UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2010**

1 hour

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

5601012045

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.

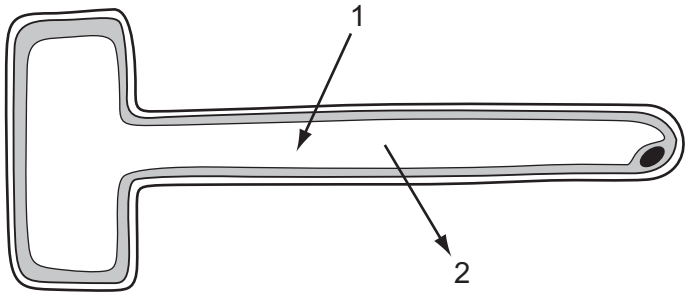
This document consists of **17** printed pages and **3** blank pages.

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1 Which terms describe the parts of a plant?

	leaf	leaf mesophyll	leaf epidermis
A	organ	cell	tissue
B	organ	tissue	tissue
C	organ system	tissue	cell
D	tissue	cell	cell

2 The diagram shows a root hair.



Which arrows show the direction in which it is **possible** for nitrate ions and water molecules to move?

	nitrate ions	water molecules
A	1 only	1 and 2
B	1 and 2	1 and 2
C	1 and 2	2 only
D	2 only	1 only

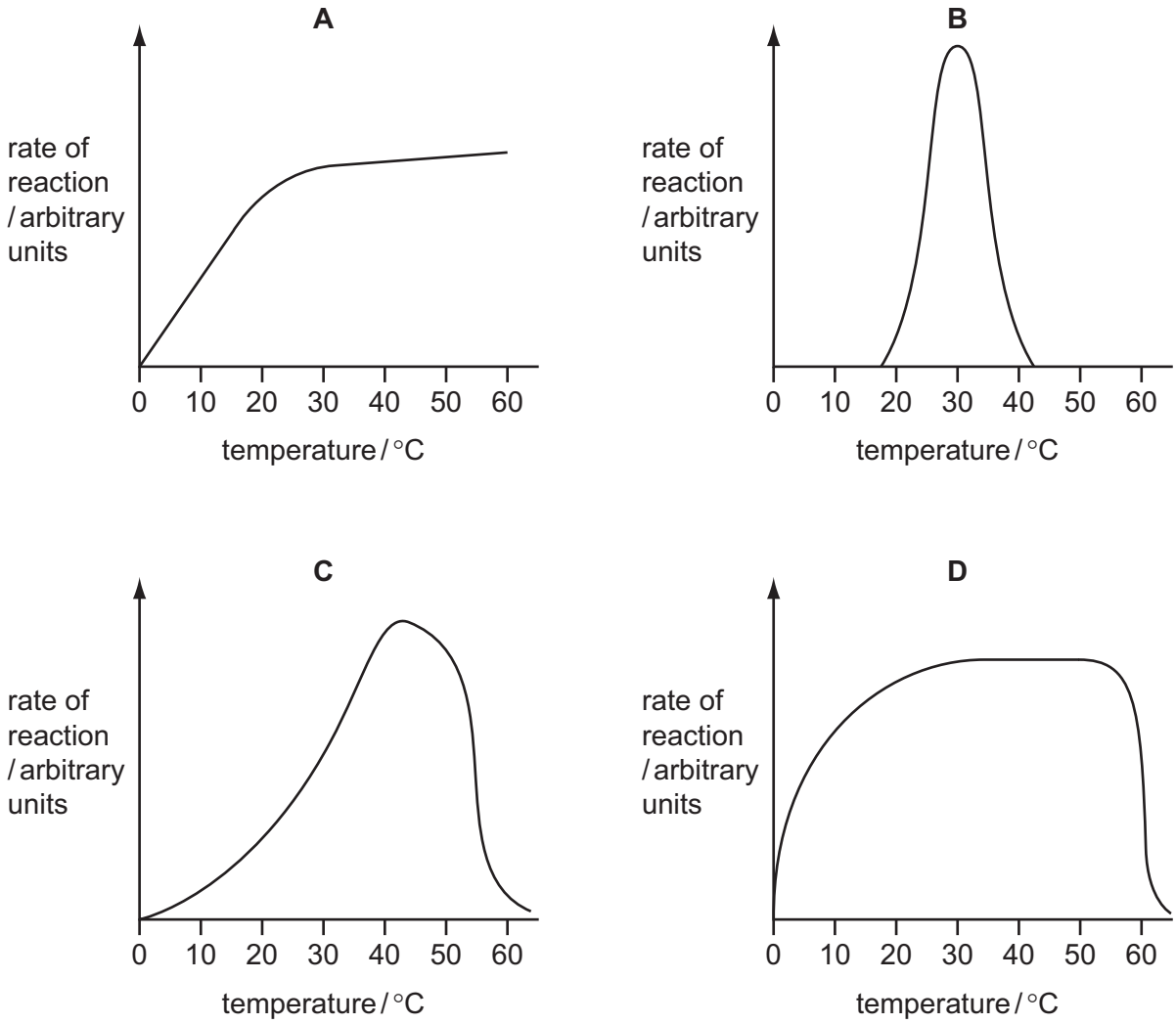
3 Four identical pieces of potato are treated in two stages, as shown.

