by alleles of the same gene. A tomato plant with red fruit was crossed with a tomato plant with yellow fruit. Of the offspring, 26 plants had red fruit and 24 had yellow fruit.

Three explanations were suggested.

1 Both parents were homozygous.

2 One parent had two recessive alleles.

3 One parent was heterozygous.

Which explanations are correct?

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

40 Diabetes may be treated using insulin from genetic engineering.

Where is this insulin produced?

A bacterial cytoplasm

B bacterial nucleus

C human liver

D human pancreas

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