UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **May/June 2011**

1 hour

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

* 7 4 8 1 1 4 8 4 1 1 *

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.

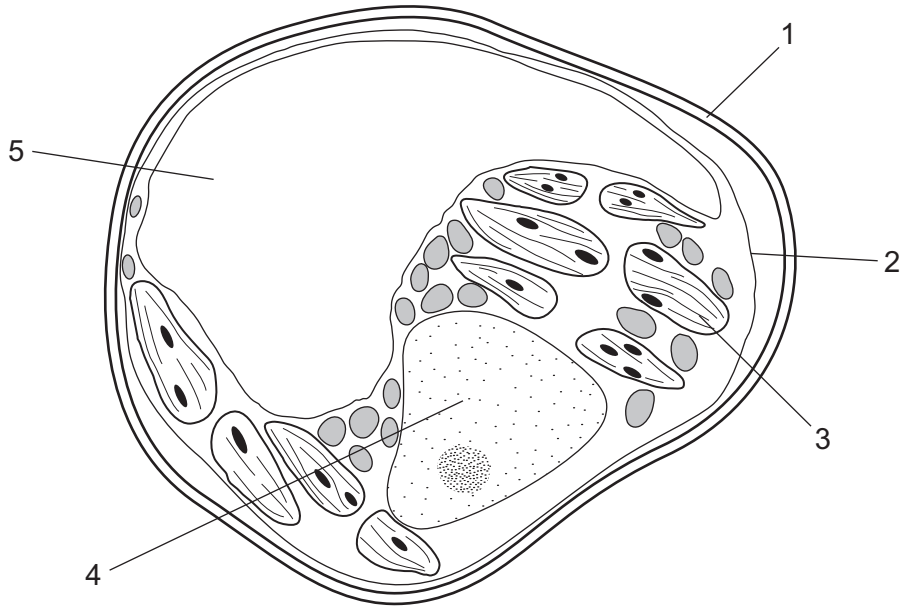
Read the instructions on the Answer Sheet very carefully.

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.

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1 The diagram shows a plant cell.



Which features are **not** found in animal cells?

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

2 The sentence describes the uptake of water by a plant.

Water moves into the root hairs of a plant by osmosis through a .....1..... permeable cell membrane, ……2…… a water potential gradient.

Which words correctly complete gaps 1 and 2?

	1	2
A	fully	down
B	fully	up
C	partially	down
D	partially	up

3 Below is a series of cell processes.

1 mineral ions entering root hair cells

2 glucose uptake by villus cells

3 water entering root hair cells

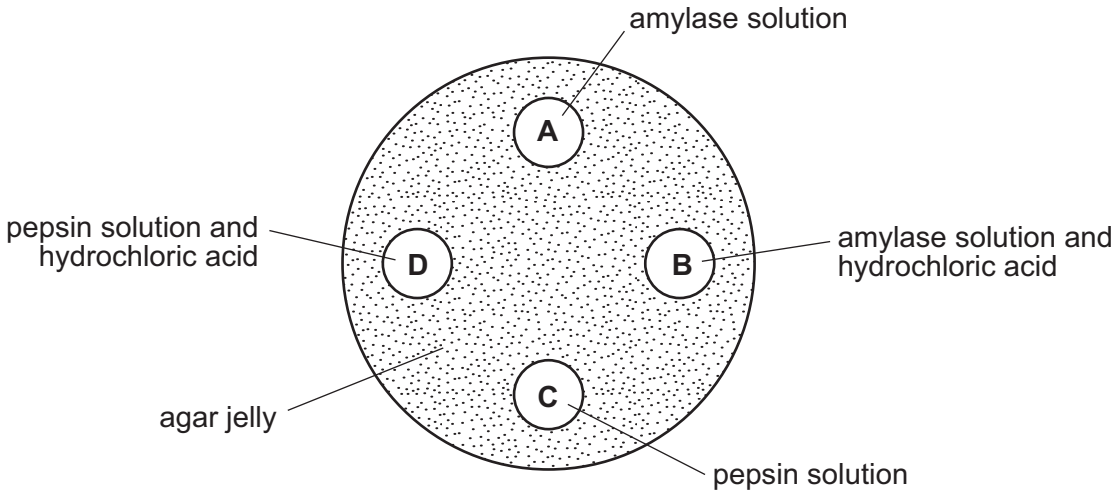
Which of these involve active transport?

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

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4 A dish is filled with agar jelly containing starch. Four holes are cut in the jelly and each hole is filled as shown.

After 30 minutes, which hole will be surrounded by the largest area without starch?