Which piece of potato will be largest after 2 hours?

	stage 1	stage 2
A	boiled in water for 10 minutes	placed in 10% salt solution for 2 hours
B	boiled in water for 10 minutes	placed in distilled water for 2 hours
C	unboiled	placed in 10% salt solution for 2 hours
D	unboiled	placed in distilled water for 2 hours

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4 Which graph shows the effect of temperature on enzyme-controlled reactions?



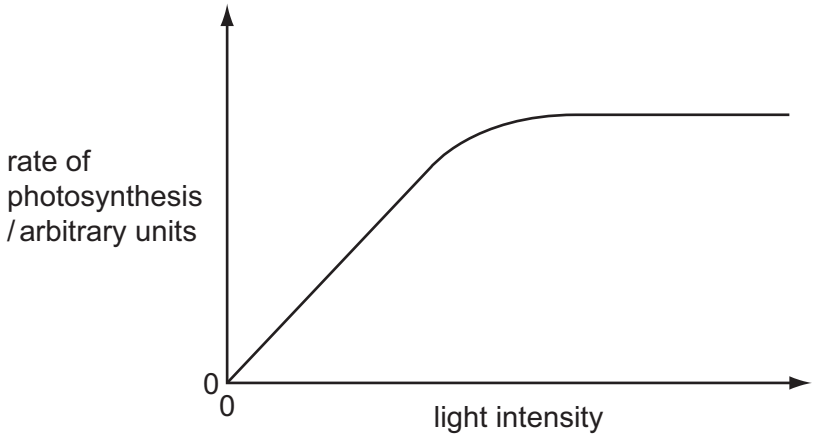
5 Lack of nitrate ions (NO_3^-) in flowering plants causes yellowing of leaves and poor growth whereas lack of magnesium ions (Mg^{2+}) causes yellowing between veins of leaves.

What explains these differences?

	Mg^{2+}		NO_3^-	
	involved in chlorophyll synthesis	involved in protein synthesis	involved in chlorophyll synthesis	involved in protein synthesis
A	✓	✗	✓	✓
B	✓	✗	✓	✗
C	✗	✓	✗	✓
D	✗	✓	✗	✗

key
✓ = true
✗ = not true

6 The graph shows the effect of light intensity on the rate of photosynthesis.



Which statement could explain what is happening at higher light intensities?

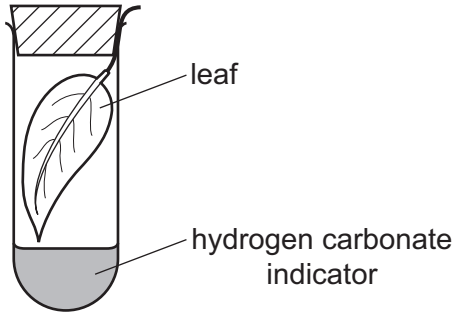
A All the available chloroplasts are fully occupied in light absorption.

B High light intensities increase the temperature above the optimum for photosynthesis.

C The chlorophyll in the chloroplasts has been damaged.

D The products of photosynthesis accumulate and inhibit photosynthesis.

7 A freshly picked leaf is placed in a sealed test-tube with some hydrogen carbonate indicator solution. The tube is kept in the light during the day. The indicator changes colour as shown.



