UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2012**

1 hour

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

5493304370

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.

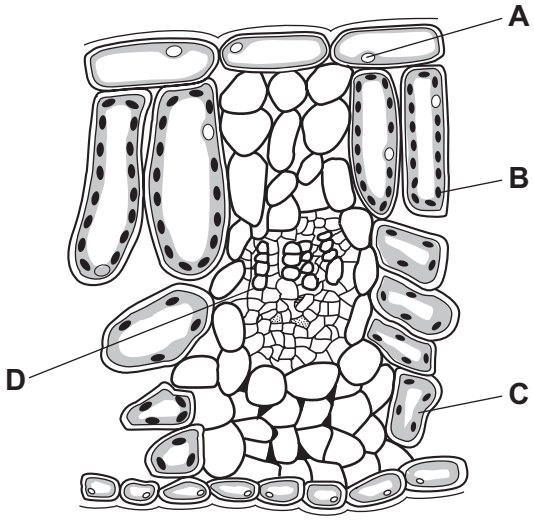
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.

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

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1 The diagram shows cells from a plant leaf.

Which structure contains a high concentration of magnesium?

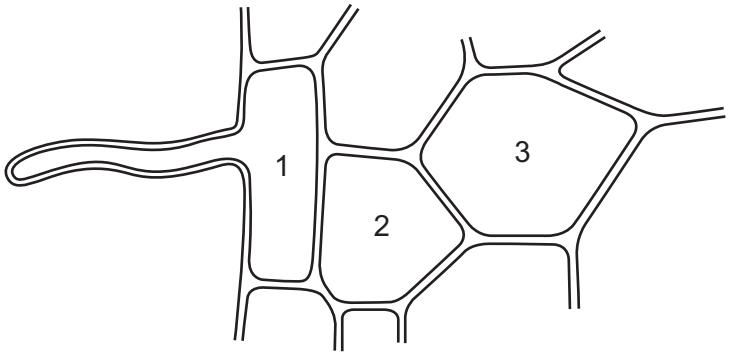


2 Which processes are responsible for the uptake of ions from the soil by a plant and the uptake of glucose into the villi of a human?

	uptake of ions into root hairs	uptake of glucose into the villi
A	active transport	osmosis
B	active transport	active transport
C	diffusion	osmosis
D	osmosis	active transport

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3 The diagram shows some cells in the root of a plant that is absorbing water from the soil.



How does the water potential of the cell marked 2 differ from the water potentials of the cells marked 1 and 3?

A higher than cell 1 and cell 3

B higher than cell 1 and lower than cell 3

C lower than cell 1 and higher than cell 3

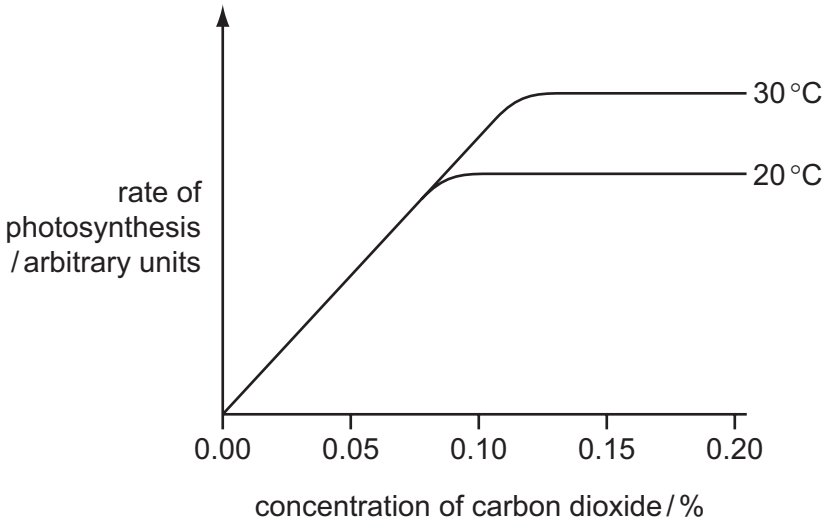
D lower than cell 1 and lower than cell 3

4 According to the lock and key hypothesis, which is the lock and which is the key for the enzyme lipase?

	key	lock
A	fatty acids	lipids
B	lipase	lipids
C	lipase	fatty acids
D	lipids	lipase

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5 The graph shows the rate of photosynthesis in a plant in full sunlight at two different temperatures and different concentrations of carbon dioxide.



At normal atmospheric carbon dioxide concentrations, what limits the rate of photosynthesis?

