UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **May/June 2013**

1 hour

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

0623043534

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.
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 **16** printed pages.

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1 Which structures are present in a root hair cell?

	nucleus	chloroplast
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key
✓ = present
✗ = absent

2 What is an example of active transport?

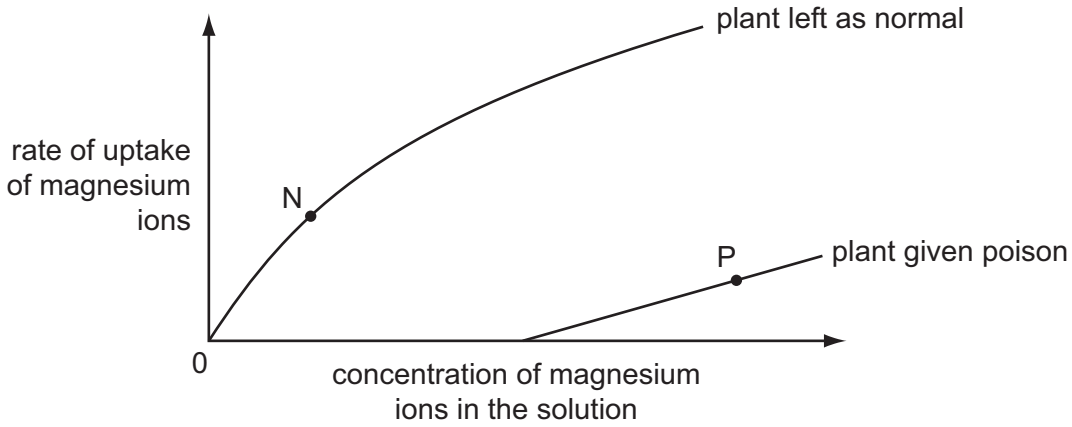
A movement of glucose molecules into the cells of the villi

B movement of glucose molecules down a concentration gradient

C movement of ions in blood plasma

D movement of water in the transpiration stream

3 An experiment measured the rate at which plants take up magnesium ions from solution. One plant was given a poison that stops respiration. Another plant was left as normal. The graph shows the results.

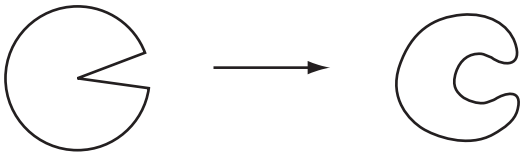


How are the magnesium ions being absorbed by the plants at points N and P?

	point N	point P
A	active transport	active transport
B	active transport	diffusion
C	diffusion	active transport
D	diffusion	diffusion

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4 The diagram represents how an enzyme molecule changes in shape.



What explains this change?

A It has been cooled to 5 °C.

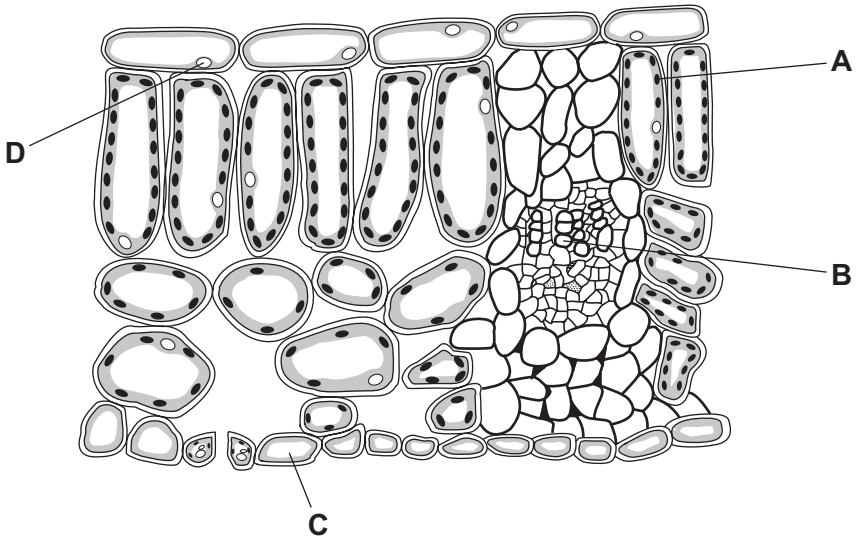
B It has been heated to 70 °C.

