UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **May/June 2010**

1 hour

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

* 2 4 4 1 3 3 1 2 7 9 *

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.

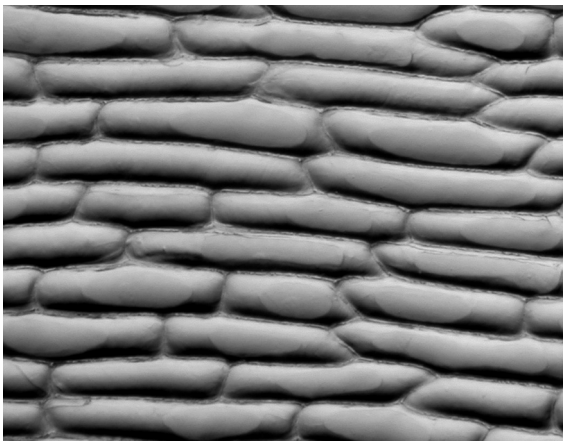
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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 photomicrograph shows onion epidermis.



Which term describes this onion epidermis?

A cell

B organ

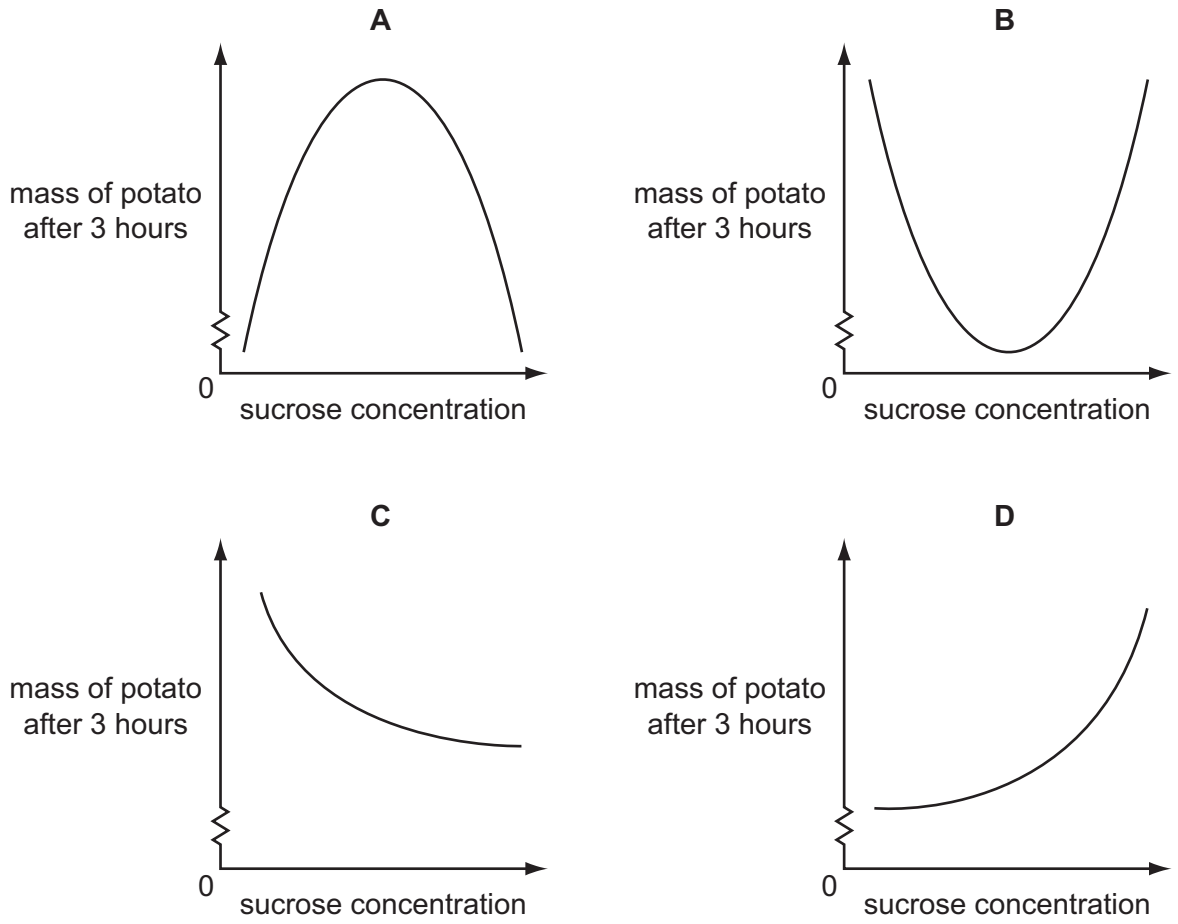
C organ system

D tissue

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2 Identical pieces of potato are placed in sucrose solutions of different concentrations. After three hours, the mass of each potato piece is measured.