A carbon dioxide concentration

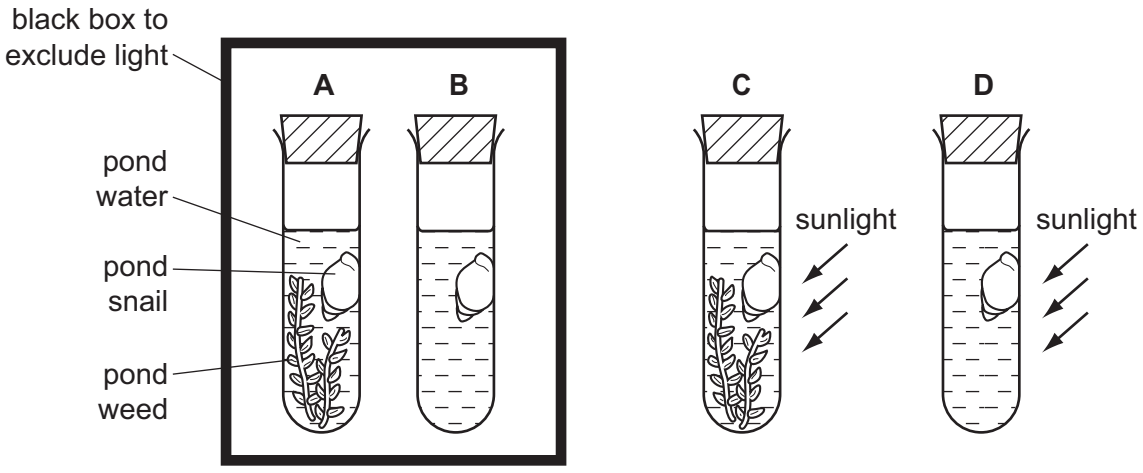
B light intensity

C temperature

D water availability

6 Four test-tubes are set up as shown.

In which test-tube will the concentration of oxygen decrease most rapidly?



7 The elements, listed, are found in all living organisms.

Which one is **not** obtained by plants from the soil?

A carbon

B iron

C magnesium

D nitrogen

8 A person tries eating a diet consisting only of lettuce leaves and water.

Which condition might develop?

A constipation

B heart disease

C rickets

D scurvy

9 The table shows changes in the concentrations of blood components as the blood flows through an organ.

blood component	change in concentration
carbon dioxide	increased
glucose	increased
oxygen	reduced
urea	increased

Which organ has the blood passed through?