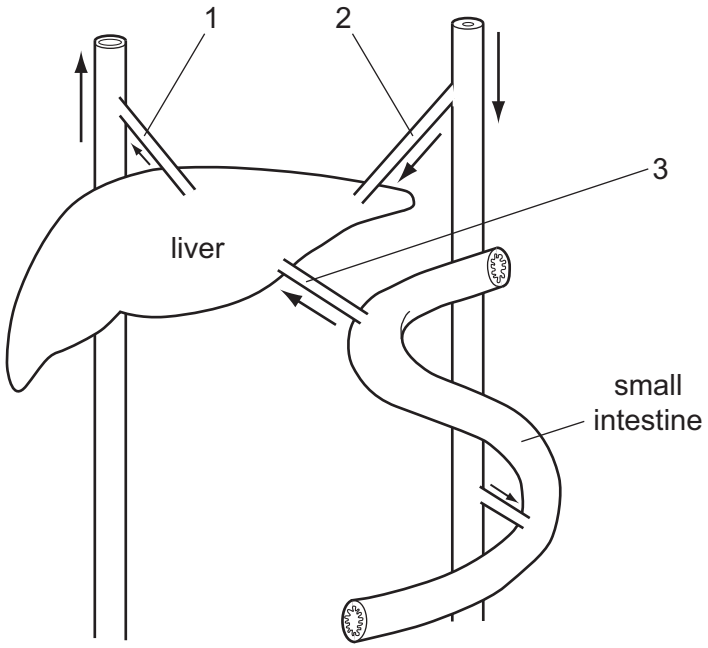
colour	amount of carbon dioxide compared to average atmospheric concentration
purple	less than normal
red	normal
yellow	more than normal

Which colour will the hydrogen carbonate indicator be at midday and at midnight?

	at midday	at midnight
A	purple	yellow
B	red	purple
C	yellow	purple
D	yellow	red

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8 The diagram represents the liver and associated blood vessels.



After a meal, how is the blood affected by the liver as it passes between these blood vessels?

	blood vessels	effect of liver
A	2 to 1	glucose added
B	2 to 1	urea removed
C	3 to 1	glucose added
D	3 to 1	urea removed

9 Which chemical test shows the presence of an enzyme in a biological washing powder?

A Benedict's

B biuret

C ethanol emulsion

D iodine solution

10 The symptoms of a disease include weakness, fatigue, aching and swollen joints, bruise-like spots round the hair follicles and swollen and soft gums.

Which food is used to treat this disease?

A liver as a source of iron

B milk as a source of calcium

C oily fish as a source of vitamin D

D oranges as a source of vitamin C

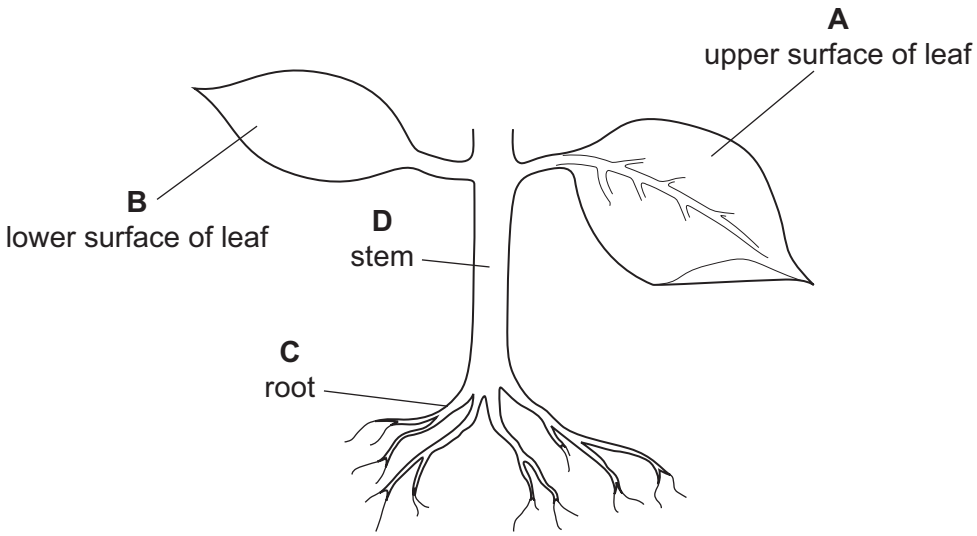
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11 Which adaptations of a root hair cell make it suitable for water uptake?

	partially permeable cell membrane	surface area to volume ratio of the cell
A	absent	high
B	absent	low
C	present	high
D	present	low

12 The diagram shows part of a flowering plant.

Where does most transpiration take place?



13 Vitamin C changes cholesterol into a form which is less likely to be deposited in artery walls.

Which dietary advice would help prevent coronary heart disease?

A Eat more bread and less meat.

B Eat more butter and less bread.

C Eat more meat and less oranges.

D Eat more oranges and less butter.

