Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **October/November 2014**

1 hour

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

3305766201

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.

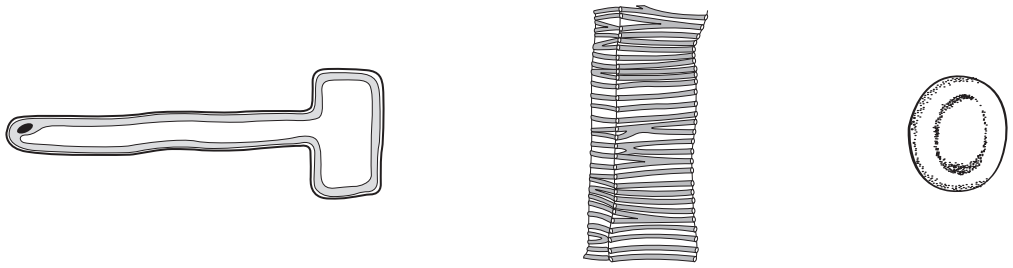
Read the instructions on the Answer Sheet very carefully.

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 **18** printed pages and **2** blank pages.

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1 The diagram shows three cellular structures.



1 2 3

Which statements about these cells are correct?

	1	2	3
A	adapted to carry oxygen	lacks a nucleus	adapted to carry water
B	adapted to carry water	lacks a nucleus	is in contact with the soil
C	is in contact with the soil	adapted to carry water	adapted to carry oxygen
D	is in contact with the soil	is in contact with the soil	lacks a nucleus

2 Active transport, diffusion and osmosis are described below.

1 the movement of ions or molecules across the cell membrane against a concentration gradient using energy

2 the movement of ions or molecules from a region of high concentration to a region of low concentration down a concentration gradient

3 the movement of water molecules from a region of their higher concentration to a region of their lower concentration through a partially permeable membrane

What links the descriptions with their names?

	diffusion	osmosis	active transport
A	1	3	2
B	2	1	3
C	2	3	1
D	3	2	1

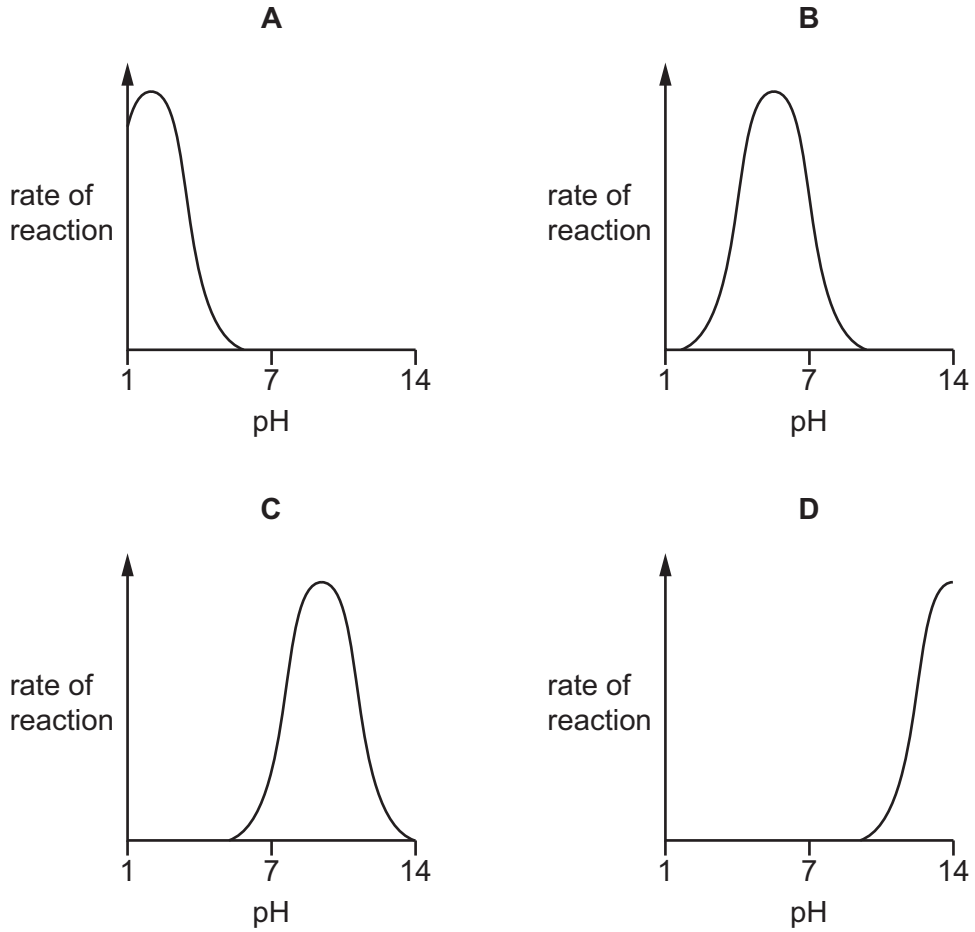
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3 A cube of fresh potato is weighed. It is then placed in a test-tube containing a dilute solution of sucrose. After an hour, its mass has increased.

