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Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **October/November 2015**

1 hour

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

* 3 7 2 8 4 0 5 1 3 3 *

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.

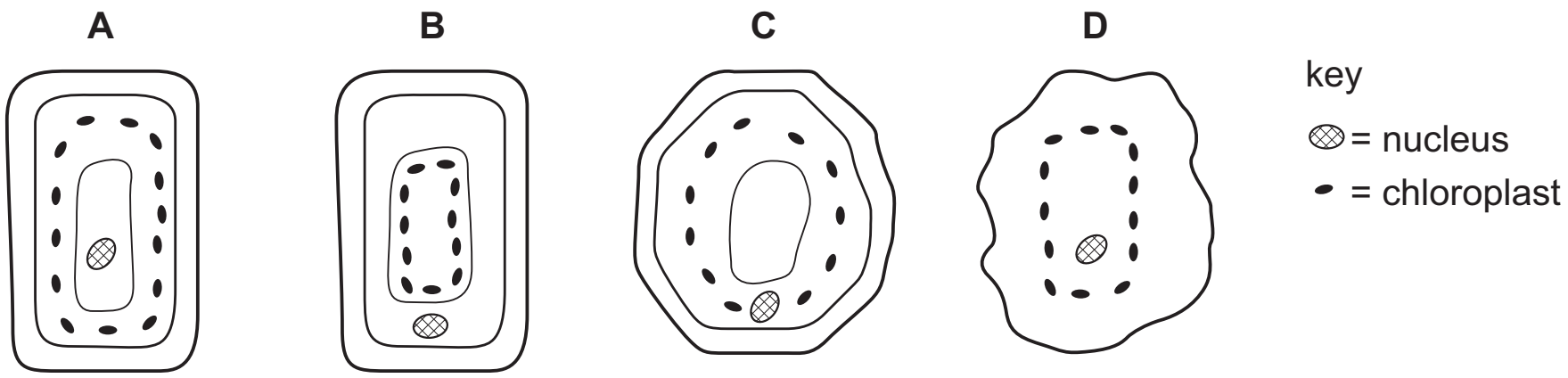
This document consists of **15** printed pages and **1** blank page.

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1 Which diagram shows the positions of the chloroplasts and the nucleus in a cell?



2 How do plants absorb nitrate ions by active transport?

A against a concentration gradient using energy

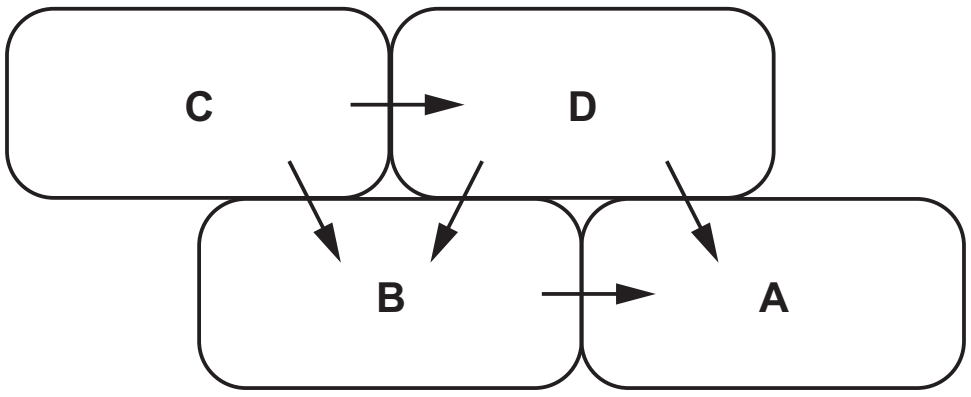
B against a concentration gradient without using energy

C down a concentration gradient using energy

D down a concentration gradient without using energy

3 The diagram shows the net movement of water by osmosis between four adjacent cells.

Which cell has the highest water potential?