A brain

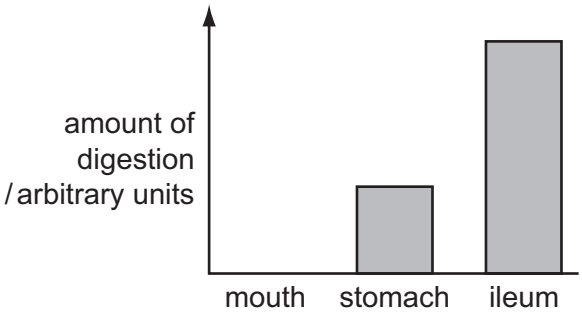
B kidney

C liver

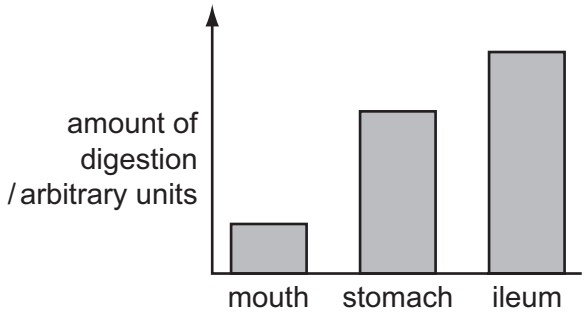
D stomach

10 Which bar chart represents the amount of **starch** digested in the mouth, stomach and ileum of a human?

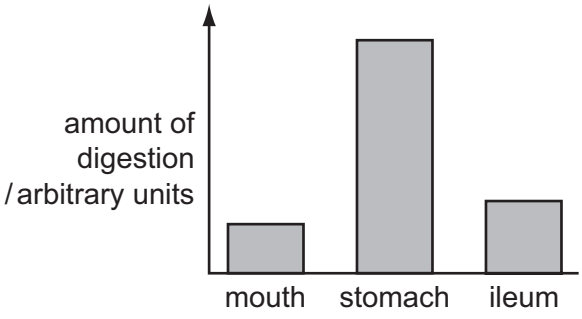
A



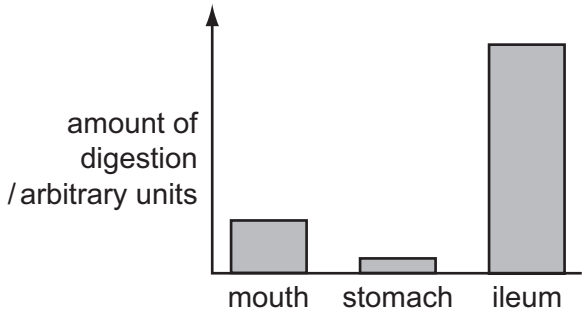
B



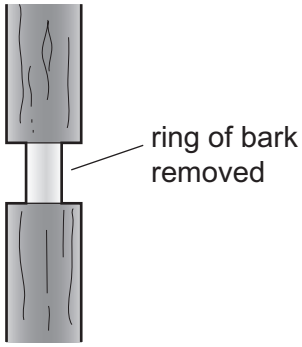
C



D



11 The diagram shows a tree trunk, with a ring of bark, which includes the phloem, removed.



The tree will eventually die because this action cuts off the supply of

A mineral salts to the leaves.

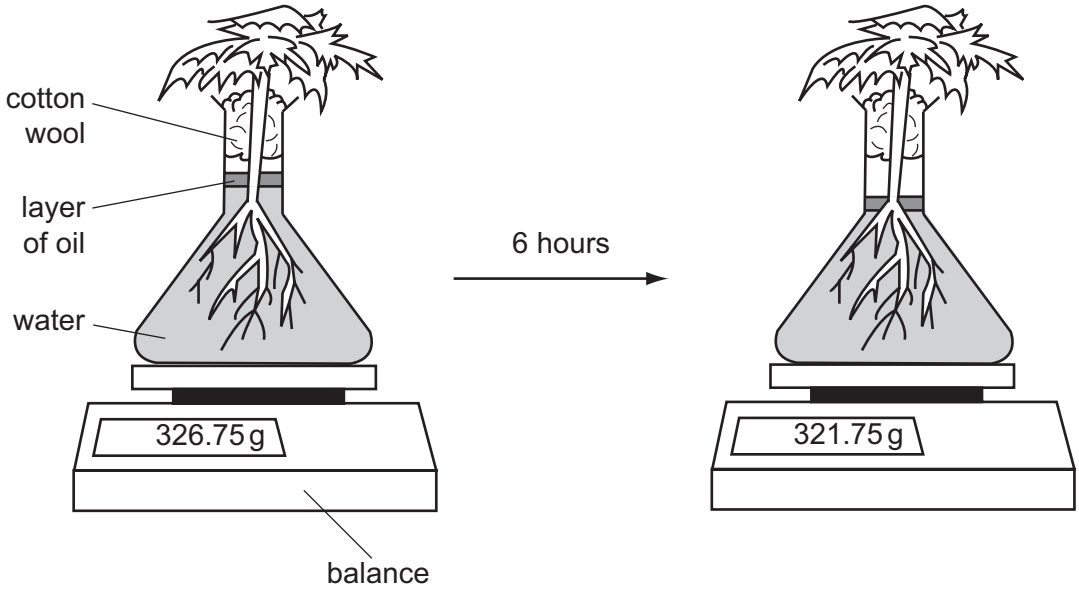
B organic nutrients to the roots.

C oxygen to the roots.

D water to the leaves.