Which process has occurred and what has happened to the concentration of the sucrose in the solution in the test-tube?

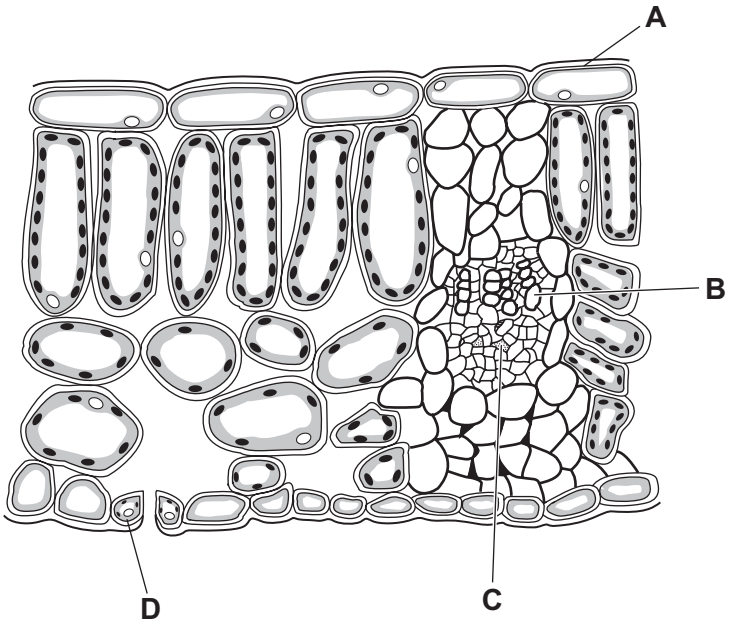
	process	sucrose concentration
A	active transport	decreased
B	active transport	increased
C	osmosis	decreased
D	osmosis	increased

4 Which graph best represents the effect of pH on the action of gastric protease?



5 The diagram shows a section through part of a dicotyledonous leaf, as seen under the microscope.

Where is the xylem?