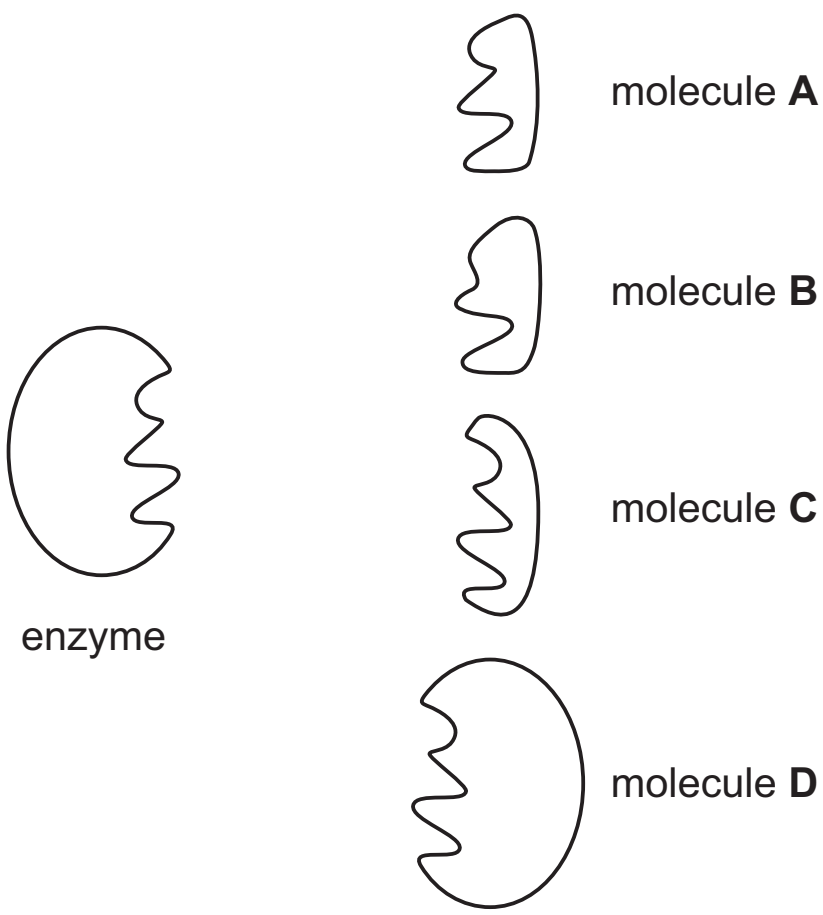


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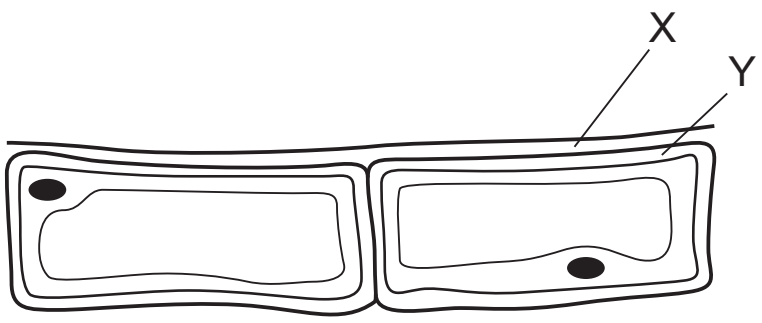
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4 The diagram represents an enzyme and four molecules, **A**, **B**, **C** and **D**.

Which molecule is the substrate of this enzyme?



5 The diagram shows the upper layers of a leaf.



What are the structures labelled X and Y?

	X	Y
A	cell membrane	cell wall
B	cell wall	cell membrane
C	cell wall	cuticle
D	cuticle	cell wall

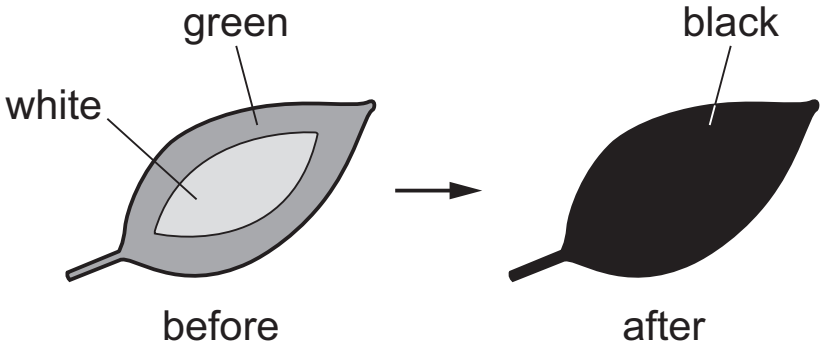
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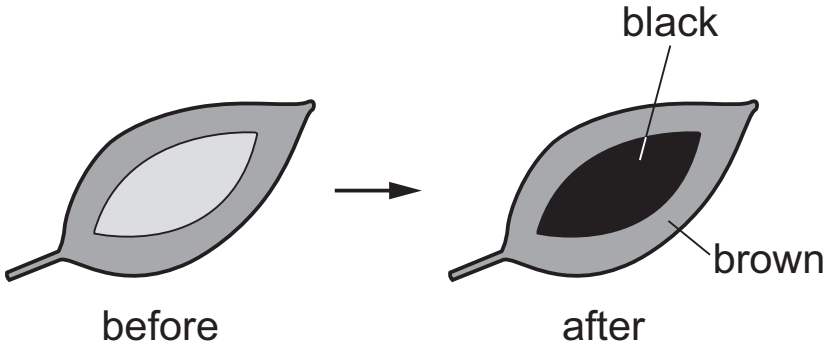
6 A variegated plant is destarched and then placed in the sunlight for several hours. A leaf is then taken and tested for starch using iodine solution.

Which diagram shows the correct results?