5 Magnesium is an essential element for

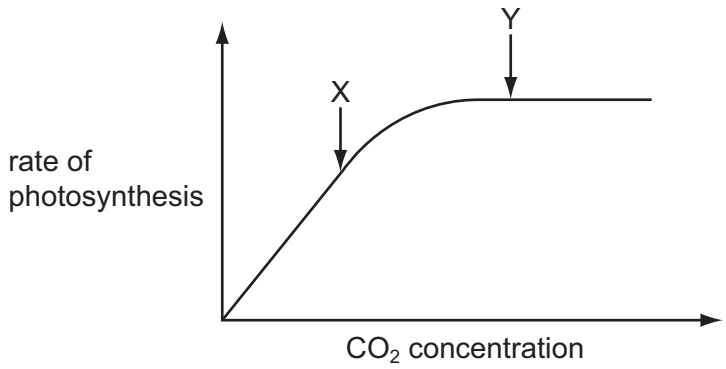
A the formation of cell walls.

B the formation of chlorophyll.

C the formation of proteins.

D the process of cell division.

6 The graph shows the effect of carbon dioxide (CO_2) concentration on the rate of photosynthesis.



What could be limiting the rate of photosynthesis at points X and Y?

	X	Y
A	carbon dioxide concentration	carbon dioxide concentration
B	carbon dioxide concentration	light intensity
C	light intensity	carbon dioxide concentration
D	light intensity	light intensity

7 What are the advantages of chewing food at the start of digestion?

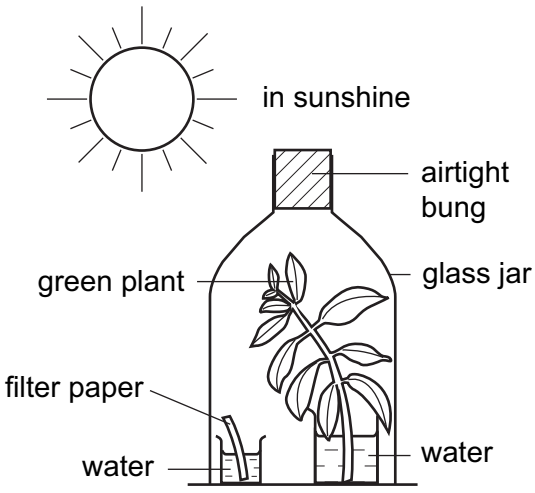
	increasing surface area	lubricating food	making food soluble
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✗	✓

8 Which row correctly gives a good source of vitamin C and its deficiency symptom?

	good source	deficiency symptom
A	egg yolk	softening of bones
B	egg yolk	bleeding gums
C	fresh green vegetables	softening of bones
D	fresh green vegetables	bleeding gums

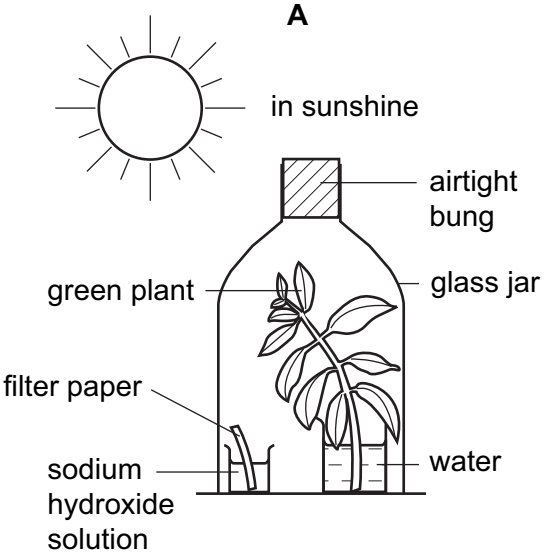
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9 The diagram shows a green shoot photosynthesising under a glass jar. This was used as a control experiment in a laboratory investigation.

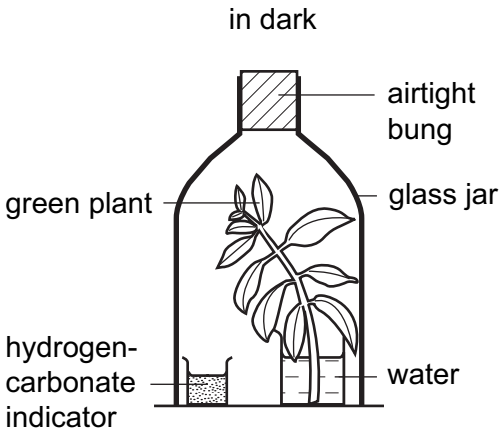


Which diagram shows the other experiment that should be done to investigate the need for carbon dioxide in photosynthesis?