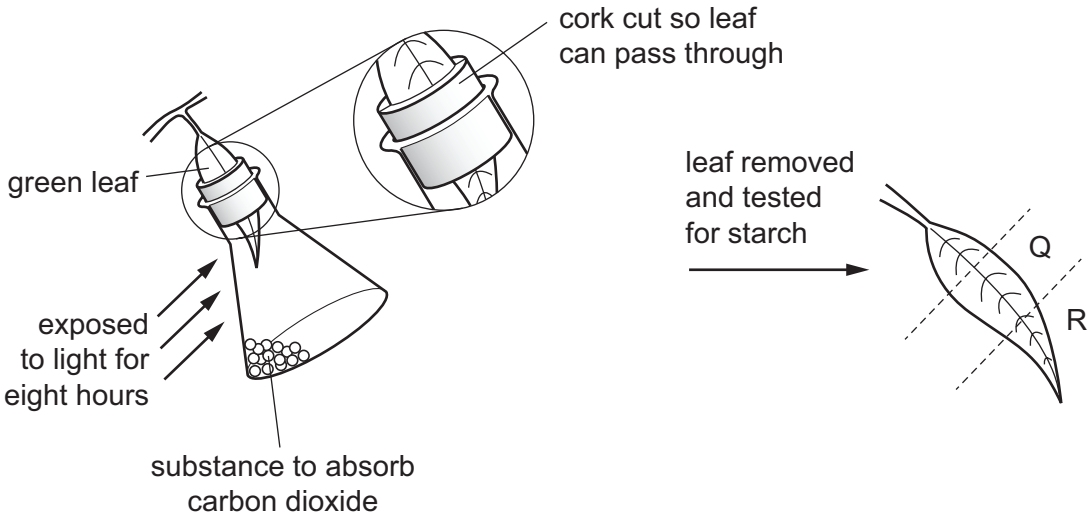


6 When a plant is photosynthesising, which gases enter and leave the stomata?

	carbon dioxide	oxygen	water vapour
A	enters	leaves	enters
B	enters	leaves	leaves
C	leaves	enters	enters
D	leaves	enters	leaves

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7 A plant is kept in the dark for two days. One of its leaves is used in an experiment to investigate photosynthesis as shown in the diagram.



What are the colours of Q and R, when the leaf is tested for starch using iodine solution?

	Q	R
A	blue / black	brown
B	brown	brown
C	blue / black	blue / black
D	brown	blue / black

8 Which molecule is absorbed in the ileum?

A glycerol

B glycogen

C protein

D starch

9 Which table describes the elements present in carbohydrate, protein and fat?

		elements			
		C	N	O	H
A	carbohydrate	✓	✓	✓	✓
	protein	✓	✗	✓	✓
	fat	✓	✓	✗	✓

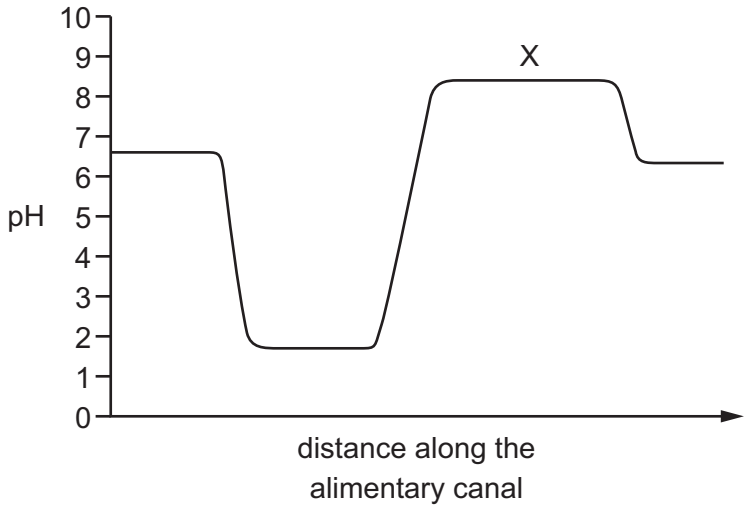
		elements			
		C	N	O	H
B	carbohydrate	✓	✗	✓	✓
	protein	✓	✓	✓	✓
	fat	✓	✗	✓	✓

		elements			
		C	N	O	H
C	carbohydrate	✓	✗	✗	✓
	protein	✓	✓	✓	✓
	fat	✓	✓	✗	✓

		elements			
		C	N	O	H
D	carbohydrate	✓	✗	✓	✓
	protein	✓	✓	✗	✓
	fat	✓	✗	✗	✓

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10 The graph shows how the pH changes along the alimentary canal.



What is the region labelled X?