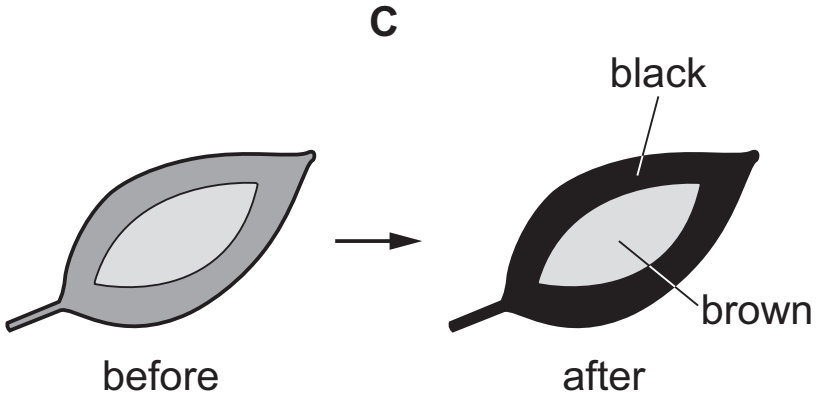
A



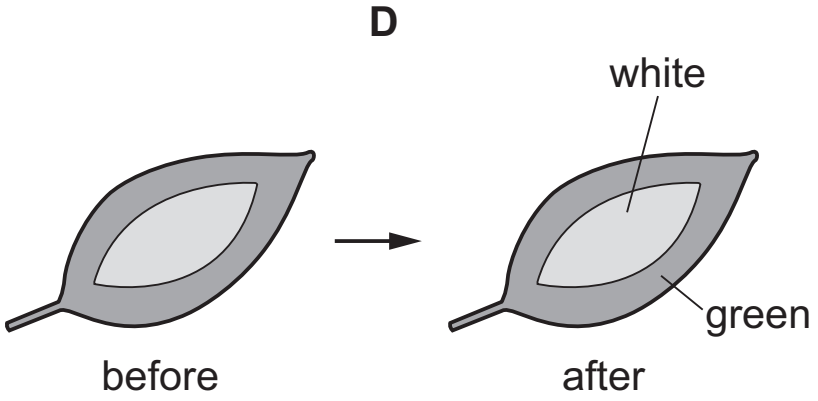
B



C

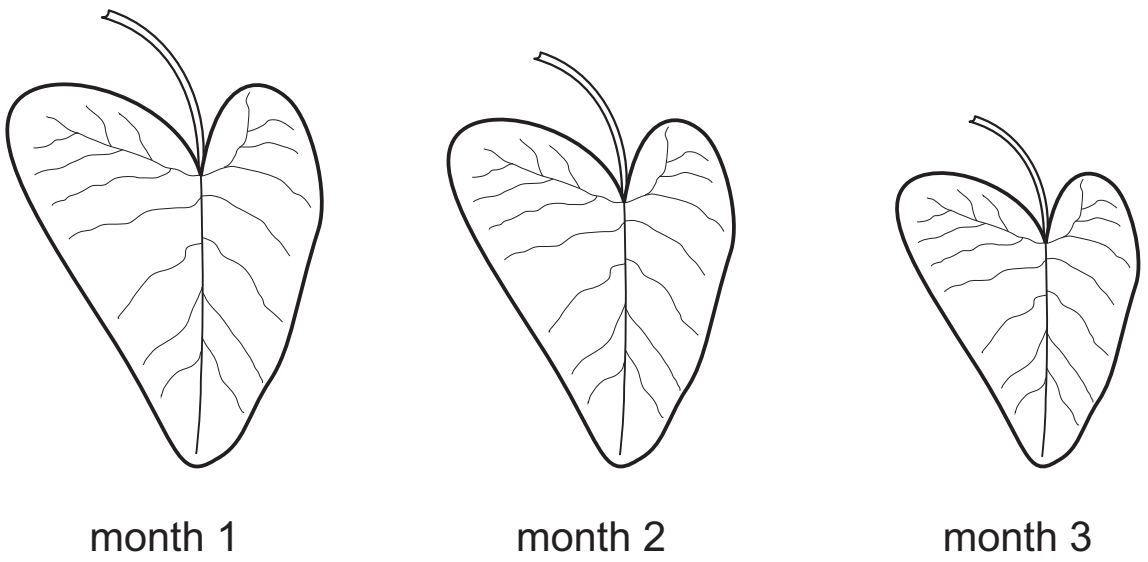


D



7 A container is filled with water from a lake and placed on an outside table in the sunlight. Healthy plant seedlings are placed in the container and left for 3 months. Distilled water is added to the container as required. At the end of each month a typical mature leaf grown during the previous 30 days is removed and drawn to the same scale.

The diagram shows the three drawings that are made.



Why is the leaf from month 3 the smallest?

A insufficient light for photosynthesis

B nitrates from the water had all been absorbed

C phloem vessels unable to transport water

D plants cannot grow without soil

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8 Which is a large molecule built up from amino acids?

A amylase

B glucose

C glycogen

D urea

9 Each part of the alimentary canal has the optimum pH for the enzymes that digest food there.

What is the optimum pH for an enzyme that works in the stomach?

A 2.0

B 6.5 – 7.5

C 7.5 – 8.5

D 12.0

10 Which features make a villus well adapted for absorbing amino acids from the ileum?

A large surface area, thin walls, lacteal

B large surface area : volume ratio, good blood supply, thin walls

C small surface area, good blood supply, lacteal

D small surface area : volume ratio, good blood supply, thin walls

11 Samples of four different tissues are removed from the same plant.

The concentration of water in each of the four tissues is measured.

Which tissue is likely to have the highest water concentration?