Which graph shows the results of this experiment?



3 Which of these processes require energy from respiration?

	diffusion	osmosis
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = energy required

✗ = energy not required

4 Cubes of hard-boiled egg white are placed in test-tubes containing 5 cm^3 of water. Other substances are added to each tube as shown in the chart. The tubes are left for eight hours and then tested for amino acids.

tube	solution added	results of test for amino acids
1	pepsin	absent
2	pepsin + alkali	absent
3	none	absent
4	pepsin + acid	large amounts
5	boiled pepsin + acid	traces
6	acid	traces
7	alkali	absent

Which tubes show that pepsin is an enzyme?

A 1 and 6 **B** 2 and 7 **C** 4 and 5 **D** 5 and 6

5 Which signs show that a plant has been grown in a culture solution deficient in magnesium?

A purple leaves and poor root growth

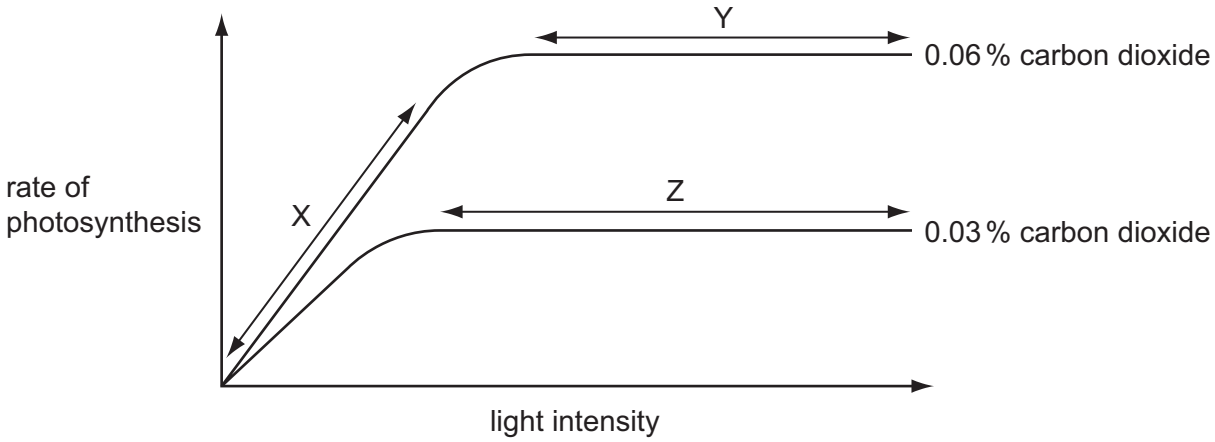
B small leaves and thin stem

C white upper leaves and normal lower leaves

D yellow stem and yellow leaves

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6 The graph shows the rate of photosynthesis of a plant at increasing light intensities at two different carbon dioxide concentrations. The temperature is kept constant.



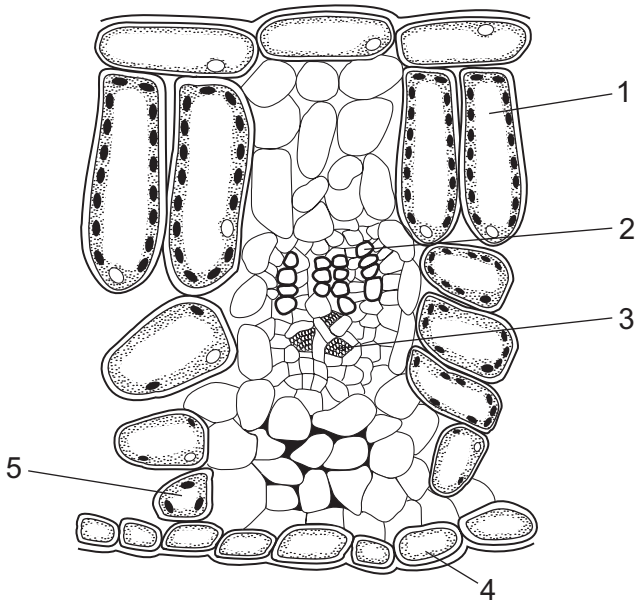
What may be limiting the rate of photosynthesis at X, Y and Z?