A large intestine

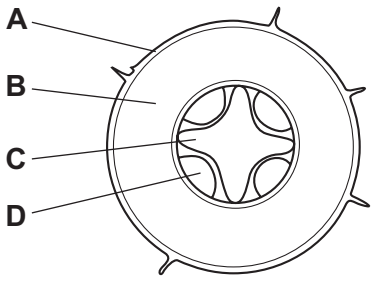
B oesophagus

C small intestine

D stomach

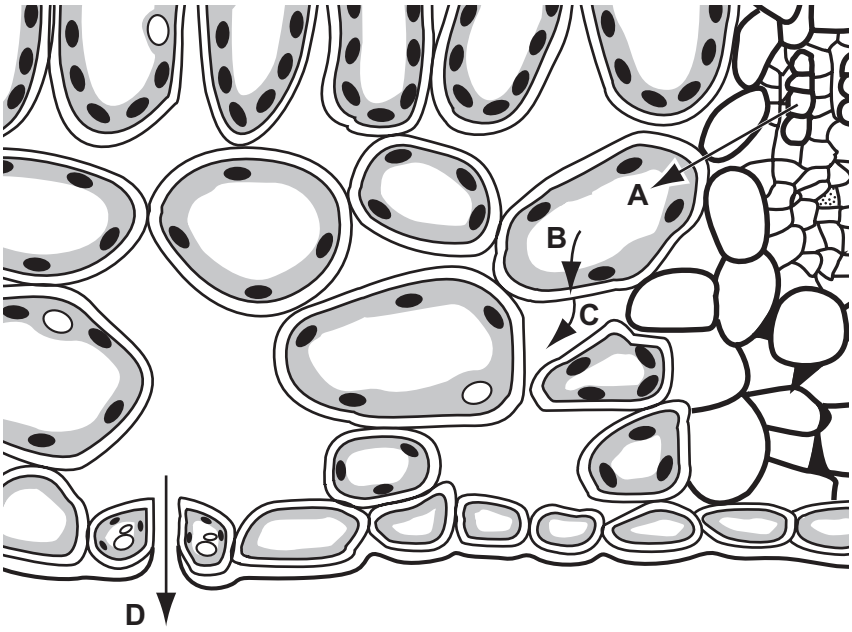
11 The diagram shows a section through a root.

Which tissue transports amino acids?



12 The diagram shows the movement of water molecules in a leaf from the xylem to the atmosphere.

At which stage does evaporation occur?

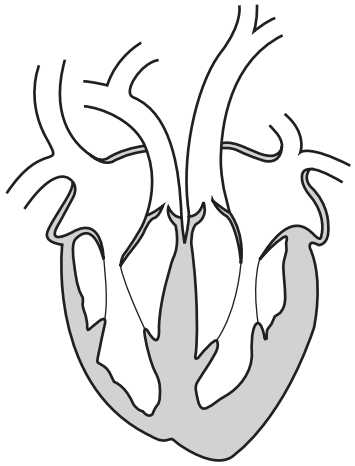


13 Which organs receive blood from both an artery **and** a vein?

	kidney	liver	lung
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

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14 The diagram shows a section through the human heart.



Why is the wall of the right ventricle thicker than the wall of the right atrium?

A The chambers have different oxygen concentrations.

B The right atrium must pump blood all the way around the body.

C The right ventricle must exert a greater force than the right atrium.

D The right ventricle receives more blood than the right atrium.

15 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

16 When breathing out forcefully, which muscles are contracting?

	diaphragm	external intercostal muscles	internal intercostal muscles
A	✓	✗	✓
B	✓	✗	✗
C	✗	✓	✗
D	✗	✗	✓

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17 Scientists believe that absorption of mineral ions in plants requires energy from respiration.

Which observation best supports this idea?

A Carbohydrate is stored in the roots.

B Living roots give off carbon dioxide.

C The root hairs have a large surface area.