A leaf epithelium

B leaf mesophyll

C root epidermis

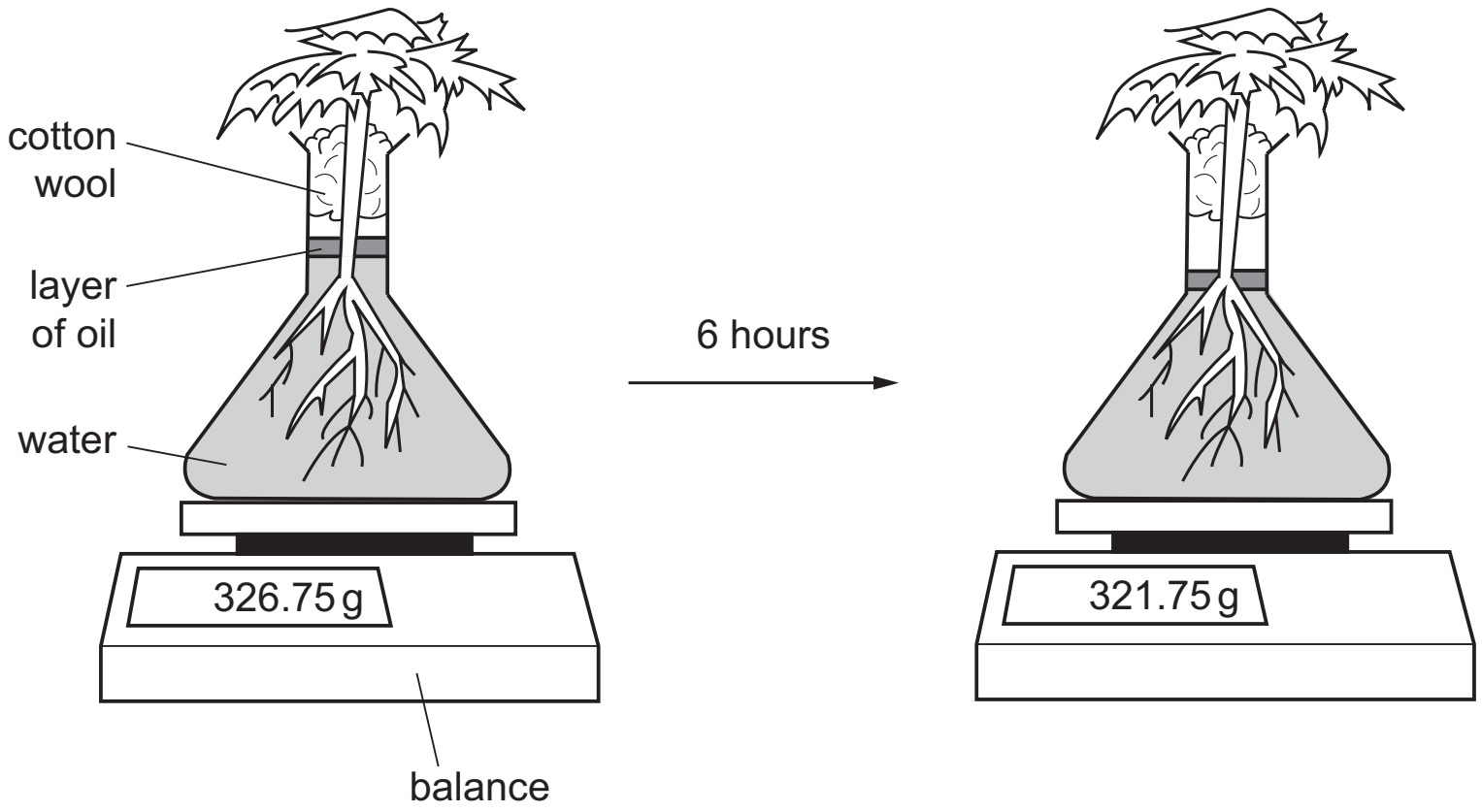
D xylem

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12 The diagrams show a plant in a flask of water. It is left in the light at 16 °C for six hours.



What explains the change in mass after six hours?

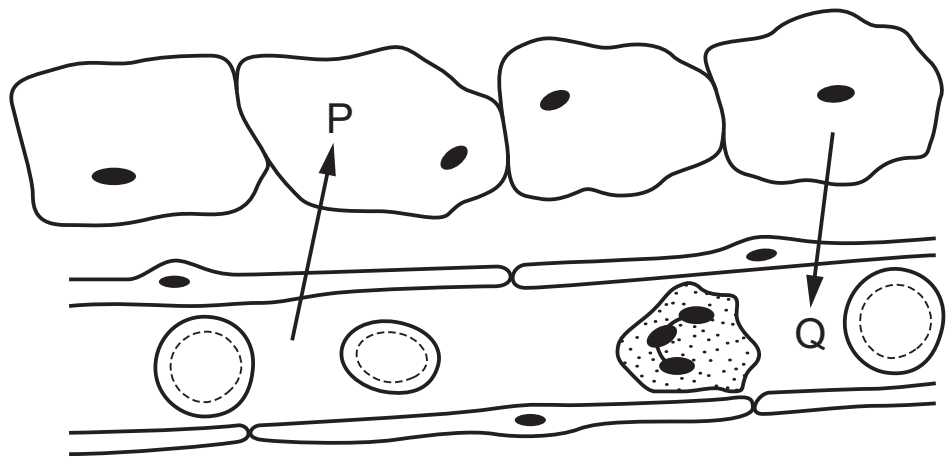
A absorption of water into the root hairs

B evaporation of water from the flask

C photosynthesis in the leaves of the plant

D transpiration from the leaves of the plant

13 The diagram shows chemicals being exchanged between some cells and a blood capillary.



What could be the identities of chemicals P and Q?

	P	Q
A	amino acids and oxygen	carbon dioxide and maltose
B	carbon dioxide and glucose	alcohol and oxygen
C	carbon dioxide and urea	oxygen and protein
D	glucose and oxygen	carbon dioxide and water

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14 In the human circulatory system, what causes the transfer of materials from the capillaries to the tissue fluid?