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

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[Turn over

7 The diagram shows a section through a leaf.

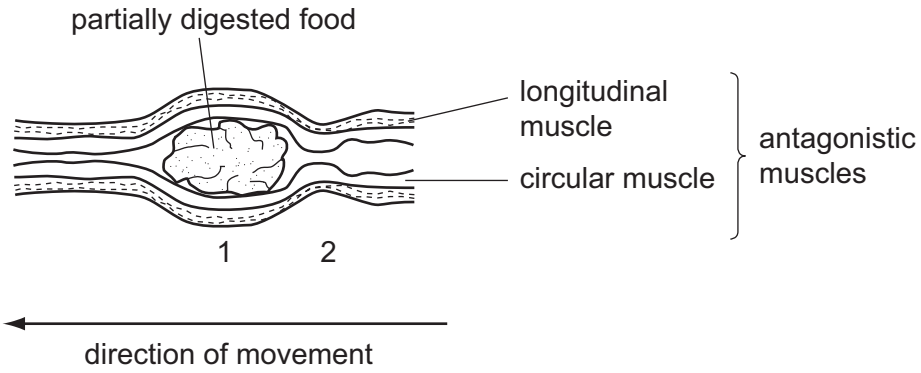


Which cells have the functions shown?

	photosynthesis	transport
A	1 and 5	2 and 3
B	2 and 4	1 and 4
C	3 and 4	2 and 5
D	4 and 5	3 and 4

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8 The diagram shows a section of the small intestine in which partially digested food is being pushed along.



What is the state of the longitudinal muscles at 1and 2?

	1	2
A	contracted	contracted
B	contracted	relaxed
C	relaxed	contracted
D	relaxed	relaxed

9 In which regions of the alimentary canal does amylase act?

A mouth cavity and pancreas

B mouth cavity and ileum

C stomach and pancreas

D stomach and ileum

10 Which substances are transported in xylem and in phloem?

	xylem	phloem
A	amino acids and mineral ions	amino acids and water
B	mineral ions and sucrose	starch and mineral ions
C	mineral ions and water	sucrose and water
D	starch and water	sucrose and starch

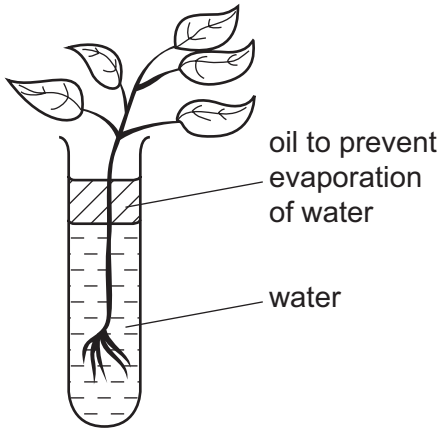
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11 The table shows the recommended daily intake of energy and of iron for females at four different ages: 6 months, 5 years, 25 years and 75 years.

Which shows the recommended daily intake for the 25 year old?

	energy / MJ	iron / mg
A	2.7	4.3
B	6.5	6.1
C	7.6	8.7
D	8.1	14.8

12 Five similar plants are placed in test-tubes as shown.



Some of the plants have their leaves coated with grease to reduce transpiration. Each plant is weighed in its test-tube at the start of the experiment and again two days later.

The results are shown in the table.

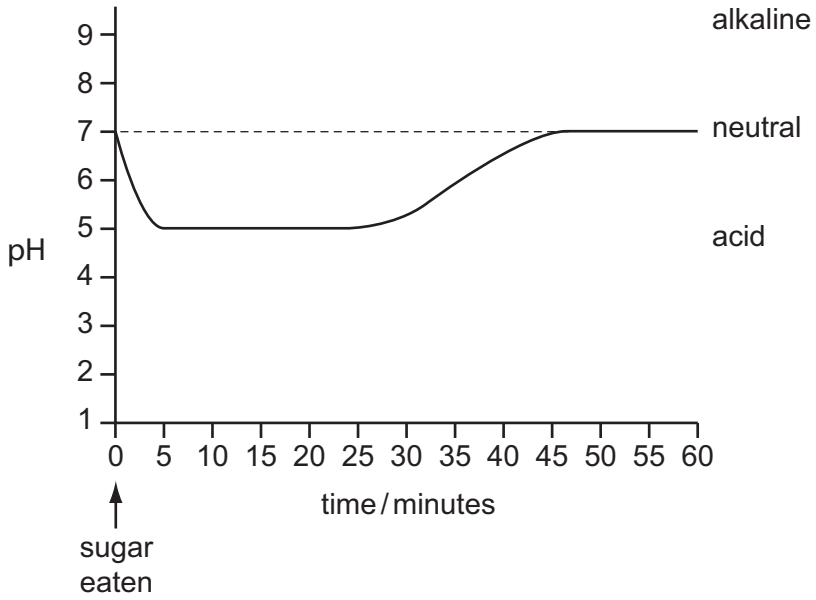
	mass / g				
	plant 1	plant 2	plant 3	plant 4	plant 5
at the start of experiment	105	121	107	111	119
after two days	103	97	84	110	93

Which plants had their leaves coated with grease?