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

A active transport

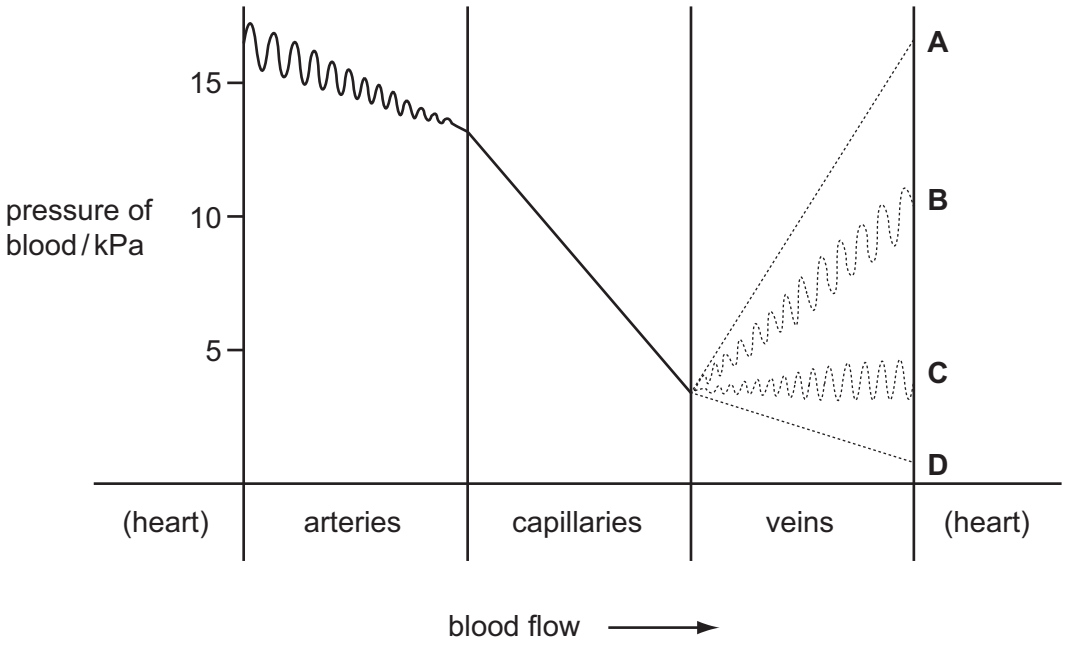
B blood pressure

C capillarity

D osmosis

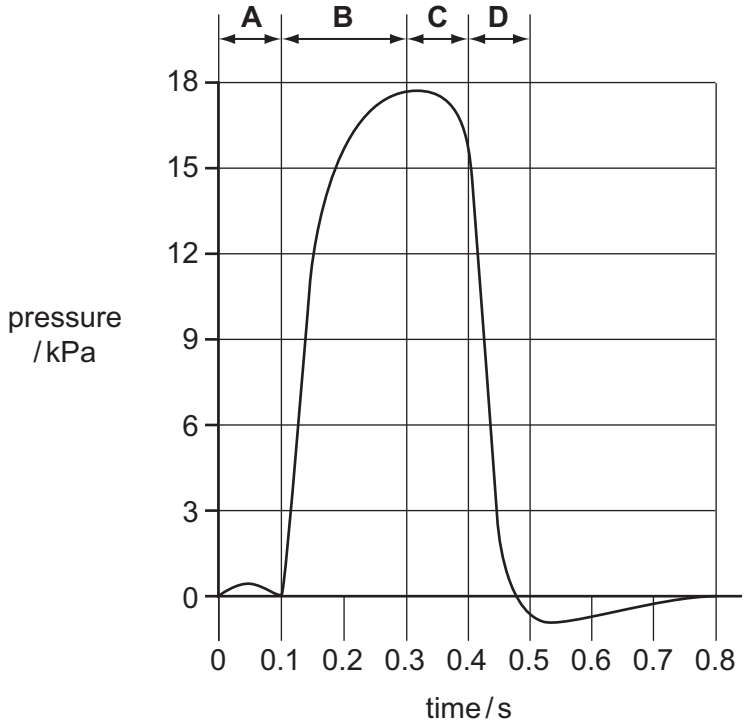
14 The diagram shows the blood pressure of a person at rest as the blood leaves the heart and passes through arteries and then capillaries.

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



15 The graph shows changes in the blood pressure in the left ventricle of the heart.

During which period is the left atrium contracting?



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16 The table shows the percentage composition of four samples of air.

Which sample has been breathed out by a person?

	oxygen	carbon dioxide	water vapour
A	16	0.3	saturated
B	16	4	saturated
C	21	0.03	trace
D	21	3	trace