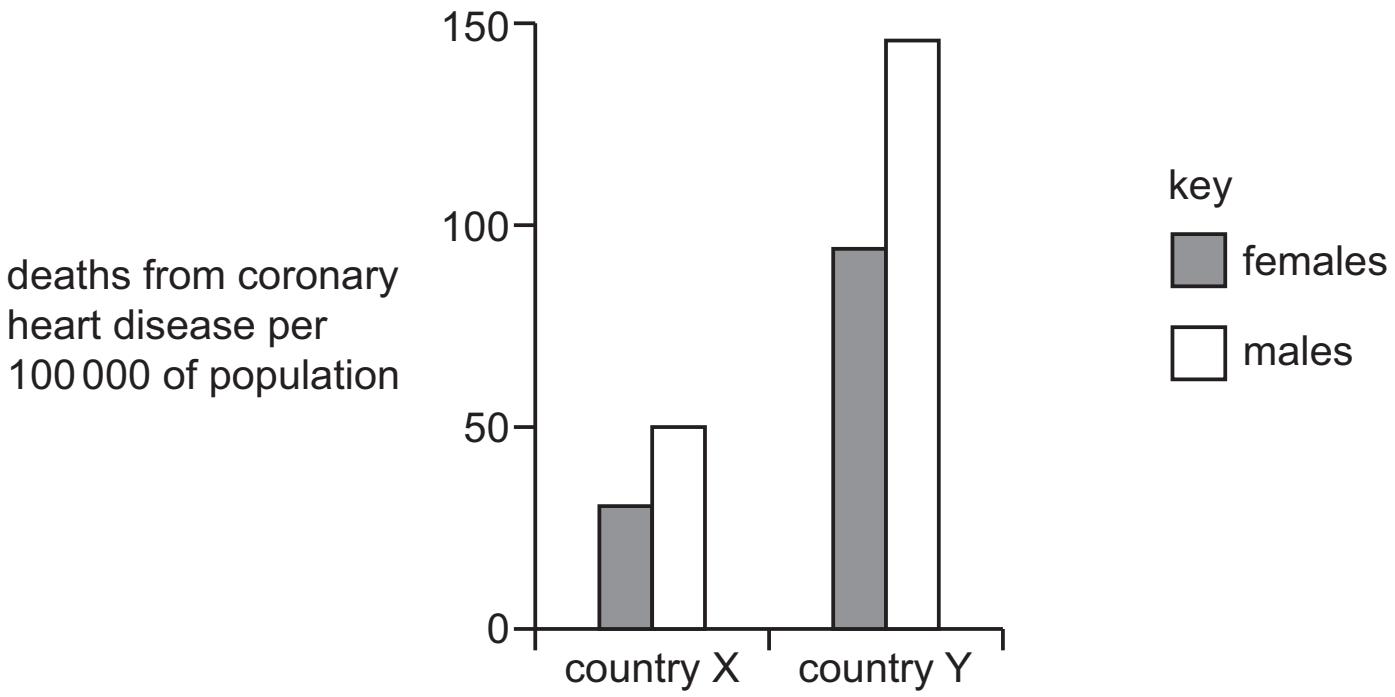
A active transport

B blood pressure

C capillarity

D osmosis

15 The graph shows the death rates from coronary heart disease in two different countries.



What could **not** explain the difference between the two countries?

A less smoking in country X

B lower average age in country X

C more males in country Y

D more saturated fats eaten in country Y

16 What happens to the diaphragm and the external intercostal muscles when breathing in?

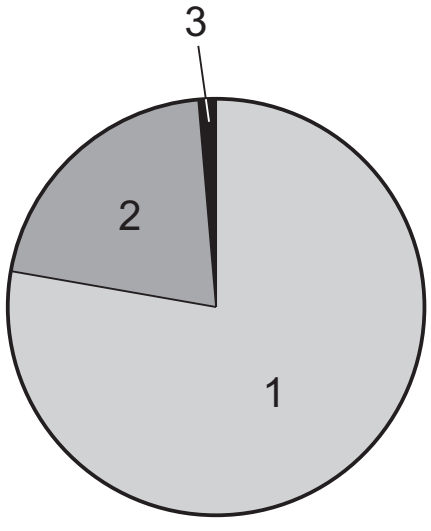
	diaphragm	external intercostal muscles
A	contracts	contract
B	contracts	relax
C	relaxes	contract
D	relaxes	relax

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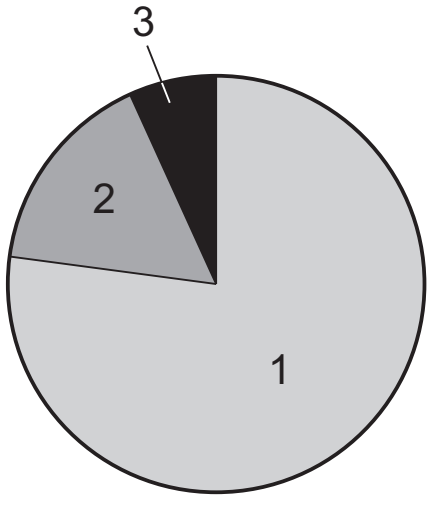
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17 The pie charts show the proportion of gases in samples of dried inspired and expired air.



inspired air



expired air

Which segments represent which gases?

	segment 1	segment 2	segment 3
A	nitrogen	other gases	oxygen
B	nitrogen	oxygen	other gases
C	oxygen	other gases	nitrogen
D	oxygen	other gases	carbon dioxide