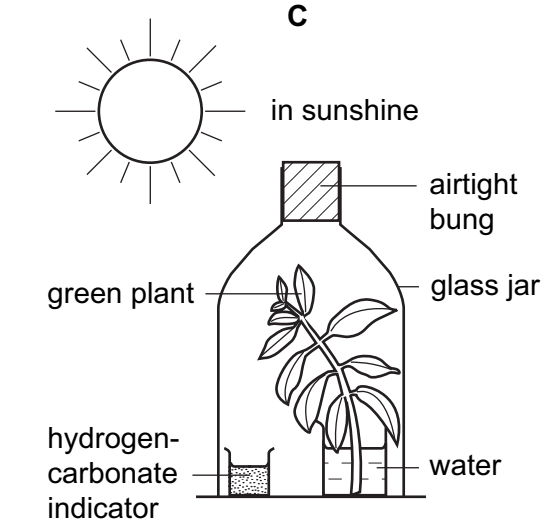
A



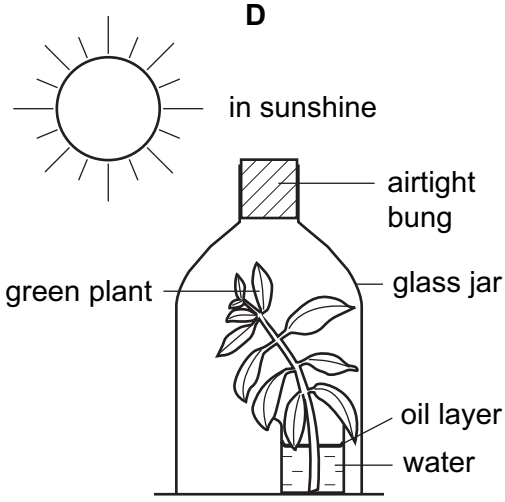
B



C



D

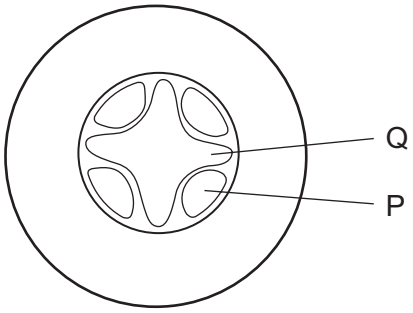


10 A protein solution is tested using three different reagents.

Which set of results is obtained?

	iodine solution	Benedict's solution	biuret solution
A	black	blue	blue
B	black	red	blue
C	brown	blue	purple
D	brown	red	purple

11 A herbaceous plant, growing in a nutrient solution, is placed in a well-lit experimental chamber through which humid air is being passed slowly. The diagram below shows a section through a part of the plant.



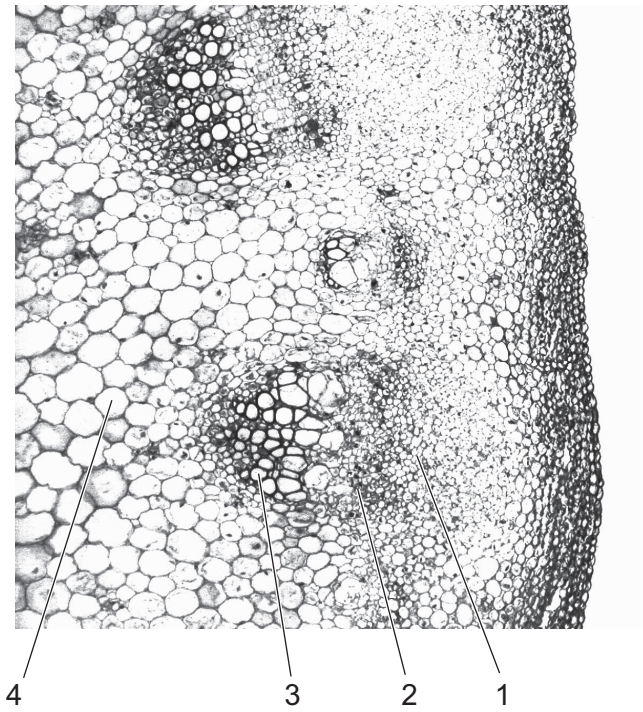
The speeds of movement of the fluids in tissues P and Q are measured. The humid air is then replaced by dry air and the speeds of movement of the fluids change.

What are these changes?

	tissue P	tissue Q
A	greatly increased upward movement	greatly increased downward movement
B	greatly increased downward movement	little change
C	little change	greatly increased downward movement
D	little change	greatly increased upward movement

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12 The photomicrograph shows part of a sunflower stem.