17 Which process does **not** result in an overall loss of energy from the organism?

A photosynthesis in a green plant

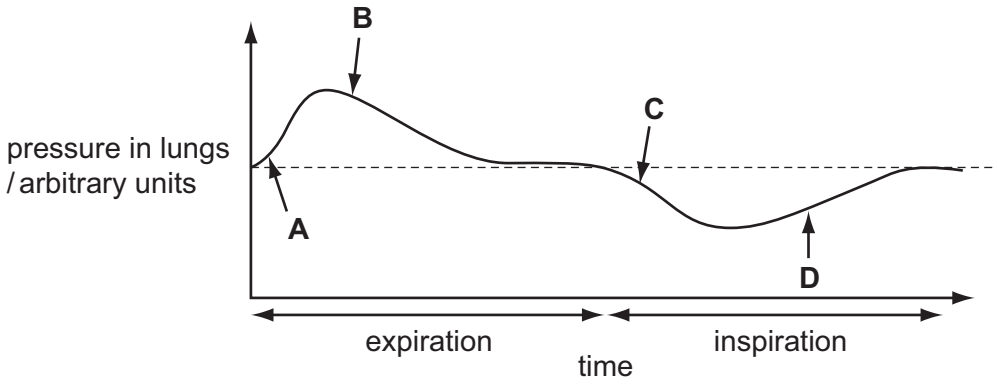
B respiration in an animal

C temperature control in humans

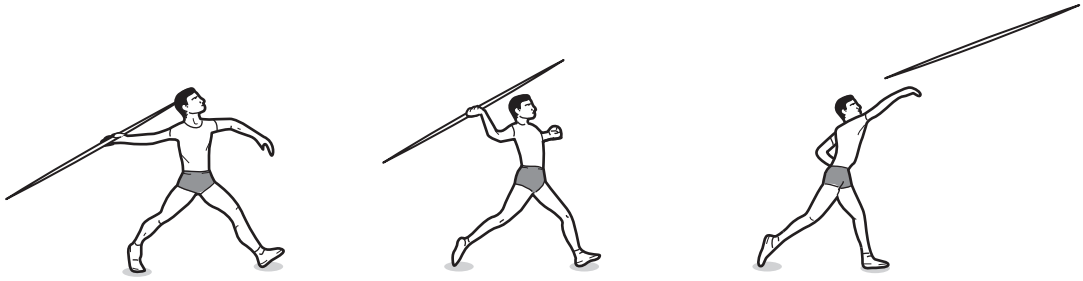
D the germination of seeds

18 The diagram illustrates changes in air pressure taking place inside the lungs during a complete cycle of breathing.

Which position on the graph corresponds to the point at which the ribs are beginning to be lowered?



19 The diagrams show an athlete throwing a javelin.

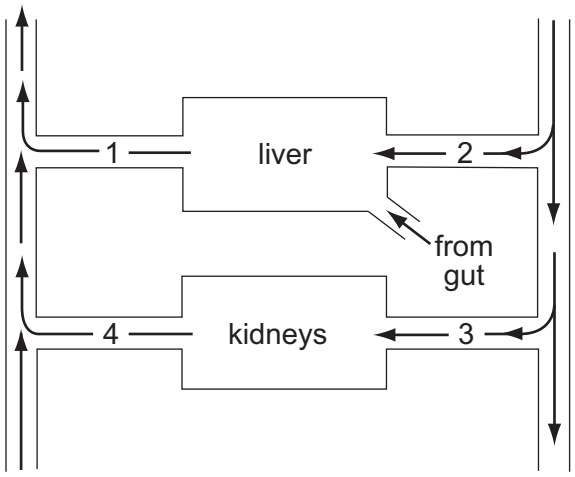


1 2 3

Which row describes the change in position of the right arm, and the action of the muscles involved, between stages 2 and 3?

	position of arm	biceps	triceps
A	flexes	contract	relax
B	flexes	relax	contract
C	straightens	contract	relax
D	straightens	relax	contract

20 The diagram represents the blood supply to the liver and to the kidneys.



Which vessels contain blood with the highest and lowest concentrations of urea?

	highest	lowest
A	1	2
B	1	4
C	3	2
D	3	4

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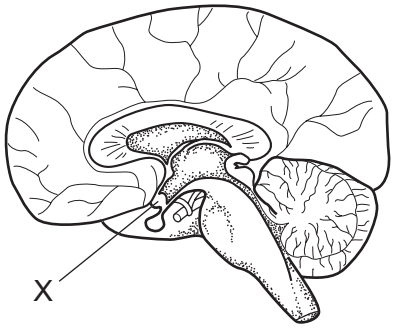
21 Which changes will occur when a person walks from a very cold room into a hot room?

	sweating	skin blood vessels
A	decreases	constrict
B	decreases	dilate
C	increases	dilate
D	increases	constrict

22 What happens in the eye when a person walks from a dark room into sunlight?

	circular muscles of the iris	radial muscles of the iris	pupil size
A	relax	contract	decreases
B	relax	contract	increases
C	contract	relax	decreases
D	contract	relax	increases

23 The diagram shows a section of the brain.



What could be a result of damage to the part labelled X?