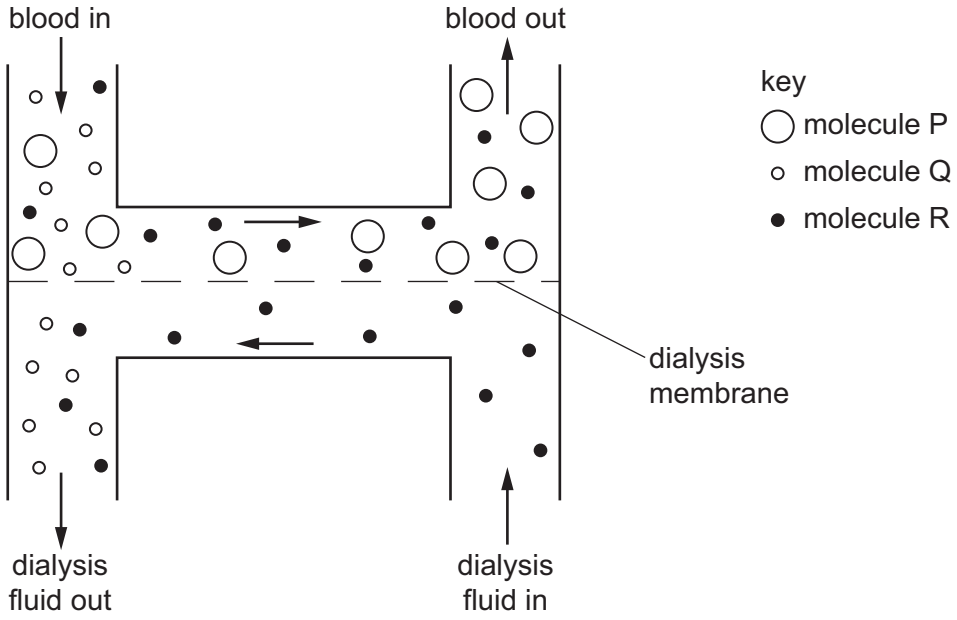
D Uptake of nitrate is reduced in lower oxygen concentrations.

18 At the end of a 100 m sprint, how will blood passing through the leg muscles be different from the blood at the start of the race?

	carbon dioxide concentration	lactic acid concentration	temperature
A	higher	higher	higher
B	higher	lower	lower
C	lower	higher	lower
D	lower	lower	higher

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19 The diagram shows what happens to molecules of glucose, protein and urea as blood passes through a kidney dialysis machine.



What are molecules P, Q and R?

	molecule P	molecule Q	molecule R
A	glucose	protein	urea
B	glucose	urea	protein
C	protein	glucose	urea
D	protein	urea	glucose

20 Which process is responsible for maintaining a person's body temperature when they are too cold?

A excretion

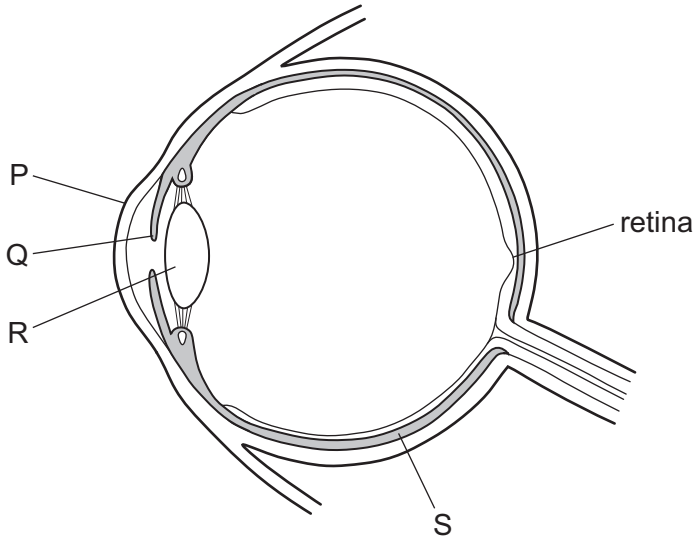
B homeostasis

C sweating

D vasodilation

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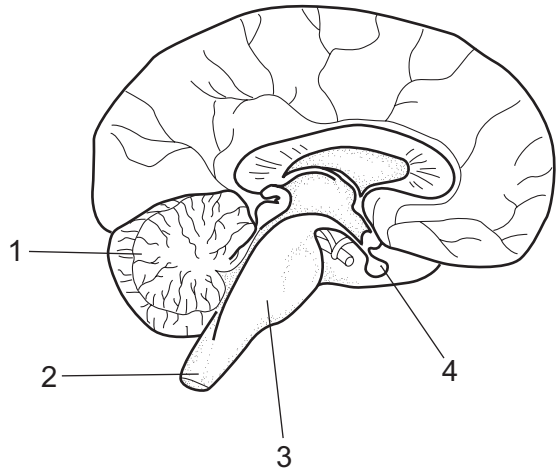
21 The diagram shows a section through the eye.