Which tissue transports water and mineral salts and which tissue transports sucrose?

	water and mineral salts	sucrose
A	1	4
B	2	3
C	3	2
D	4	1

13 How do veins differ from arteries?

	width of lumen	wall thickness	elastic fibres	muscles in wall
A	narrower	thicker	more	less
B	narrower	thinner	less	more
C	wider	thicker	more	more
D	wider	thinner	less	less

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[Turn over

14 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?

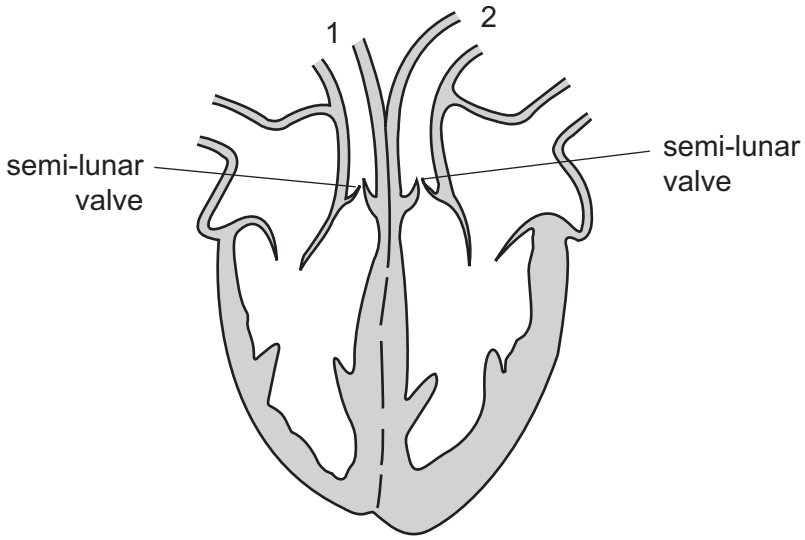
A aorta

B pulmonary artery

C pulmonary vein

D vena cava

15 The diagram shows a section through the human heart.



What happens as blood is being pumped out of the heart?

	semi-lunar valves	vessel through which blood passes to the lungs
A	open	1
B	open	2
C	closed	1
D	closed	2

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16 What happens to the diaphragm when breathing in?

	muscle action	shape becomes
A	contraction	domed
B	relaxation	domed
C	contraction	flattened
D	relaxation	flattened

17 Which process does **not** depend on respiration?

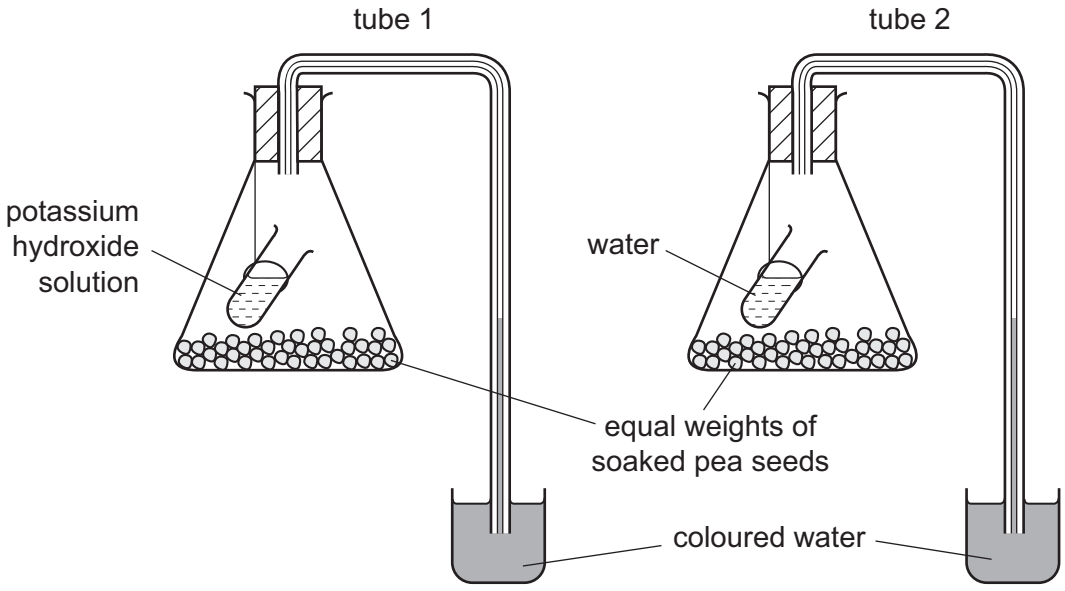
A active uptake of ions

B conduction of nervous impulses

C diffusion of glucose

D muscle contraction

18 An experiment is set up as shown.



After four hours, the coloured water will

A have gone down by the same amount in both tubes.