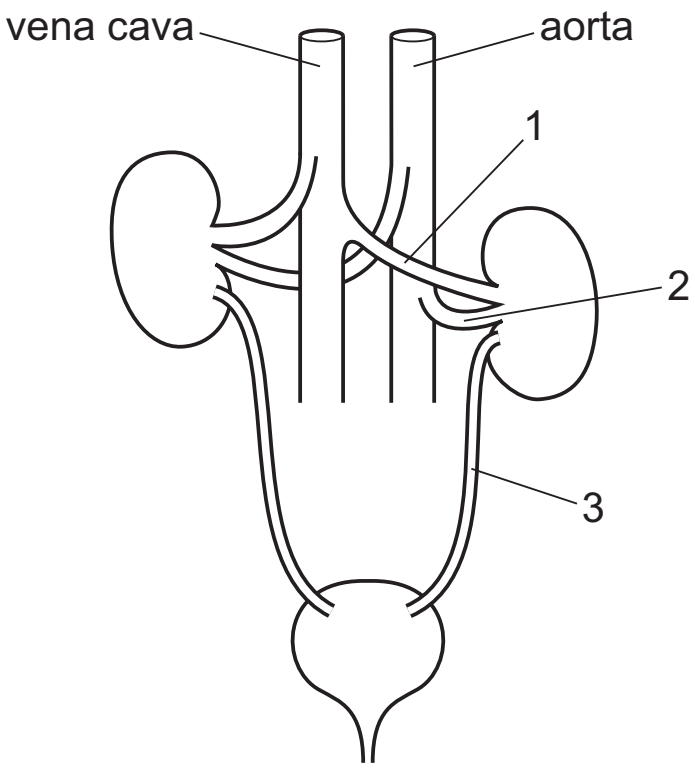
18 Which changes occur as a person exercises?

	depth of breathing	breathing rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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19 The diagram shows the kidneys and associated structures.



What are the contents of the labelled structures?

	1	2	3
A	deoxygenated blood	oxygenated blood	urine
B	oxygenated blood	deoxygenated blood	urine
C	oxygenated blood	urine	deoxygenated blood
D	urine	oxygenated blood	deoxygenated blood

20 What are the responses to decreased body temperature?

A shivering and vasoconstriction in blood vessels near the skin surface

B shivering and vasodilation in blood vessels near the skin surface

C sweating and vasoconstriction in blood vessels near the skin surface

D sweating and vasodilation in blood vessels near the skin surface

21 Which process keeps conditions such as temperature and glucose concentration constant inside the body?

A excretion

B homeostasis

C secretion

D vasodilation

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22 What is a function of sensory neurones?

A transmitting impulses from muscle to spinal cord

B transmitting impulses from receptor to muscle

C transmitting impulses from receptor to spinal cord

D transmitting impulses from spinal cord to muscle

23 What does the hypothalamus control?

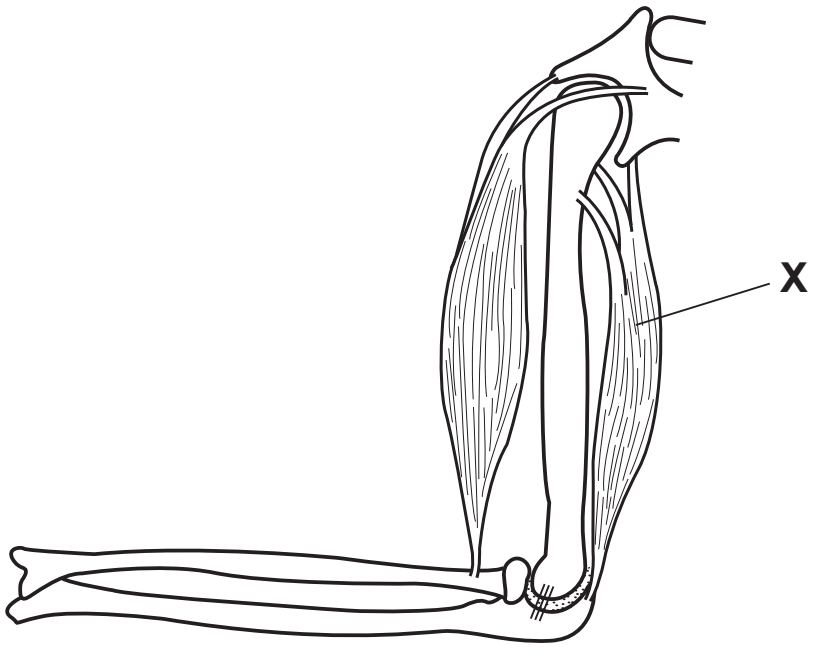
A body temperature

B heart rate

C insulin secretion

D rate of breathing

24 The diagram shows the main muscles and bones of the arm.



What happens when muscle **X** contracts?

A The lower arm is extended.

B The lower arm is raised.

C The upper arm is lowered.

D The upper arm is raised.

25 What are the cause, signs and symptoms and treatment for diabetes mellitus?

	cause	signs and symptoms	treatment
A	damaged pancreas cells	excess sugar in blood	adrenaline injections
B	damaged pancreas cells	sugar in urine	insulin injections
C	sugar in urine	damaged pancreas cells	insulin injections
D	sugar in urine	damaged pancreas cells	adrenaline injections

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26 Foods can be made by treating milk in different ways.

1 Bacteria are added.

2 The milk is acidified.

3 The milk proteins are coagulated.

Which processes occur in both cheese and yoghurt production?

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

27 An ocean is polluted by an oil spill.

What is **least** likely to speed up the rate of decomposition of oil by microorganisms?