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

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13 The graph shows the pH of the saliva in the mouth after eating sugar.



When are conditions in the mouth most likely to cause tooth decay?

A 0-5 minutes

B 5-25 minutes

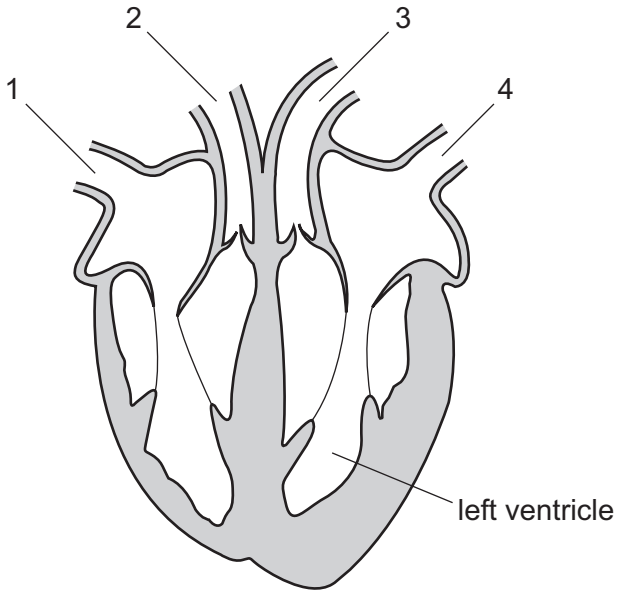
C 25-45 minutes

D 45-60 minutes

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[Turn over

14 The diagram shows a vertical section through the heart.

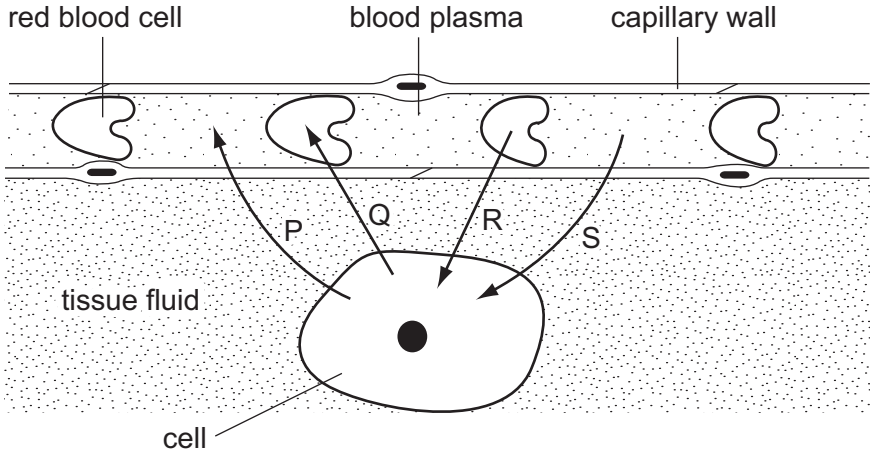


What are the functions of the numbered blood vessels?

	carries blood to body	carries blood to lungs	carries blood from lungs	carries blood from body
A	1	4	3	2
B	2	1	3	4
C	2	3	4	1
D	3	2	4	1