14 Which sequence shows the shortest route taken by blood travelling from a leg to an arm in the human body?

A leg → heart → lungs → heart → arm

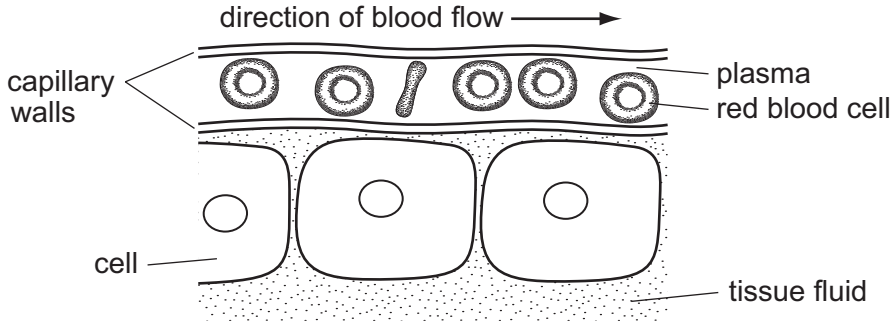
B leg → heart → lungs → kidney → arm

C leg → kidney → heart → lungs → arm

D leg → lungs → heart → gut → arm

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15 The diagram shows a blood capillary close to some tissue cells bathed in tissue fluid. Exchange of nutrients takes place here.



Which row shows the type of nutrient in the plasma and in the tissue fluid and the method of transfer between the two?

	plasma	tissue fluid	method of transfer
A	amino acid	amino acid	diffusion
B	amino acid	protein	osmosis
C	protein	amino acid	digestion
D	protein	protein	active uptake

16 The following changes take place in an athlete's body during a 100 m race.

Which change occurs first?

A increased availability of oxygen to muscles

B increased breathing rate

C increased carbon dioxide concentration in the blood

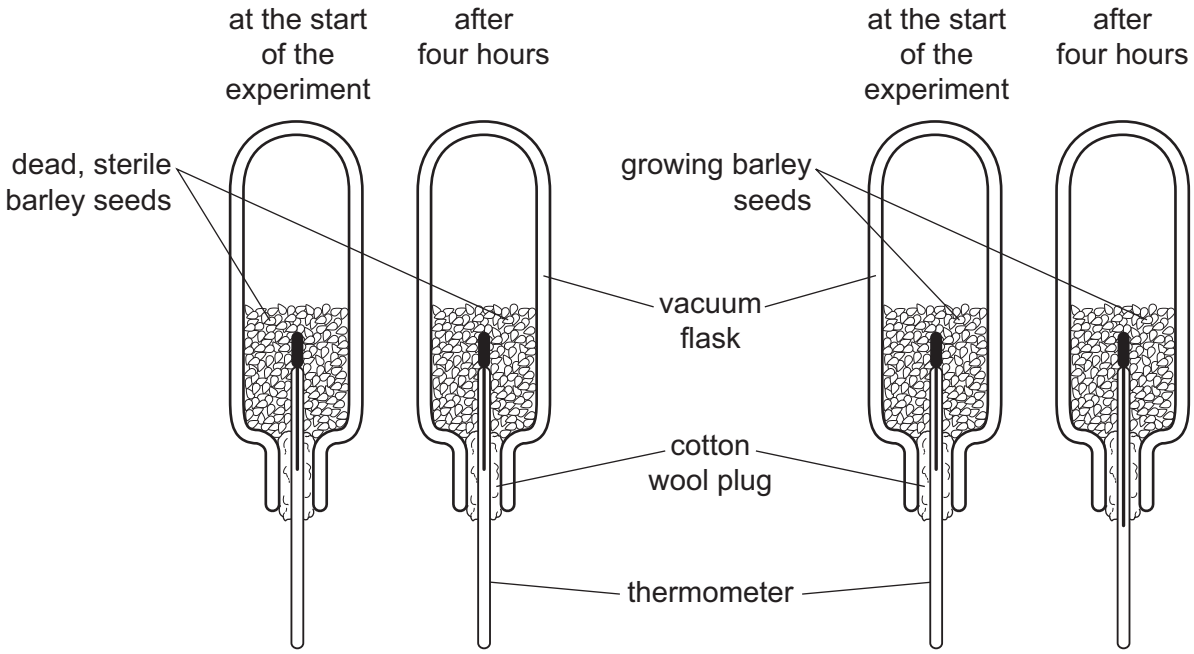
D increased production of carbon dioxide by muscles

17 What happens to the muscles of the diaphragm, the external intercostal muscles and the position of the diaphragm when breathing in?

	diaphragm muscles	external intercostal muscles	diaphragm movement
A	contract	contract	downward
B	contract	relax	upward
C	relax	contract	upward
D	relax	relax	downward

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18 The diagram shows an experiment to study respiration in growing barley seeds.