Which pair of structures focus light rays onto the retina?

A P and Q **B** P and R **C** Q and R **D** Q and S

22 The diagram represents a section through the brain and associated structures.



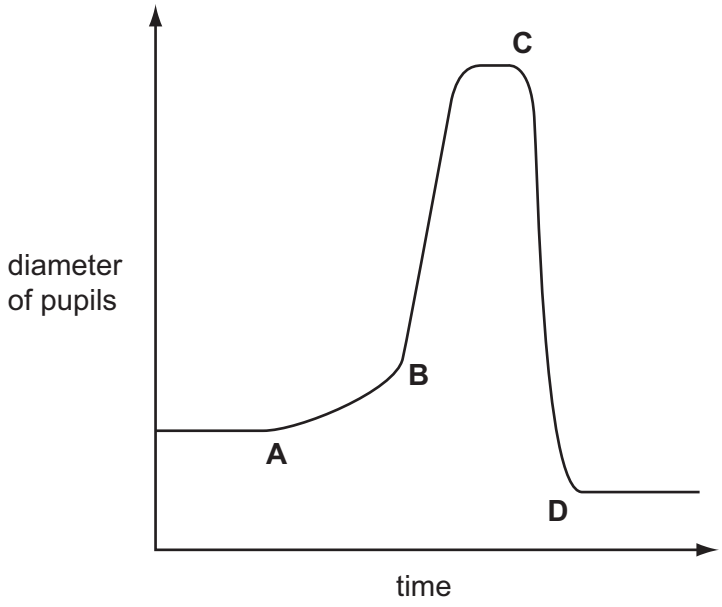
Which labelled region coordinates breathing movements and which secretes a hormone causing ovulation?

	coordinates breathing movements	secretes a hormone causing ovulation
A	1	2
B	1	4
C	3	2
D	3	4

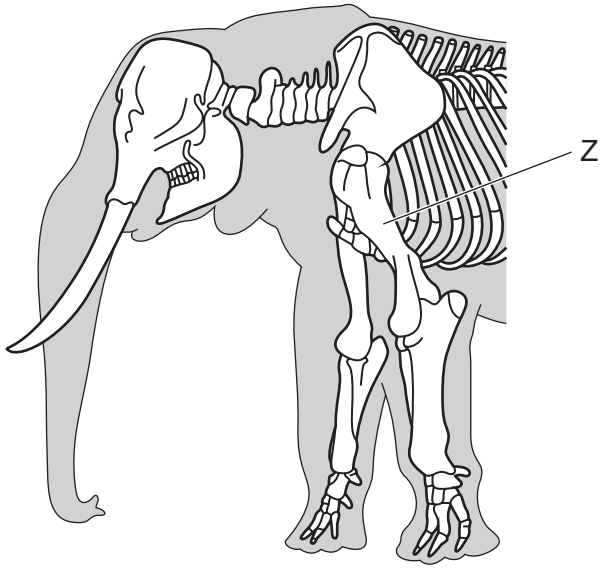
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23 The graph shows changes in the diameter of a person's pupils while outdoors on a sunny day.

At which time did the person take off a pair of sunglasses?



24 The diagram shows part of the skeleton of an elephant.



What is the bone labelled Z?