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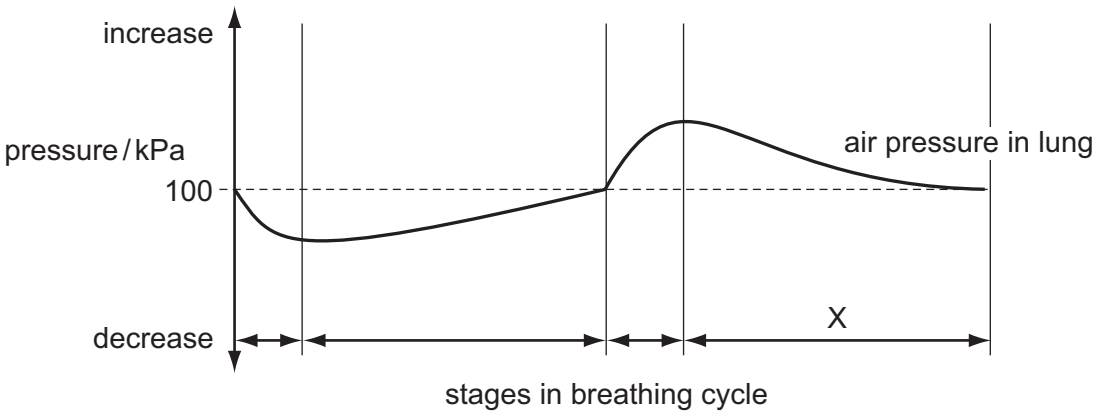
15 The diagram represents a blood capillary with an adjacent cell. The arrows represent the transfer of substances between the capillary and the cell.



Which arrows represent glucose, carbon dioxide and oxygen?

	glucose	carbon dioxide	oxygen
A	P	R	Q
B	Q	S	P
C	R	Q	S
D	S	P	R

16 The graph shows changes in the air pressure within the lungs during one breathing cycle.



What causes the change in air pressure during stage X?

A contraction of diaphragm muscles

B increase in volume of lungs

C outflow of air from lungs

D relaxation of internal intercostal muscles

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[Turn over

17 What do the cilia do in the bronchi of the lungs?

	trap bacteria	move mucus out of the lungs
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = function of the cilia

✗ = not a function of the cilia

18 Fitness training increases the concentration of lactic acid that runners can build up in their muscles before pain stops them running.

What is a consequence of this increase?

A Aerobic respiration in muscles can be more rapid.

B Blood flow to the muscles is increased.

C More anaerobic respiration can take place in muscles.

D More energy is needed by the muscles.

19 Which **cannot** be an example of excretion?

A Carbon dioxide is breathed out from the lungs.

B Undigested food leaves the body through the anus.

C Urea leaves the body in urine.

D Water is removed through the kidneys.

20 Which structures are **all** involved in controlling human body temperature?

A blood vessels near the skin surface, the cerebellum and sweat glands

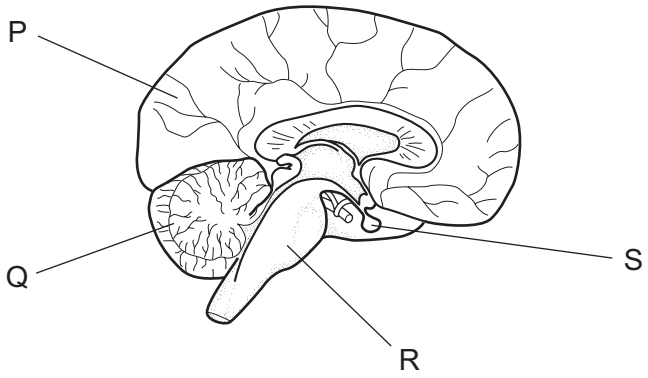
B blood vessels near the skin surface, the hypothalamus and skeletal muscles

C kidneys, the cerebellum and sweat glands

D kidneys, the hypothalamus and skeletal muscles

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21 The diagram shows a section through the brain and part of the spinal cord.



Which row correctly identifies the cerebral hemisphere, cerebellum, medulla and pituitary gland?

	cerebral hemisphere	cerebellum	medulla	pituitary gland
A	P	Q	R	S
B	P	R	Q	S
C	Q	R	S	P
D	S	P	R	Q