B be higher in tube 1 than in tube 2.

C be higher in tube 2 than in tube 1.

D have gone up by the same amount in both tubes.

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19 What is the correct sequence of the bones in the arm of a mammal, from the hand to the shoulder?

	hand	⟶	shoulder
A	humerus	radius	scapula
B	humerus	scapula	radius
C	radius	humerus	scapula
D	scapula	radius	humerus

20 What is **not** an excretory product of mammals?

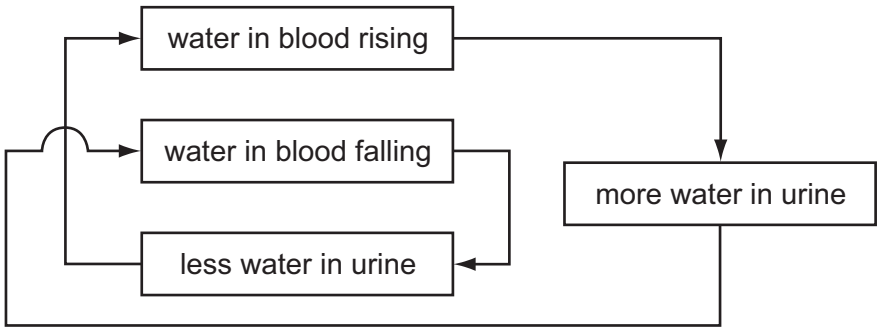
A carbon dioxide in expired air

B undigested food in faeces

C urea in sweat

D urea in urine

21 The diagram refers to the control of water concentration in the blood.



Why is this a negative feedback system?

A It decreases the amount of water in the blood.

B It increases any change in the amount of water in the blood.

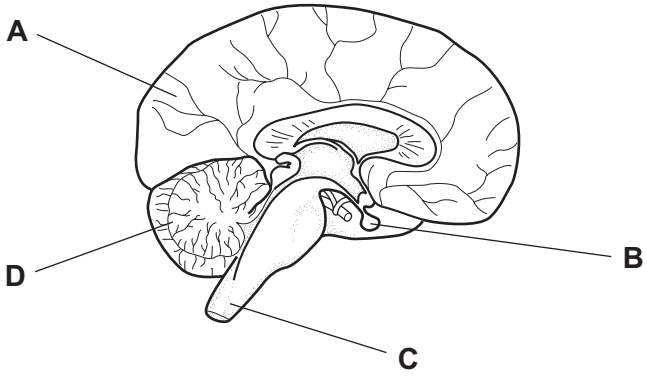
C It increases the amount of water in the blood.

D It reverses any change in the amount of water in the blood.

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22 The diagram represents a section through the brain and part of the spinal cord.

Which part of the brain controls balance?



23 What are the functions of the relay, motor and sensory neurones in a reflex response?

	relay neurone	motor neurone	sensory neurone
A	to connect neurones within the central nervous system	to conduct impulses to the effector from the central nervous system	to conduct impulses from the receptor to the central nervous system
B	to conduct impulses to the effector	to connect neurones within the central nervous system	to receive the stimulus
C	to conduct impulses from the central nervous system to the effector	to conduct impulses from the receptor to the central nervous system	to connect neurones within the central nervous system
D	to conduct impulses from the receptor to the central nervous system	to conduct impulses from the receptor to the central nervous system	to conduct impulses to the effector

24 What **decreases** as a result of adrenaline secretion?

A blood sugar level

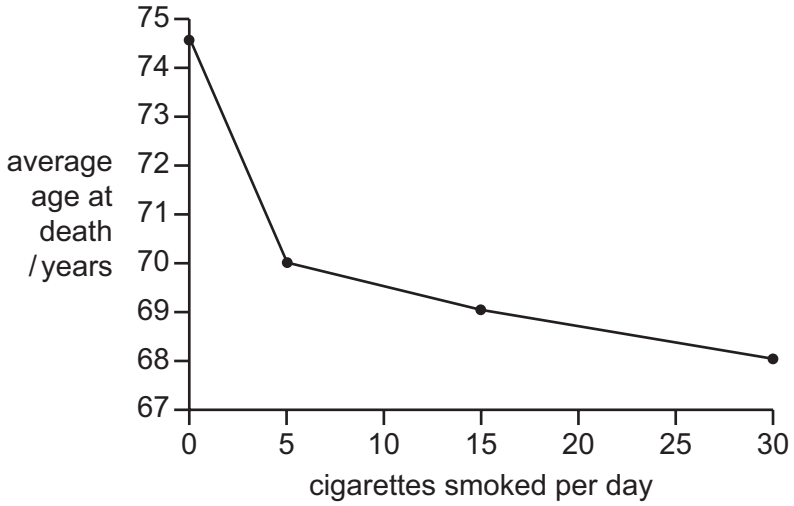
B digestive activity

C heart rate

D size of the pupils of the eyes

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25 The graph shows the relationship between the average age at death and the number of cigarettes smoked per day.