A humerus **B** radius **C** scapula **D** ulna

25 Which risk is greatly increased by the nicotine in cigarette smoke?

A bronchitis and emphysema

B cancer of the airways

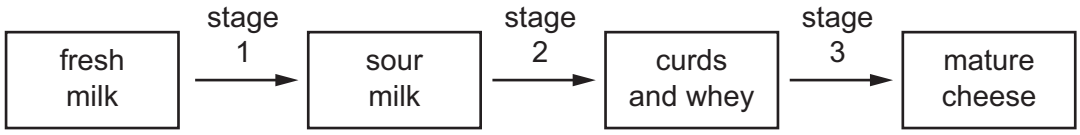
C high blood pressure

D reduced birth weight of babies

26 Which type of organism produces penicillin, and which type of infection can be treated using penicillin?

	type of organism	type of infection treated
A	bacterium	bacterial
B	bacterium	viral
C	fungus	bacterial
D	fungus	viral

27 The diagram shows three stages in the production of a blue cheese.



The three stages use micro-organisms and enzymes, as shown by P, Q, R and S.

P bacterial culture added

Q bacteria killed by pasteurisation

R rennin added

S fungal mould added

What is done at each of the stages?

	stage 1	stage 2	stage 3
A	P and then Q	R	S
B	P and then Q	S	R
C	Q and then P	R	S
D	Q and then P	S	R

28 Why does an ecosystem need to be exposed regularly to sunlight?

A Energy is converted to biomass.

B Energy is lost as heat.

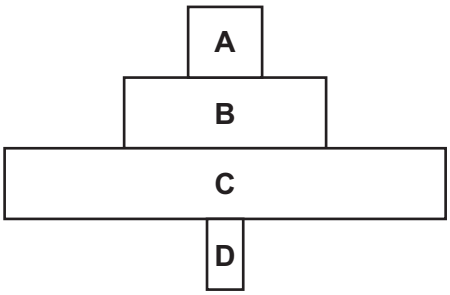
C Energy is lost to decomposers.

D Energy is reflected by plants.

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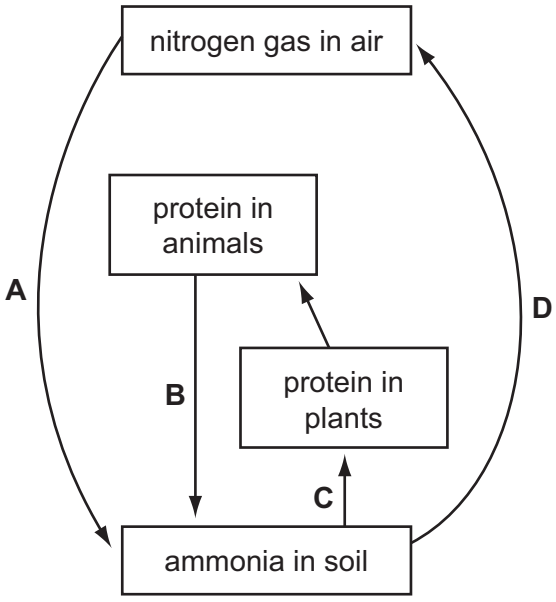
29 The diagram shows a pyramid of numbers in a woodland ecosystem.

At which trophic level are the individual organisms **largest in size**?



30 The diagram shows part of the nitrogen cycle.

Which arrow shows decomposition?



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 methods can be used to control malaria?

A 1, 2 and 3

B 1 and 2 only

C 1 only

D 2 and 3 only

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[Turn over

32 Which consequence of burning fossil fuel leads to acid rain?

A Burning carbon compounds produces carbon dioxide.

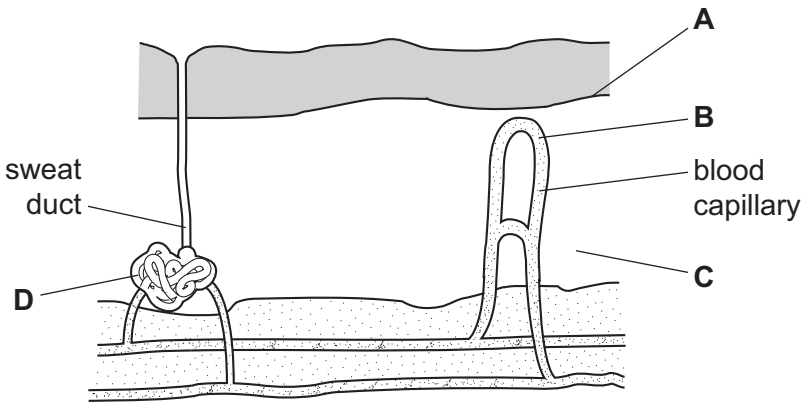
B Burning carbon compounds produces carbon monoxide.