A difficulty in breathing

B inability to control body temperature

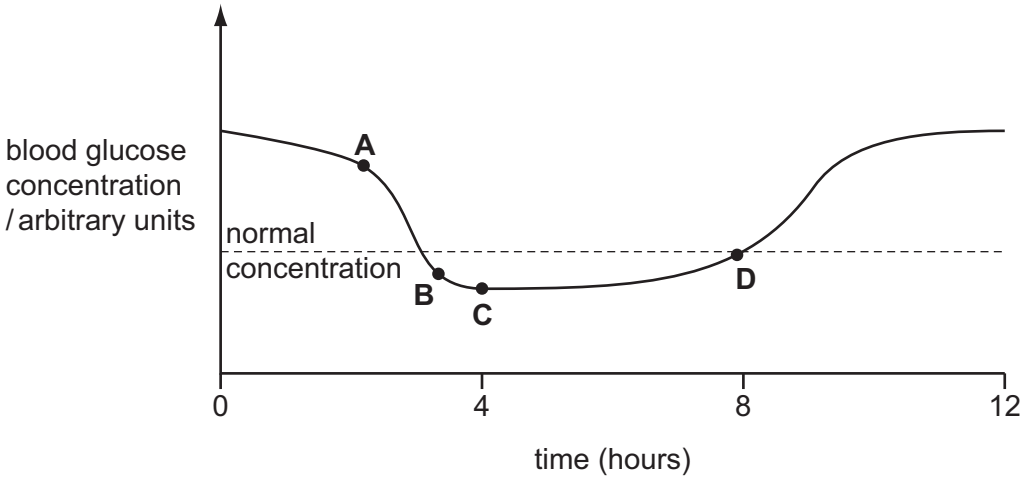
C may cause rickets

D raised insulin levels

24 A person with diabetes mellitus is receiving treatment with insulin injections.

The graph shows how this person's blood glucose concentration changed during part of one day.

At what point was an insulin injection given?



25 Which component of tobacco smoke may cause lung cancer?

A carbon dioxide

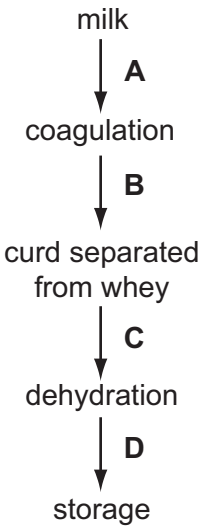
B carbon monoxide

C nicotine

D tar

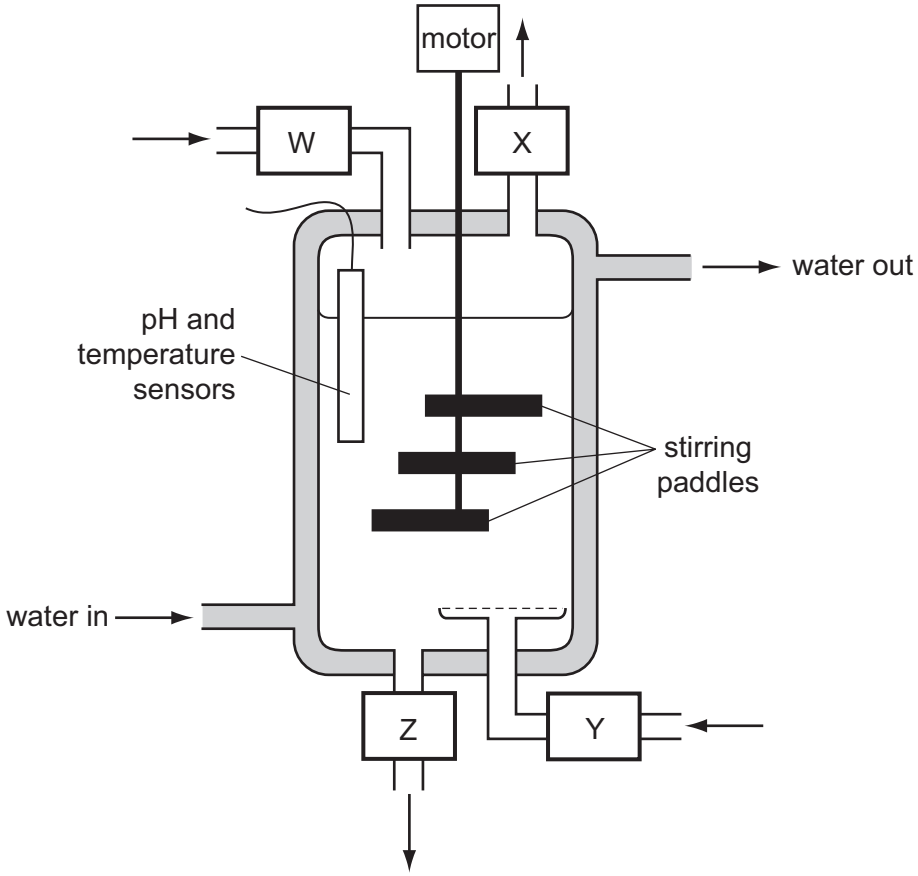
26 The diagram shows some of the stages in cheese production.

At which stage in the production of cheese are the bacteria added?



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27 The diagram shows a fermenter used for the production of antibiotics.