Which conclusion from the graph is correct?

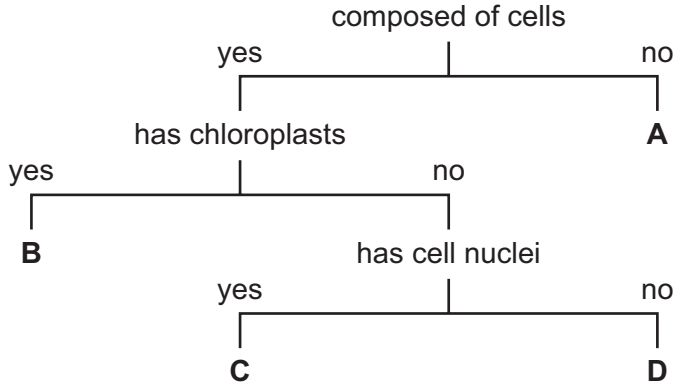
A Most people living longer than 74 years are non-smokers.

B People smoking five cigarettes a day live longer on average than those smoking 15 cigarettes a day.

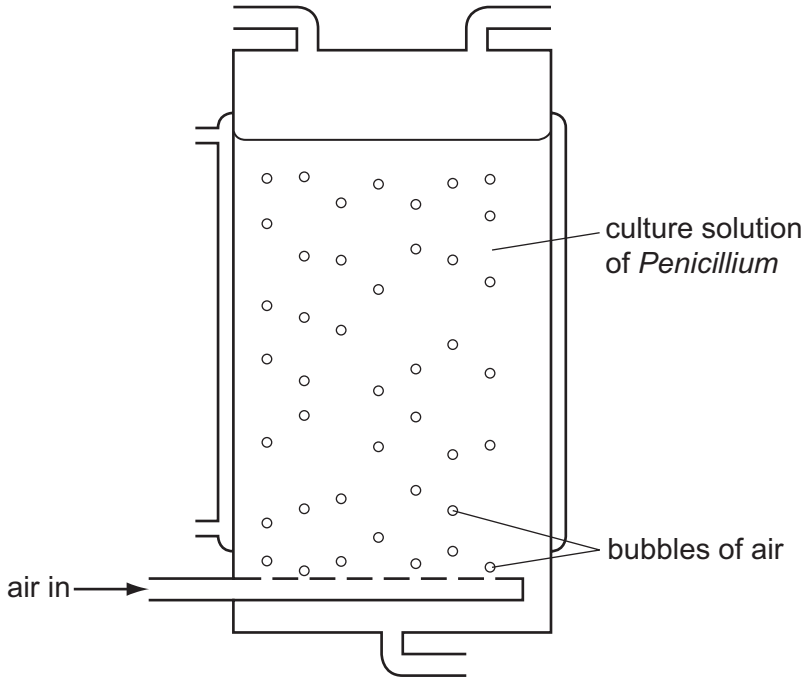
C The average length of life of people who smoke is 4.5 years less than that of non-smokers.

D The main cause of death in people who smoke 30 cigarettes a day is lung cancer.

26 Using the flow diagram, which organism is a fungus?



27 The diagram shows a fermenter used to produce penicillin.



Why is air pumped into the fermenter?

	to mix culture	to provide oxygen
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = yes
✗ = no

28 On decomposition, which substance in decaying plants is the major source of carbon for carbon dioxide production by the micro-organisms involved?