C It has been placed in a concentrated salt solution.

D It has been placed in a dilute salt solution.

5 The diagram represents a cross section of a leaf under the microscope.

Where is light energy converted into chemical energy?



6 What is the effect of a lack of nitrate ions on plant leaves?

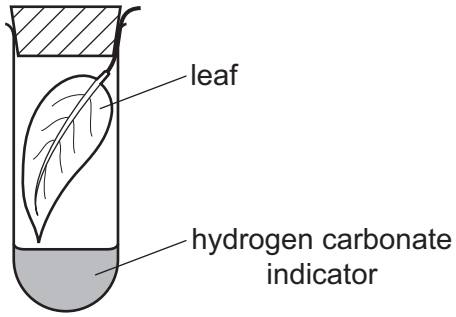
A all leaves are very dark green

B leaves lose their yellow colour

C the leaves wilt

D young leaves grow very slowly

7 A green leaf is picked at time 07.00 and immediately placed in a sealed test-tube containing hydrogen carbonate indicator solution. The tube is kept near a window for 24 hours. The table shows how the indicator changes in colour.



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 times 12.00 and 24.00?

	at 12.00	at 24.00
A	purple	yellow
B	red	purple
C	yellow	purple
D	yellow	red

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8 Which table states the tests for different food groups?

A

test	reagent	positive result
starch	iodine	blue-black
reducing sugars	Benedict's	orange
protein	biuret	purple
fats	ethanol	milky white

B

test	reagent	positive result
starch	biuret	blue-black
reducing sugars	Benedict's	orange
protein	iodine	purple
fats	ethanol	milky white

C

test	reagent	positive result
starch	iodine	blue-black
reducing sugars	Benedict's	purple
protein	biuret	milky white
fats	ethanol	orange

D

test	reagent	positive result
starch	biuret	blue-black
reducing sugars	Benedict's	purple
protein	iodine	milky white
fats	ethanol	orange

9 What are the basic units from which molecules of glycogen and of protein are synthesised?

	basic units of glycogen	basic units of protein
A	glucose	amino acids
B	glucose	fatty acids
C	glycerol	amino acids
D	glycerol	fatty acids

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[Turn over

10 The table shows where different components of food are digested in the alimentary canal.

Which option states where **protein** is digested?

	mouth (buccal) cavity	stomach	duodenum	ileum
A	✓	✗	✓	✗
B	✗	✓	✓	✓
C	✗	✗	✓	✓
D	✗	✓	✗	✓

key

✓ = substance is digested

✗ = substance is not digested

11 What contributes to the wilting of plant leaves?

A the mesophyll cells lose turgor

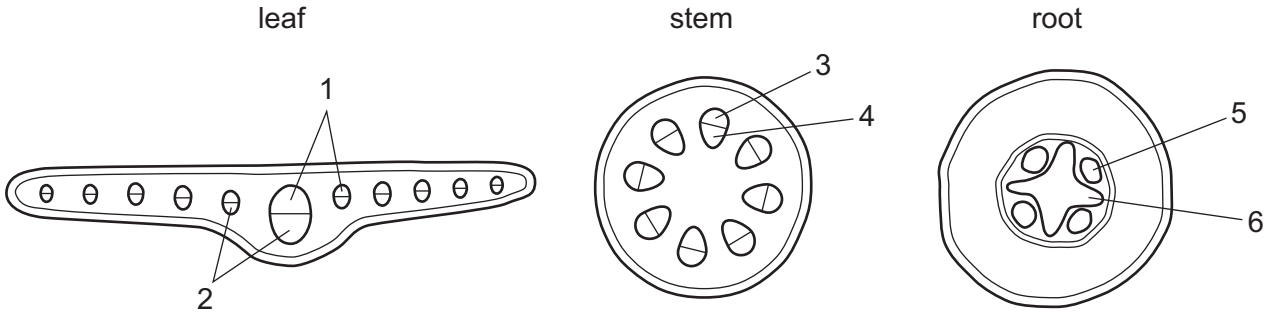
B the phloem stops translocating

C the stomata close

D the xylem fills with air

12 In an experiment to investigate the transport of water, the roots of a plant are placed in water coloured with a dye.

The diagrams show sections of the leaf, stem and root.