C Burning sulfur compounds produces sulfur dioxide.

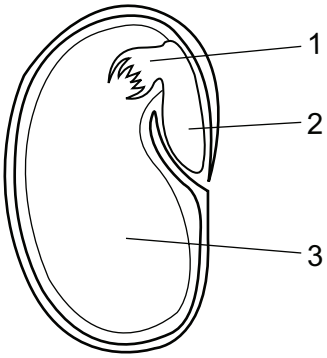
D Burning sulfur compounds produces water vapour.

33 The diagram represents a section through the human skin.

In which part is mitosis occurring most rapidly?



34 The diagram shows a section of a seed.



What are the numbered parts?

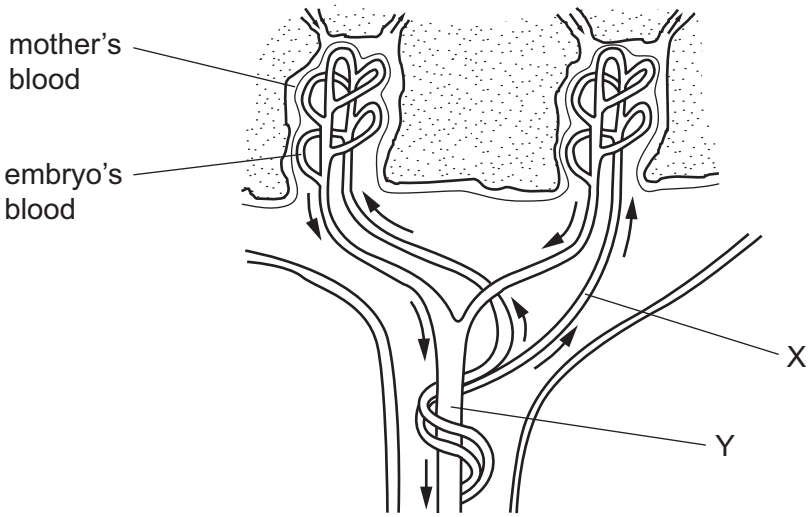
	1	2	3
A	cotyledon	plumule	radicle
B	plumule	cotyledon	radicle
C	plumule	radicle	cotyledon
D	radicle	plumule	cotyledon

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35 What are the functions of LH and FSH in the menstrual cycle?

	LH	FSH
A	causes ovulation	causes menstruation
B	causes ovulation	stimulates an egg to mature in an ovary
C	stimulates an egg to mature in an ovary	causes menstruation
D	stimulates an egg to mature in an ovary	causes ovulation

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 term describes reproduction between those members of a species that are best fitted to their environment?

A discontinuous variation

B gene mutation

C natural selection

D survival of the fittest

38 In the ABO blood grouping system, which genotype is homozygous dominant?

A $I^A\ I^O$ **B** $I^A\ I^B$ **C** $I^B\ I^B$ **D** $I^O\ I^O$

39 Bacteria can be genetically modified to produce human insulin.

What is a possible danger of this procedure?

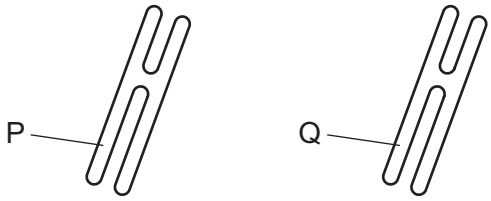
A Bacterial insulin is less effective in treating diabetes than animal insulin.

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.

40 The diagram shows a pair of chromosomes from the same cell.



A gene is found at the point labelled P.

In a heterozygous individual, what will be found at the equivalent position labelled Q?

A a different allele of a different gene

B a different allele of the same gene

C a different gene of the same allele

D the same gene of the same allele

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