22 Which is **not** controlled directly by the nervous system?

A blood glucose concentration

B dilation of the blood vessels

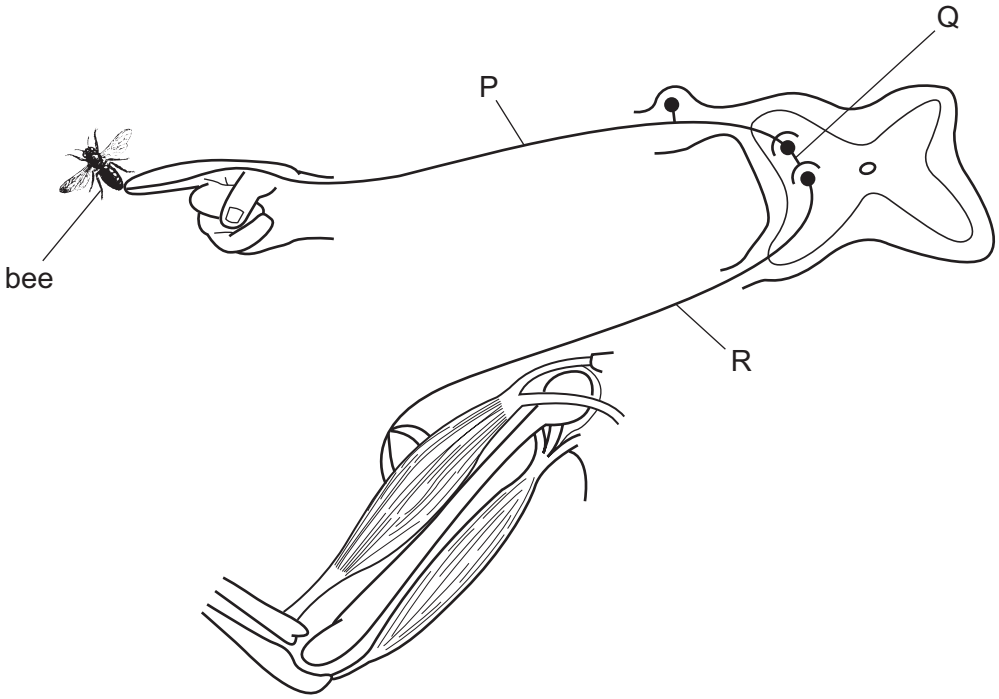
C heart rate

D pupil diameter in the eye

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[Turn over

23 The diagram shows a reflex arc in which a bee sting causes the arm to be moved quickly.



If the relay neurone at Q is damaged, how will the transmission of nerve impulses in the reflex arc be affected?

A They cannot pass from P to Q.

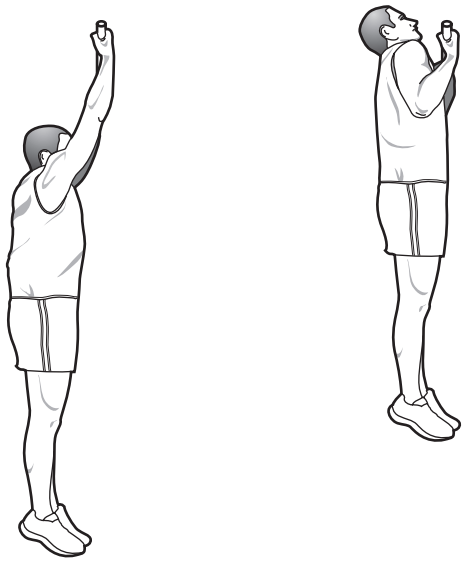
B They cannot pass from P to R.

C They cannot pass from Q to P.

D They cannot pass from R to Q.

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24 The diagram shows a person doing 'pull ups' on a horizontal bar.



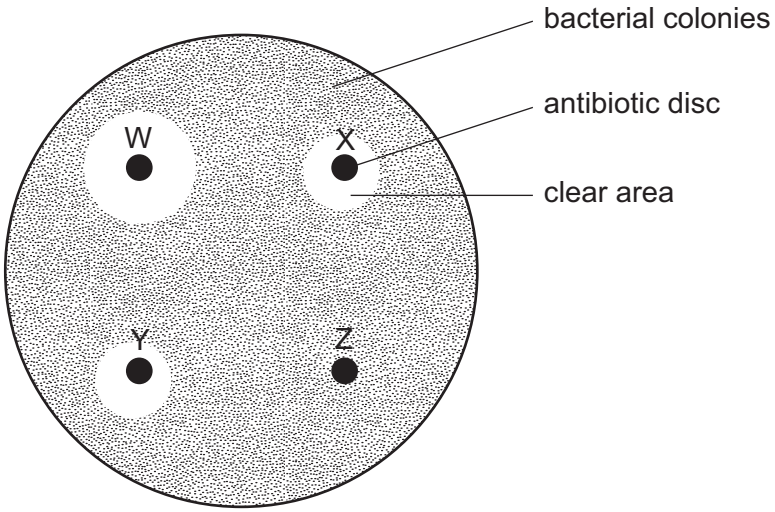
X Y

In moving from the lower position X to the upper position Y, which muscles and joint movements occur?

	biceps	triceps	ball and socket joint
A	contracts	relaxes	rotates
B	contracts	relaxes	extends
C	relaxes	contracts	rotates
D	relaxes	contracts	flexes

25 Bacteria were grown on an agar plate, until the plate was covered with visible yellow bacterial colonies.

Four discs containing equal amounts of different antibiotics were then placed on the agar plate. After two days, clear areas had formed around some of the discs, as shown in the diagram.