Which numbered parts will become stained by the dye as the water is initially absorbed?

	leaf	stem	root
A	1	3	5
B	2	3	6
C	1	4	6
D	2	4	5

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13 After muscular exercise, which blood vessel carries the **lowest** concentration of carbon dioxide?

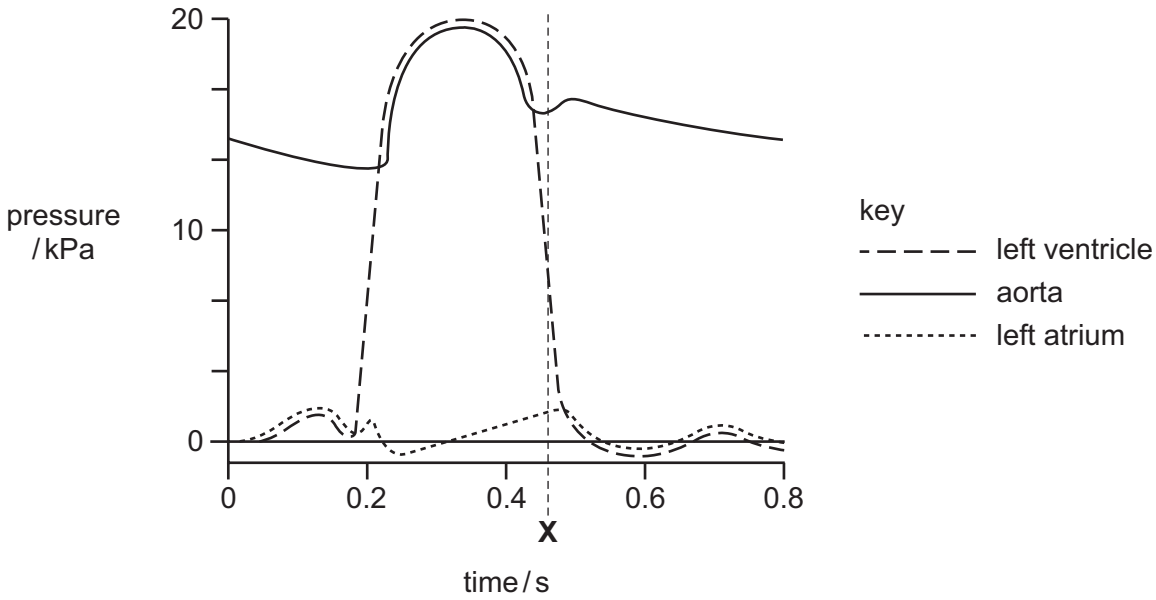
A hepatic vein

B pulmonary artery

C pulmonary vein

D vena cava

14 The diagram shows the pressures in the left side of the heart during one heart beat.



Which valves are open and which are closed at the time marked X?

	bicuspid	semi-lunar
A	closed	closed
B	closed	open
C	open	closed
D	open	open

15 Two hours after eating a meal, which vessel contains blood with the highest concentration of glucose?

A aorta

B hepatic portal vein

C pulmonary vein

D renal vein

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16 Which equation for anaerobic respiration in yeast is correct?