A aerobic conditions

B mixing by wave action

C presence of salt water

D spraying the surface of the sea with warm water

28 The diagram shows the label from a bottle of gin.



What will happen, during the next few hours, after a person drinks a large amount of gin?

A Their judgement of distance will improve.

B Their muscle control will be reduced.

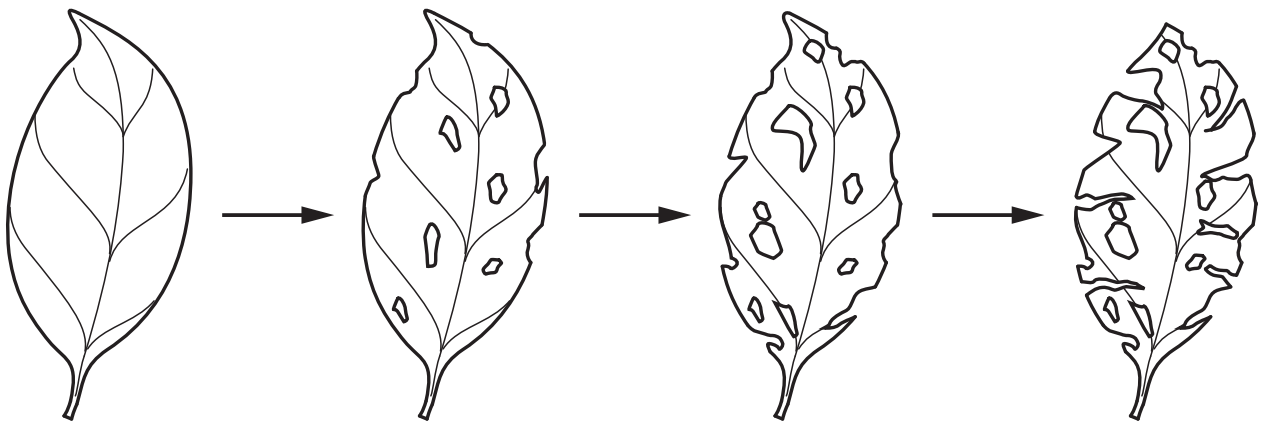
C Their reaction time will decrease.

D Their urine output will decrease.

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29 The diagram shows changes in the appearance of a leaf over a period of time, as it lies on the damp ground.



Which type of organism is most likely to cause these changes?

A carnivore

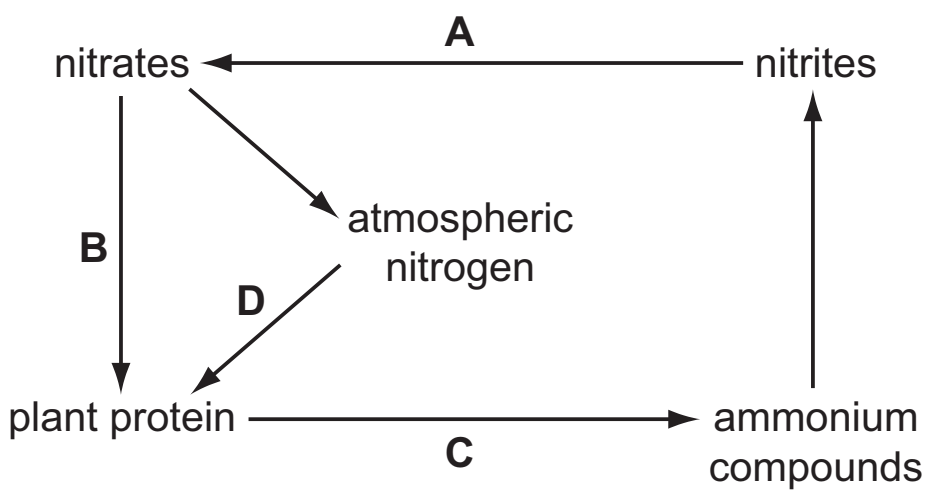
B decomposer

C herbivore

D producer

30 The diagram shows some stages in the nitrogen cycle.

Which arrow represents the action of nitrogen-fixing bacteria?



31 Which method of malarial control is effective against both adult and larval forms of the mosquito?

A covering standing water

B draining swamps

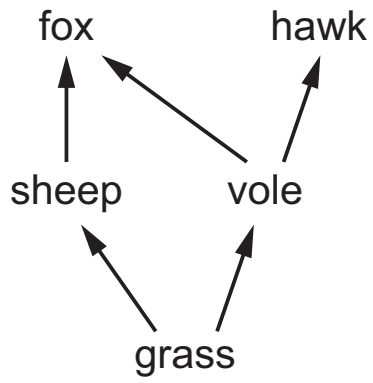
C spraying insecticides

D spraying oil on standing water

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32 The diagram shows a food web.



To which pair of animals is the greatest amount of energy available?

A fox and hawk

B fox and sheep

C hawk and vole

D sheep and vole

33 Some effects of deforestation are listed.

1 less absorption of carbon dioxide from the atmosphere

2 desertification

3 release of carbon from soil and decaying wood by action of microorganisms

4 soil dryness

5 flooding, landslides and soil erosion

Which effects contribute to **causing** climate change?