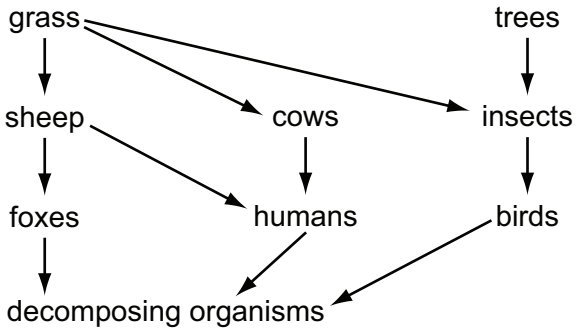
Where do air and nutrients enter, and where do antibiotics and waste leave?

	air in	antibiotics out	nutrients in	wastes out
A	W	X	Y	Z
B	Y	Z	W	X
C	Y	X	W	Z
D	W	Z	Y	X

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[Turn over

28 The diagram shows part of a food web.



What is the original source of energy for this food web?

A decomposer organisms

B oxygen

C producer organisms

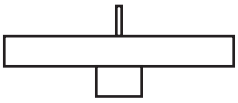
D sunlight

29 The table shows the mean dry biomass for the organisms in a food chain.

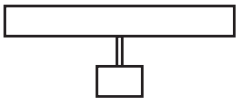
type of organism	mean dry biomass / g per m^2
producer	540
herbivore	26
carnivore	2

Which pyramid of biomass is correct for this food chain?

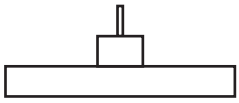
A



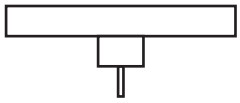
B



C

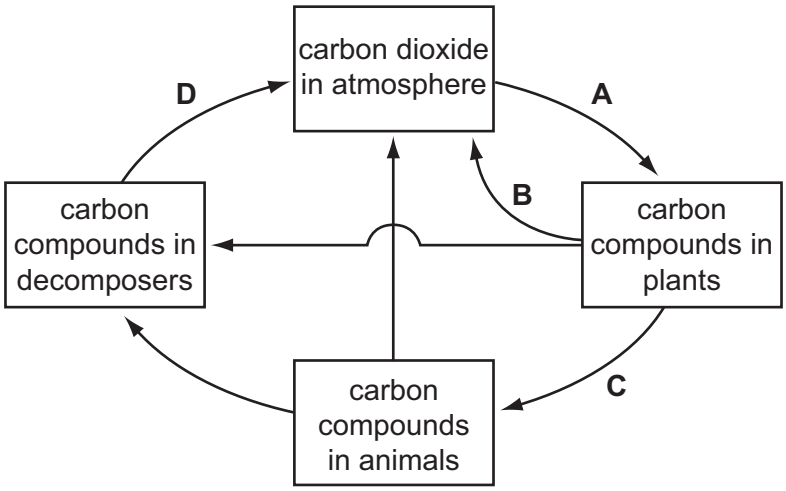


D

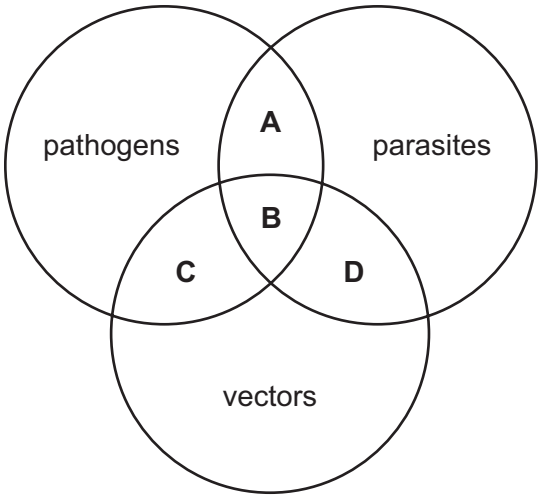


30 The diagram shows part of the carbon cycle.

Which process causes the largest amount of carbon to be converted from one form to another?



31 Which area of the diagram best describes mosquitoes?



32 The presence of high concentrations of nitrogen-containing fertilisers in a pond can lead to the death of fish.

What is the sequence of events leading to the death of the fish?

A increase in algae → algae die → increase in bacteria → drop in oxygen

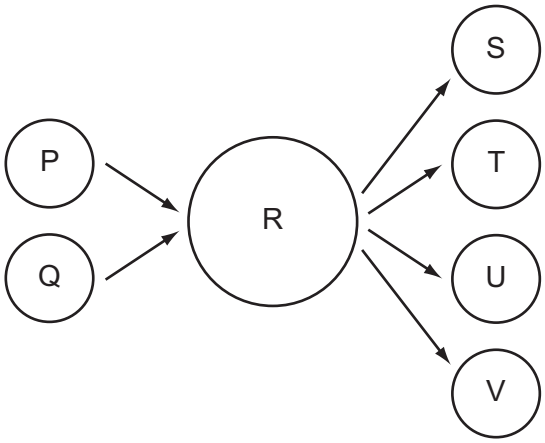
B increase in algae → drop in oxygen → increase in bacteria → algae die

C increase in bacteria → drop in oxygen → increase in algae → algae die

D increase in bacteria → increase in algae → algae die → drop in oxygen

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33 The diagram represents gametes P and Q fusing to give cell R. Cell R then produces gametes S, T, U and V.