Which conclusion about this experiment is correct?

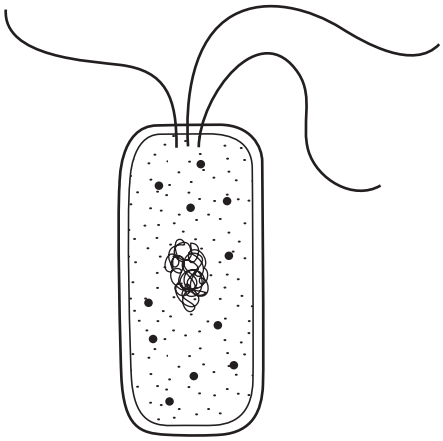
A Antibiotic W is more effective against these bacteria than antibiotic X.

B Antibiotic Y is more effective against these bacteria than antibiotic W.

C Disc W has a higher concentration of antibiotic than disc Y.

D Disc Z contains no antibiotic.

26 The diagram shows the structure of a bacterium.



In what way does this differ from a cell of a fungus?

A The bacterium has a cell membrane.

B The bacterium has a cell wall.

C The bacterium has cytoplasm.

D The bacterium has no true nucleus.

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27 During the production of yoghurt and cheese, the pH of the mixture changes.

What causes this change in pH?

A breakdown of lactose sugar

B coagulation of milk proteins

C production of ethanol

D uptake of oxygen

28 What would be an **undesirable** feature in an insecticide?

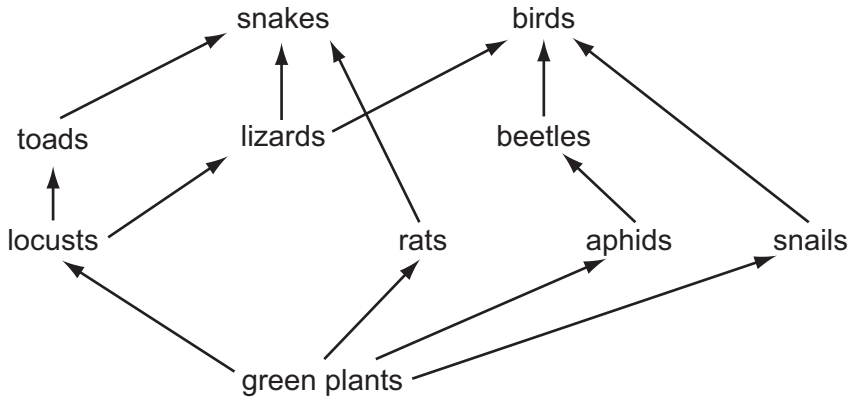
A It becomes more concentrated at each stage in the food web.

B It breaks down within a few months.

C It destroys one particular insect only.

D It destroys the immature forms of the insect.

29 The diagram shows a food web in woodland.



In this food web, the beetles are

A carnivores.

B decomposers.

C herbivores.

D producers.

30 Which bacteria convert urea to ammonia?

A decay bacteria

B denitrifying bacteria

C nitrifying bacteria

D nitrogen-fixing bacteria

31 Which control measure would **not** help to prevent the spread of malaria?

A boiling drinking water

B covering windows with netting

C draining swamps

D spraying insecticides onto stagnant water

32 Why is it important to control the amount of nitrate fertiliser used on farm land?

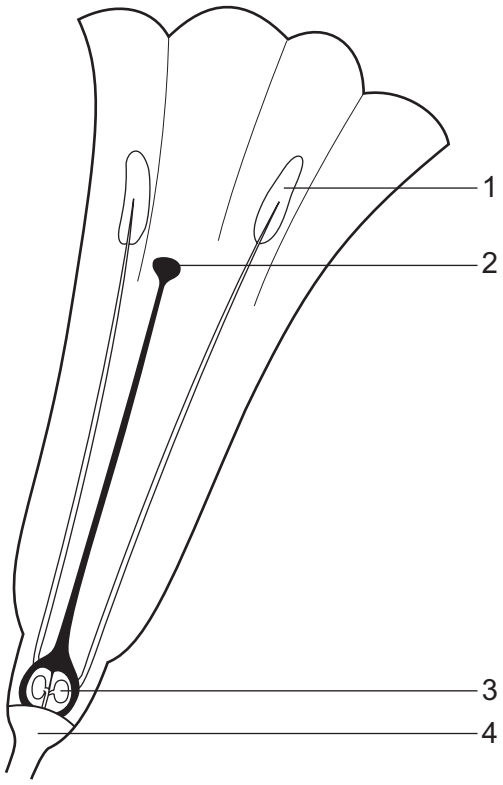
A Nitrate causes acid rain which kills trees and fish.