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

34 What passes down a pollen tube after pollination?

A female nucleus

B male nucleus

C ovule

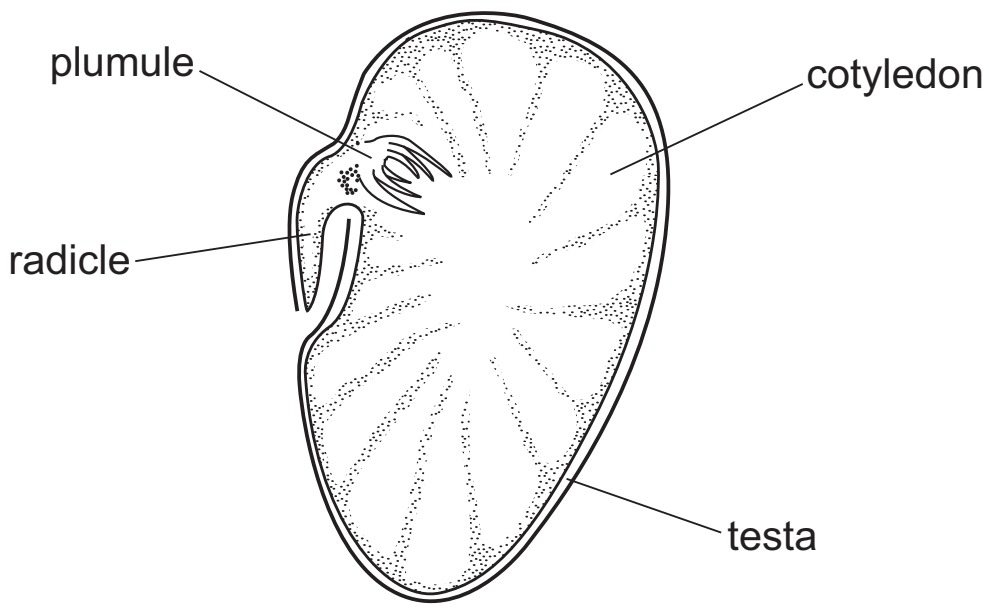
D pollen grain

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35 The diagram shows a broad bean seed. Part of it has been cut away to show the internal structure.



Which parts make up the complete embryo?

A radicle, plumule, cotyledons and testa

B radicle, plumule and cotyledons only

C radicle and plumule only

D radicle only

36 Human gametes are different from each other.

Which information about male gametes is correct?

	size	numbers released at one time	movement
A	large	normally one	cannot move on their own
B	large	millions	cannot move on their own
C	small	normally one	can swim
D	small	millions	can swim

37 The main function of which hormone is to maintain the uterus lining after ovulation?

A FSH

B LH

C oestrogen

D progesterone

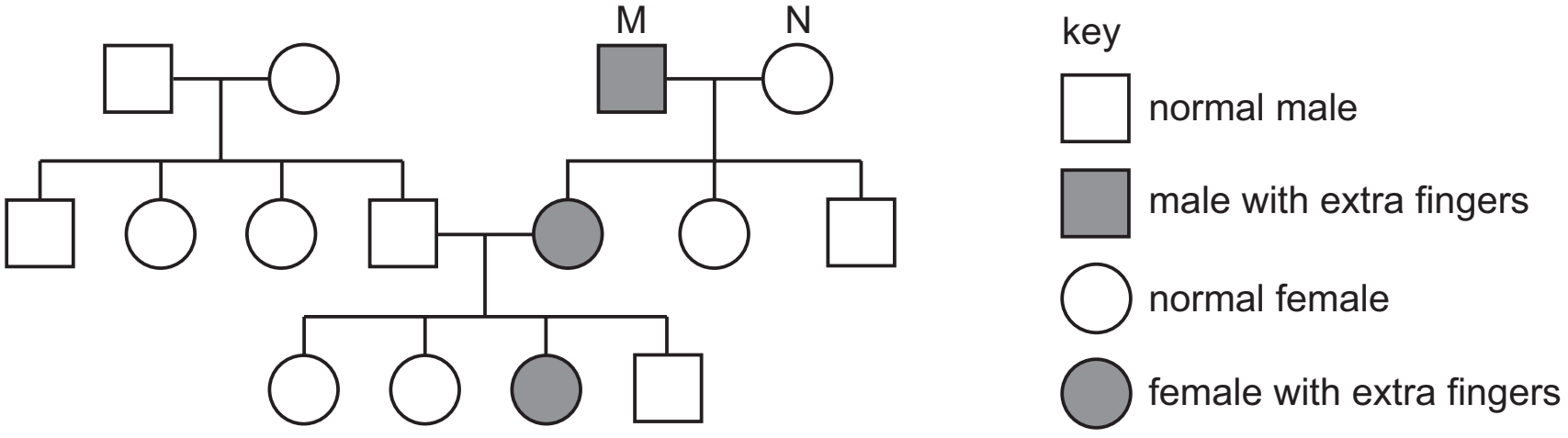
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38 Which row in the table is correct?

	chromosome in mother's ovum	chromosome in father's sperm	sex of baby
A	X	X	male
B	X	Y	male
C	Y	X	female
D	X	Y	female

39 The diagram shows the inheritance of the allele, E, for polydactyly (having extra fingers) which is dominant over the normal allele, e.



What are the genotypes of persons M and N?

	M	N
A	EE	ee
B	Ee	Ee
C	Ee	ee
D	ee	ee

40 Bacteria can be genetically engineered to produce human insulin by adding a human insulin gene to the bacterial DNA.

What is an advantage of this procedure?

A The bacteria do not need a source of glucose.

B The bacteria grow faster than before being engineered.

C The insulin does not need to be purified before being injected into a patient.

D The insulin is unlikely to cause an immune response when injected into a patient.

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