Which statement about the numbers of chromosomes in the cells and gametes is correct?

A The numbers of chromosomes in P and Q are different.

B The numbers of chromosomes in P and S are the same.

C The number of chromosomes in S is one quarter of the number of chromosomes in R.

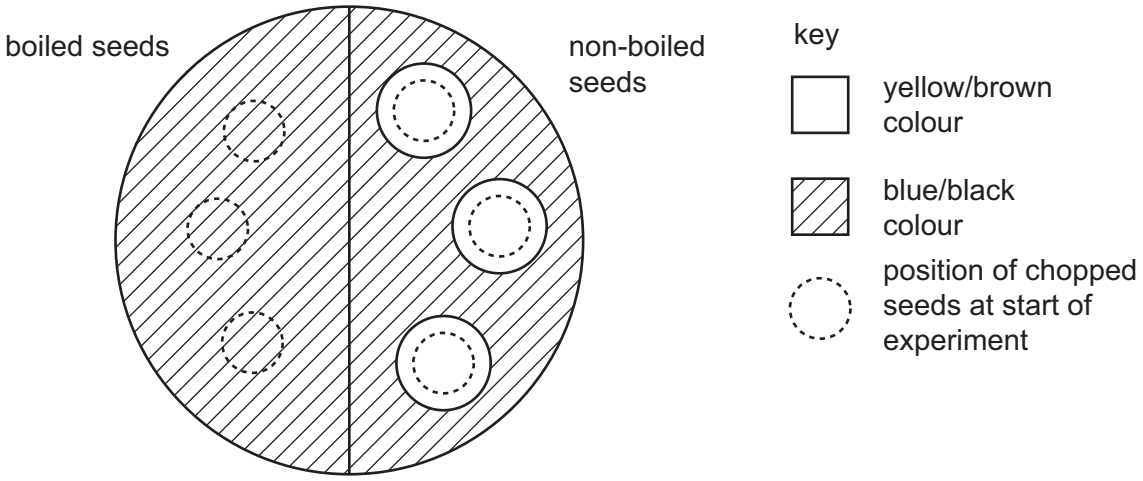
D The number of chromosomes in T is half the number of chromosomes in Q.

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34 Six bean seeds were soaked in cold water. Three of them were boiled and cooled. The boiled and the non-boiled seeds were chopped up and then placed on the surface of agar jelly containing starch.

After two days, all the seeds were removed and the jelly was tested with iodine solution.

The diagram shows the result of the experiment.



What is the explanation for the results with the non-boiled bean seeds?

A They absorb iodine.

B They absorb starch.

C They contain acid.

D They contain amylase.

35 Which row describes the exchange of substances at the placenta?

	passing from mother to fetus	passing from fetus to mother
A	carbon dioxide, glucose and alcohol	oxygen and urea
B	carbon dioxide, nicotine and glucose	oxygen and urea
C	oxygen and urea	carbon dioxide and glucose
D	oxygen, glucose and antibodies	carbon dioxide and urea

36 How do condoms reduce the risk of HIV infection?

A They prevent sperm from entering the vagina

B They prevent virus particles crossing the placenta

C They prevent the formation of seminal fluid

D They prevent seminal fluid from coming into contact with the vagina wall

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37 Which method could **not** be used to produce human insulin from genetically engineered bacteria?

A Bacteria are ground up and used as a source of insulin.

B Insulin is extracted from gases given off from the fermenter in which bacteria are grown.

C Insulin is extracted from homogenised bacteria.

D Insulin is extracted from the nutrient medium from a fermenter in which bacteria have been grown.

38 One gene has two codominant alleles, A^E and A^F, and one recessive allele, A^G.

How many different genotypes and phenotypes are possible?

	genotypes	phenotypes
A	3	3
B	4	6
C	6	4
D	6	6

39 Some normal fruit flies are subjected to radiation in a laboratory. As a result, they produce offspring with unusual characteristics, such as white eyes.

What causes this?

A continuous variation

B discontinuous variation

C dominance

D mutation

40 What would be the genotype(s) of the offspring from a cross between two organisms with the genotype Tt?

A all Tt

B half TT, half tt

C quarter TT, half Tt, quarter tt

D three quarters TT, quarter Tt

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