The results of this experiment show that respiration

A produces carbon dioxide.

B releases energy.

C requires glucose.

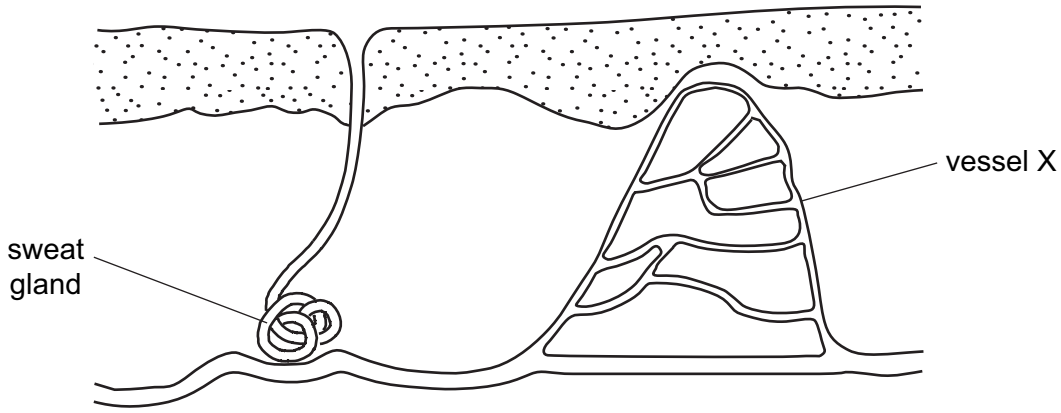
D uses up oxygen.

19 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

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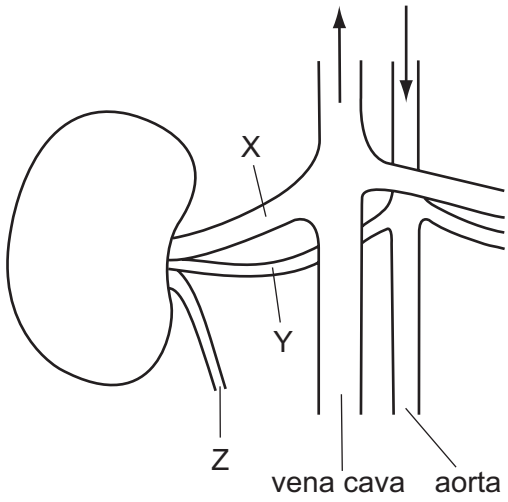
20 The diagram shows a section through skin.



What happens if the body temperature starts to fall below normal?

	sweat glands	blood flow in vessel X
A	secrete sweat	decreases
B	secrete sweat	increases
C	stop secreting sweat	decreases
D	stop secreting sweat	increases

21 The diagram shows the structures associated with a human kidney.



What are the relative concentrations of urea in X, Y and Z?