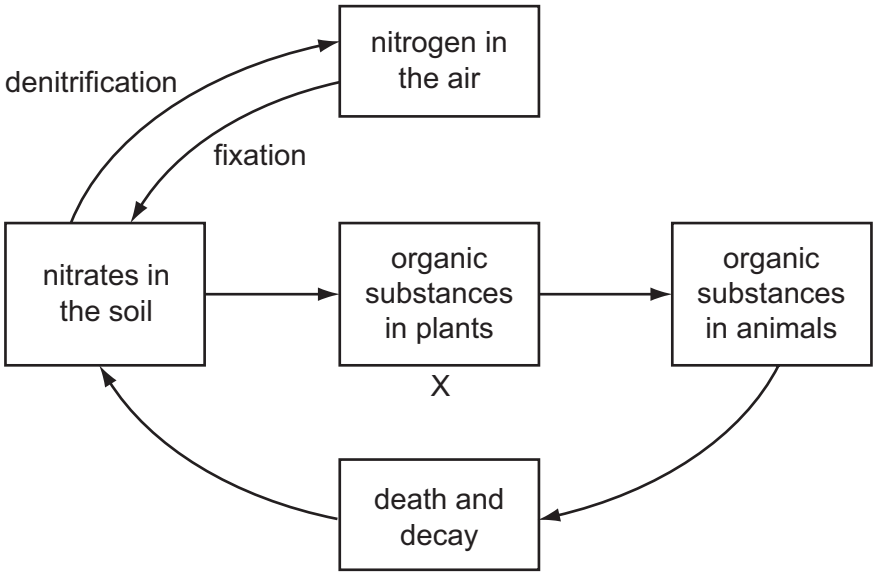
A cellulose

B glucose

C starch

D sucrose

29 The diagram shows part of the nitrogen cycle.



Which substance at X forms part of this cycle?

A cellulose

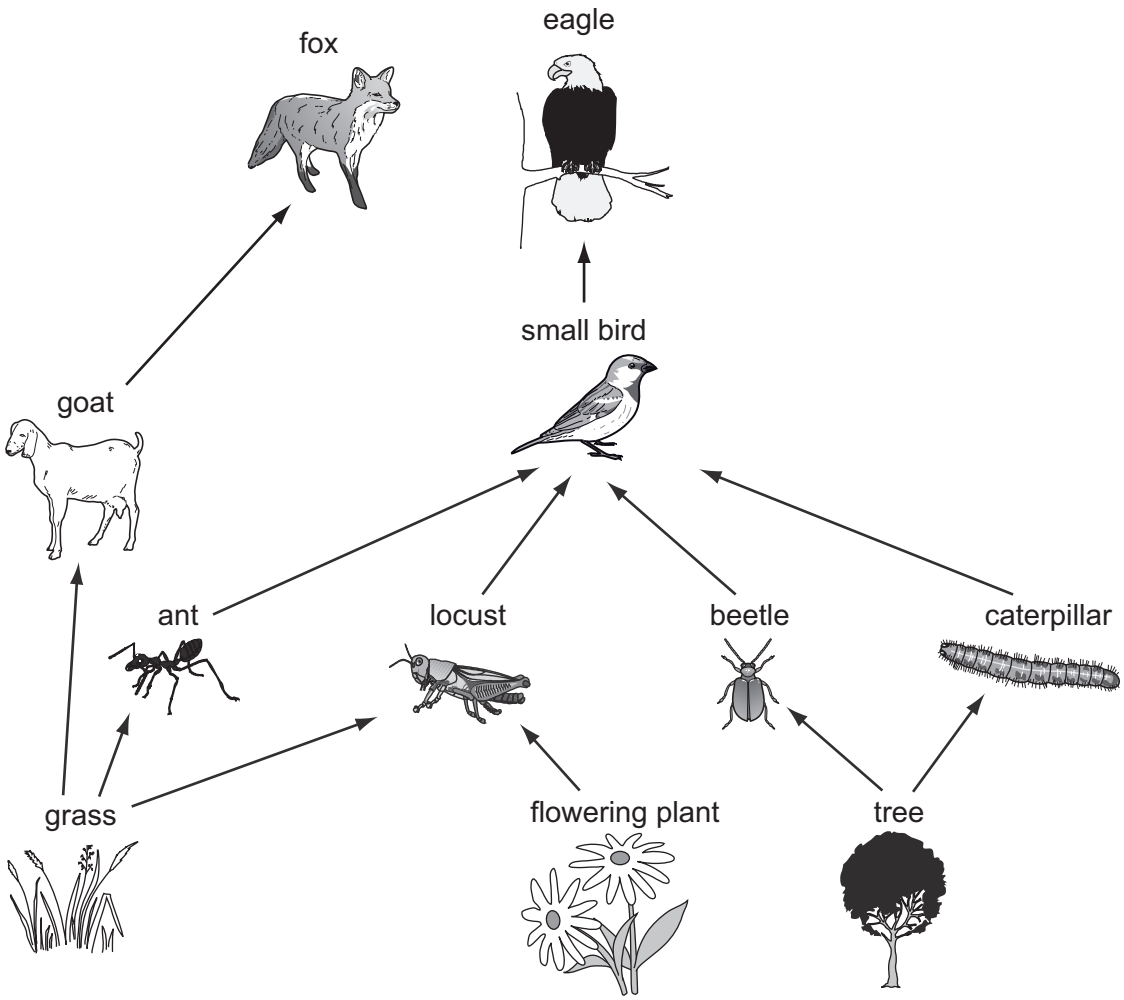
B fat

C protein

D starch

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30 The diagram shows part of a food web.



How many herbivores are shown?