B Nitrate decreases the fertility of the soil.

C Nitrate may lead to excessive growth of water plants.

D Nitrate poisons many kinds of crop plants.

33 The diagram shows a section through a flower.



In which structures are haploid nuclei formed by reduction division?

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

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34 A germinating seed is soaked in blue dye, which becomes colourless in tissues that are actively respiring.

What will be the appearance of the cotyledons, plumule and radicle?

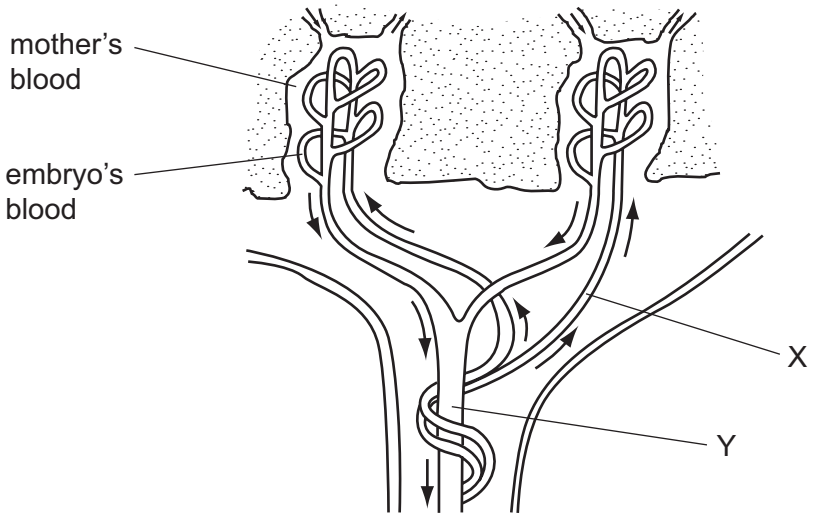
	cotyledons	plumule	radicle
A	blue	blue	blue
B	blue	blue	colourless
C	colourless	blue	colourless
D	colourless	colourless	colourless

35 After sexual intercourse, sperm can survive for 3 days in the uterus and oviducts. Ovulation can occur any time from day 13 to day 15 and an egg cell can live for 2 days after ovulation.

How long is the longest possible fertile phase of the menstrual cycle?

A 2 days **B** 3 days **C** 5 days **D** 7 days

36 The diagram shows how the blood of a human embryo flows close to the mother's blood in the placenta.



Which substances are present at X in higher concentrations than at Y?

A carbon dioxide and glucose

B carbon dioxide and urea

C glucose and oxygen

D glucose and urea

37 Which statement about human blood groups is correct?

A A person with the blood group A cannot have an I^O allele.

B A person with the blood group B may have either the genotype I^BI^B or I^BI^O.

C In a person with blood group AB, the I^B allele is recessive to the allele I^A.

D The alleles I^O and I^B are co-dominant and have equal effect on a phenotype.

38 Bacteria can be genetically modified to produce human insulin.

What is a possible danger of this procedure?

A Bacterial insulin is less effective in treating diabetes than animal insulin.

B The genetically modified bacteria may become insulin resistant.

C The genetically modified bacteria may produce too much insulin.

D The presence of a new gene in the bacteria may alter the way that existing genes work.

39 Which statement about chromosomes is correct?

A Chromosomes are long DNA molecules called genes which are divided into sections.

B Chromosomes include a long molecule of DNA divided into sections called genes.

C Chromosomes include genes which are divided into sections called DNA molecules.

D Genes include long DNA molecules called chromosomes.

40 In maize, one allele of a particular gene allows chlorophyll production while the other allele prevents this, giving plants with cream coloured leaves.

Half the seeds from a cross between two green-leaved plants were sown in trays kept in the dark. The other half were sown in similar conditions except that they received light.

The table gives the results obtained.

numbers of seedlings			
kept in the dark		kept in the light	
green leaves	cream leaves	green leaves	cream leaves
?	405	320	110

What was the number of green-leaved plants formed from seeds germinating in the dark?

A 0 **B** 110 **C** 320 **D** 405

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