A $C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O$

B $C_6H_{12}O_6 + 6O_2 = 6CH_3–CH_2–OH + 6CO_2$

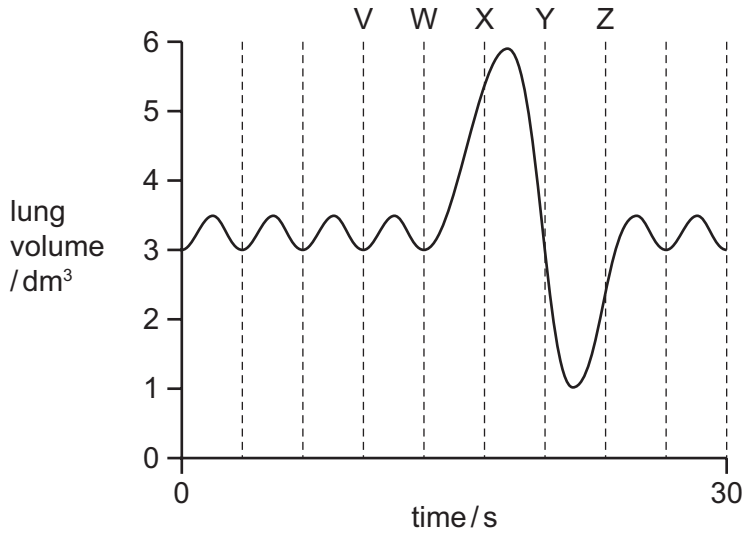
C $C_6H_{12}O_6 = 2CH_3–CH_2–OH + 2CO_2$

D $6CO_2 + 6H_2O = C_6H_{12}O_6 + 6O_2$

17 What happens to the diaphragm muscles and to the internal and external intercostal muscles when a person breathes out during exercise?

	diaphragm	external intercostal muscles	internal intercostal muscles
A	contracts	contract	relax
B	contracts	relax	contract
C	relaxes	contract	relax
D	relaxes	relax	contract

18 The graph shows changes in the amount of air in a person's lungs over a period of 30 seconds.



Between which time periods is the rate of breathing fastest?

A V to W **B** W to X **C** X to Y **D** Y to Z

19 In the human breathing system, which features maintain the carbon dioxide gradient between the alveoli and the outside air?

1 blood continually pumped to the alveoli

2 breathing in and out

3 moist alveolar surfaces

4 thin alveolar walls

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

20 Which of these correct statements describes control by **negative** feedback?

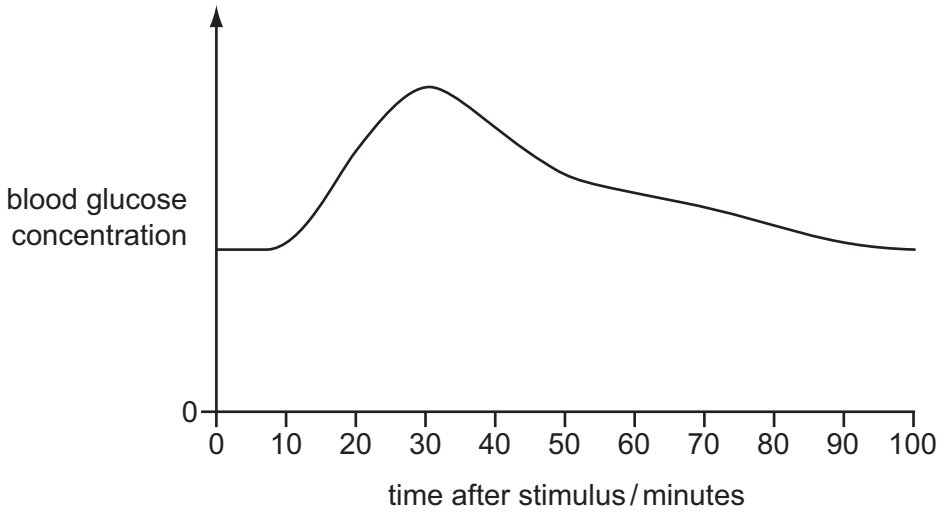
A An injury to body tissue activates platelets in the blood and these activated platelets release chemicals which activate more platelets.

B During the menstrual cycle, luteinising hormone stimulates the release of oestrogen which in turn stimulates the release of more luteinising hormone.

C The onset of contractions during childbirth causes the release of a hormone which stimulates further contractions.