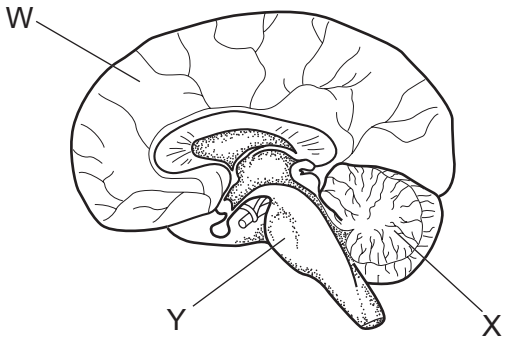
A X is sometimes higher than Y

B Y is always higher than Z

C Y is always lower than Z

D Z is sometimes lower than X

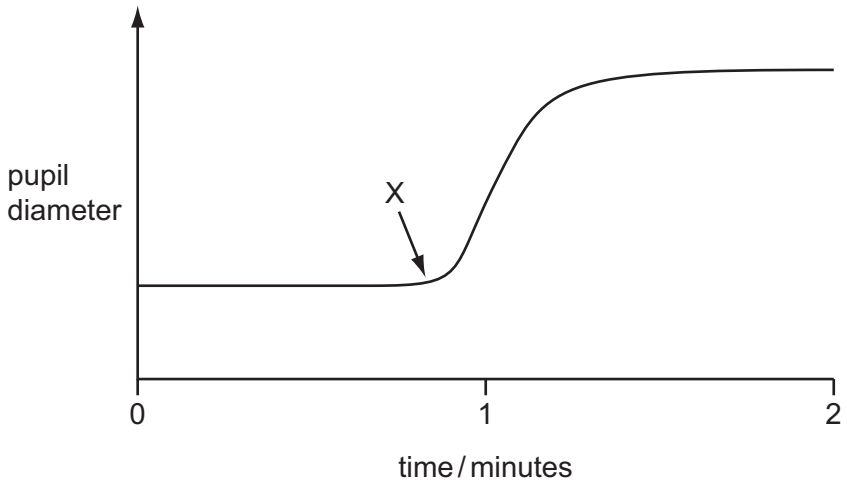
22 The diagram shows a section through the human brain.



What are the functions of the labelled regions?

	memory	balance
A	W	X
B	W	Y
C	X	W
D	X	Y

23 The graph shows how the diameter of the pupil of a person's eye changed during the course of two minutes.



What happens to the light intensity at X and which muscles begin to contract?

	light intensity	iris muscles contracting
A	decreases	circular
B	decreases	radial
C	increases	circular
D	increases	radial

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24 When are antibiotics likely to be most effective?

A Infection is caused by a bacterium or fungus.

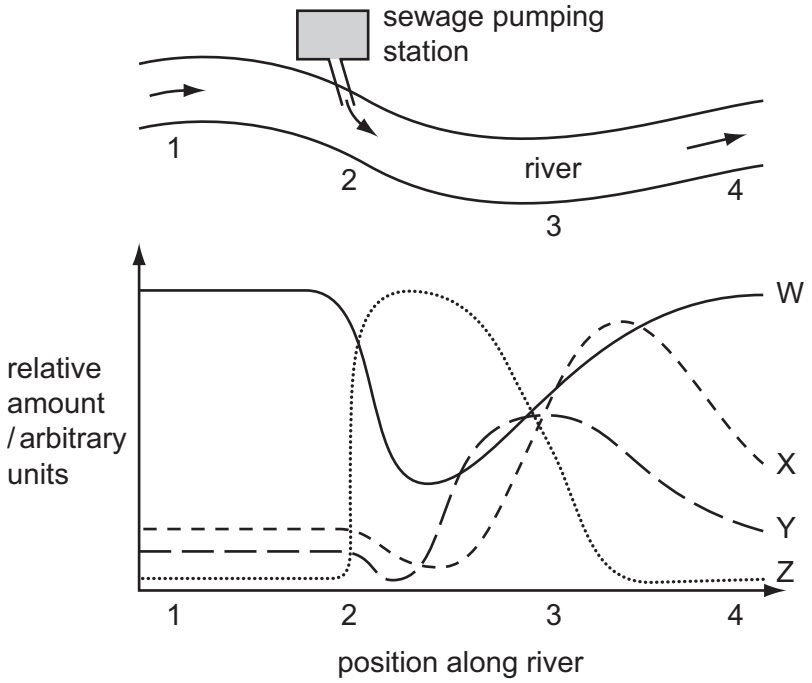
B Infection is caused by a virus.

C The disease is cancerous.

D The pathogen can digest the antibiotic.

25 The diagram shows part of a river into which sewage is being pumped.

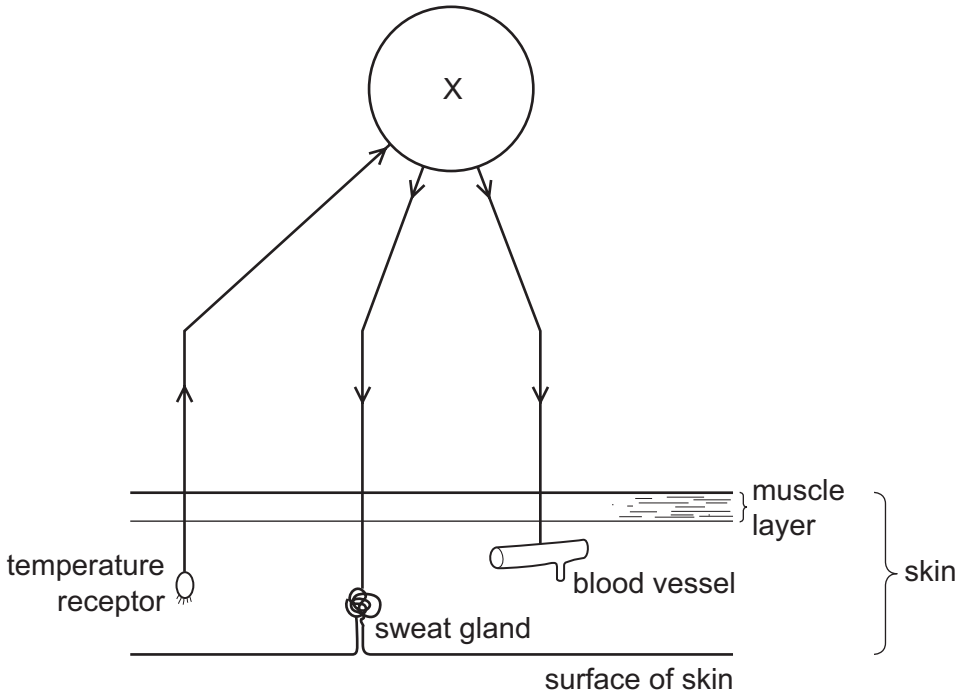
Some of the effects of adding sewage to the river are plotted in the graph.