A 3 **B** 4 **C** 5 **D** 6

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 of these methods can be used to control malaria?

A 1 only

B 1 and 2 only

C 2 and 3 only

D 1, 2 and 3

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32 If high levels of nitrates are washed into rivers, the following changes may occur, causing fish to die.

1 Water plants die and fall to the bottom.

2 Bacteria multiply rapidly.

3 Concentration of oxygen in the water decreases.

4 Increased growth of single-celled water plants makes the water green.

In which order do these changes take place?

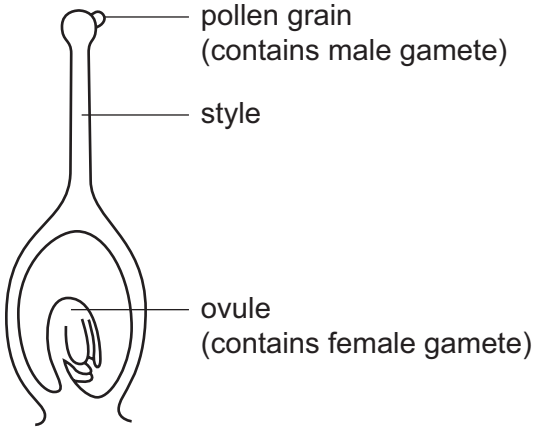
A $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

B $2 \rightarrow 3 \rightarrow 1 \rightarrow 4$

C $3 \rightarrow 2 \rightarrow 4 \rightarrow 1$

D $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

33 The diagram shows part of a flower at the time of pollination.



How does the male gamete reach the female gamete?

A A pollen tube grows down the style.

B The pollen grain moves down the style.

C The male gamete digests its way down the style.

D The male gamete swims down the style.

34 Which statement correctly describes advantages or disadvantages of self-pollination to a plant?

A It needs a lot of pollen but can happen when a plant is on its own.

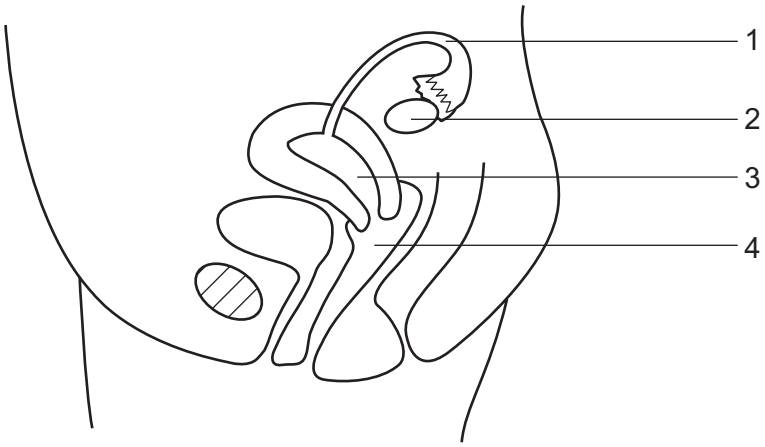
B It needs little pollen but there is a high chance of pollination.

C It needs no agent to transfer pollen but pollination is unlikely.

D It needs two plants of the same species but there is little variation in the offspring.

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35 The diagram shows a side view of the female reproductive system.



In which region are sperms released during sexual intercourse and where does fertilisation usually take place?

	sperms released	fertilisation
A	3	1
B	3	2
C	4	1
D	4	2

36 Which disease can be cured by antibiotics?

A HIV / AIDS

B diabetes

C emphysema

D syphilis

37 A man is blood group A and his wife is blood group AB.

What are the possible blood groups of their children?

A A only

B AB only

C A and AB only

D A, B and AB

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38 Which of these may be heterozygous?

A a haploid cell

B an allele of a gene

C an organism with a dominant phenotype

D an organism with a recessive genotype

39 Flower colour is controlled by a single pair of alleles. The allele for red flowers is dominant to the allele for white flowers.

A plant homozygous for red flowers is crossed with a plant homozygous for white flowers. All the resulting plants have red flowers (F_1 generation).

When the F_1 generation are crossed with each other, 18 plants are obtained. 12 plants have red flowers and 6 have white flowers (F_2 generation).

What ratio is expected in the F_2 generation and what ratio has been obtained?

	expected ratio red to white	obtained ratio red to white
A	1 : 1	2 : 1
B	1 : 1	3 : 1
C	3 : 1	2 : 1
D	3 : 1	3 : 1

40 In the commercial manufacture of insulin, a human gene is inserted into which of these?

A a chromosome of a human cell

B a protein molecule in a yeast cell

C the DNA of a bacterium

D the nucleic acid in a virus

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