Which graphs represent the bacteria and the oxygen content of the water?

	bacteria	oxygen
A	W	Y
B	X	Z
C	Y	X
D	Z	W

26 The diagram shows some nerve pathways involved in temperature control of the human body.



Which part of the nervous system does X represent?

A cerebrum

B hypothalamus

C medulla

D pituitary gland

27 Which organisms are used, and what is their role, in the manufacture of cheese?

	organism	role
A	bacteria	to lower the pH
B	fungi	to break down milk sugar
C	viruses	to curdle milk
D	yeast	to release carbon dioxide

28 Nitrates in the soil can be absorbed by plants. Nitrates can also be removed from the soil by the action of

A bacteria in the root nodules of legumes.

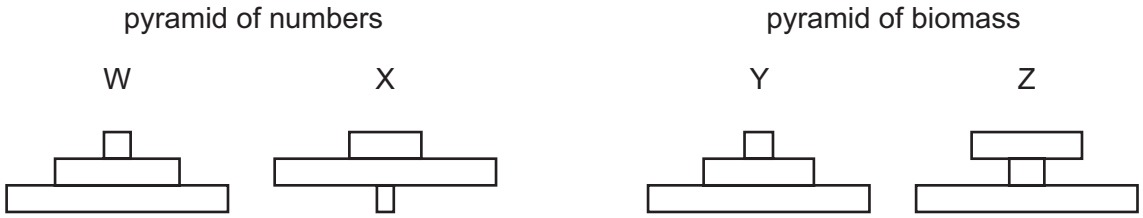
B denitrifying bacteria in poorly aerated conditions.

C nitrogen-fixing bacteria on ammonium compounds.

D nitrogen-fixing bacteria on decaying plants.

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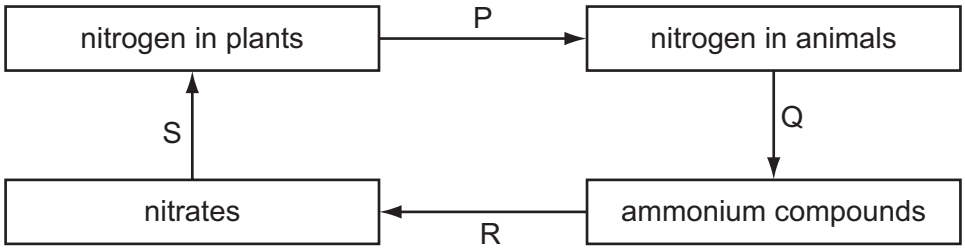
29 A single plant provides food for many herbivores. The herbivores supply food for a few carnivores.



Which pyramid of numbers and which pyramid of biomass show this information?

	pyramid of numbers	pyramid of biomass
A	W	Y
B	W	Z
C	X	Y
D	X	Z

30 The diagram shows part of the nitrogen cycle.



Which stages depend on bacteria?

A P, Q, R and S

B P and S only

C Q and R only

D R and S only

31 What makes the female mosquito an effective vector for malaria?

A It has wings.

B It lays many eggs.

C It makes a noticeable noise.

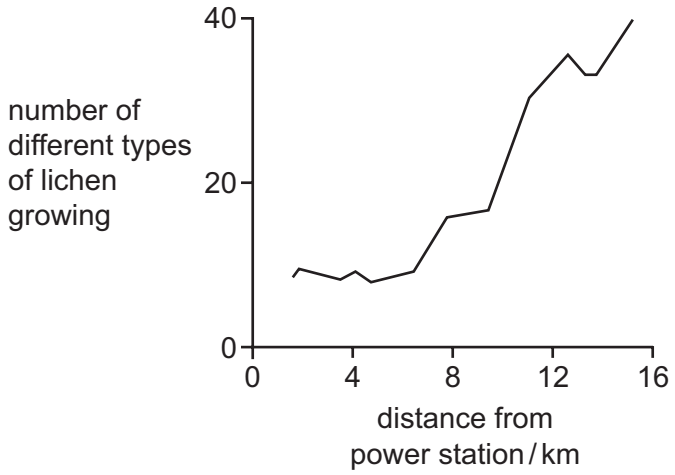
D It mates several times.

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[Turn over

32 Lichens are organisms which are very sensitive to air pollution.

The graph shows how the distance from a coal-fired power station affects the number of different types of lichen growing.



Which conclusion can be drawn from this information?

A Lichens grow faster near the power station.

B Lichens grow more slowly near the power station.

C Sulfur dioxide from the power station inhibits the growth of lichens.

D There are fewer different types of lichen growing near the power station.

33 What passes down a pollen tube after pollination?

A female nucleus

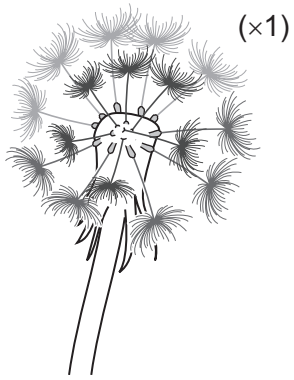
B male nucleus

C ovule

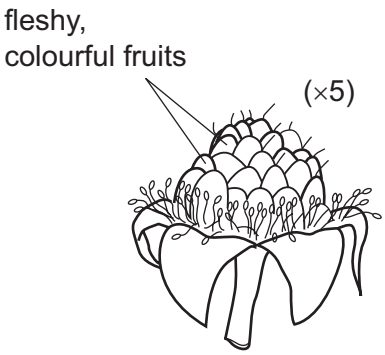
D pollen grain

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34 The diagrams show two kinds of fruit.



1

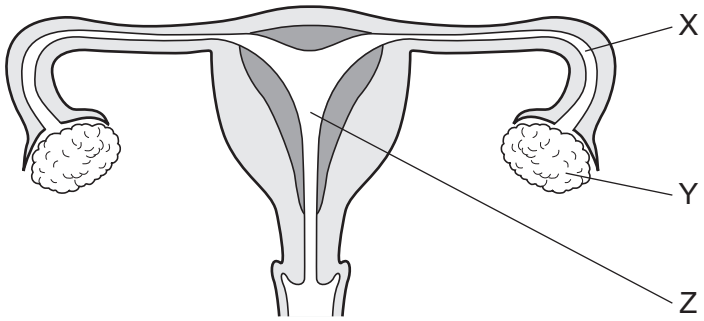


2

How are the seeds of these fruits dispersed?

	1	2
A	birds	mammals
B	birds	wind
C	mammals	birds
D	wind	mammals

35 The diagram shows a section through the female reproductive system.



During pregnancy, where does mitosis occur in the cells of the embryo?

	X	Y	Z
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✗	✓

key

✓ = takes place

✗ = does not take place

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[Turn over

36 What is a reason for breast milk being better for a baby than bottled milk?

A It contains antibodies for disease protection.

B It contains calcium ions for bone development.

C It contains protein for growth.

D It contains sugar for energy.

37 Which statement is evidence that genes may be copied and passed on to the next generation?

A Asexual reproduction produces genetically identical offspring.

B Different alleles of a gene can produce variation in phenotype.

C Each species of a plant or animal has a fixed number of chromosomes.

D Sexual reproduction produces genetically different offspring.

38 The genotype for the height of an organism is written as Tt.

What conclusion may be drawn?

A The allele for height has at least two different genes.

B There are at least two different alleles of the gene for height.

C There are two different genes for height, each having a single allele.

D There is one allele for height with two different forms.

39 The body cells of a mammal contain two copies of 24 000 genes, making 48 000 genes in total.

Of these 48 000 genes in the body cells of a mammal, how many would have been inherited from its mother?

A 6 000

B 12 000

C 24 000

D 48 000

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40 The inheritance of the ABO blood groups in humans is controlled by three alleles (I^A, I^B and I^O), only two of which can be present in one individual.

What are the possible blood groups of children born to a homozygous group A woman and a heterozygous group B man?

A A and B only

B A and AB only

C A, B and AB only

D A, B, AB and O

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