D When blood pressure is high, nerve impulses from the brain cause the blood vessels to dilate and blood pressure is reduced.

21 The graph shows changes in blood glucose concentration when a body responds to an external stimulus.



What is the hormone responsible for the change in blood glucose concentration in the first 30 minutes?

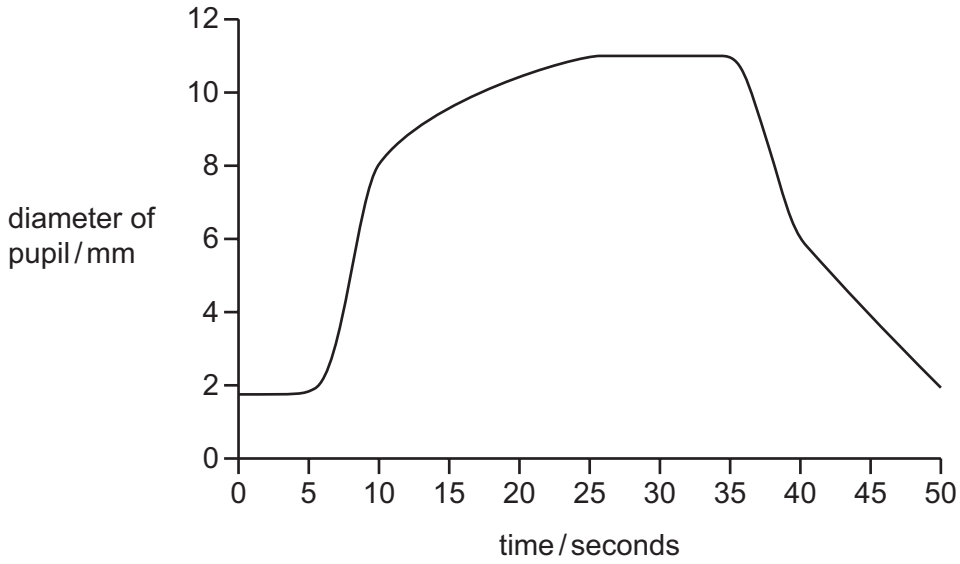
A adrenaline

B fibrinogen

C glycogen

D insulin

22 The graph shows the changes in the size of the pupil of the eye as the light intensity of the surroundings is changed.



Between which times is the light intensity increasing?

A 5 to 10 seconds

B 10 to 25 seconds

C 25 to 35 seconds

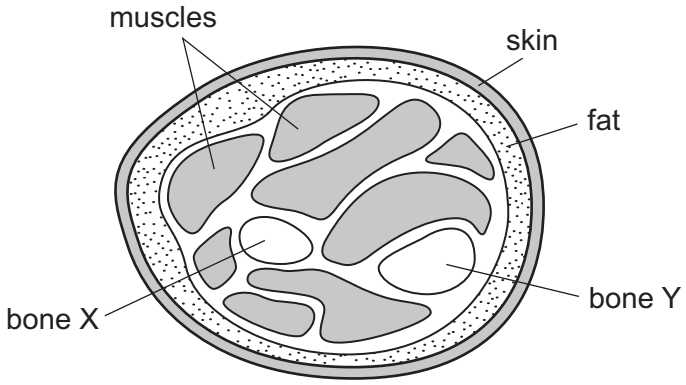
D 35 to 40 seconds

23 Which information about the listed glands is correct?

	gland	hormone produced	target organ	effect
A	adrenal	adrenaline	heart	decreases heart rate
B	ovary	oestrogen	uterus	increases thickness of lining
C	pancreas	insulin	liver	converts glycogen to glucose
D	pituitary	FSH	uterus	causes ovulation

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24 The diagram shows a section through the lower arm of a human.



What are bones X and Y?

	X	Y
A	humerus	radius
B	humerus	ulna
C	radius	humerus
D	radius	ulna

25 What are the effects of the excessive consumption of alcohol?

	depressant	liver damage	shorter reaction time
A	✓	✗	✓
B	✓	✓	✗
C	✗	✓	✓
D	✗	✓	✗

key

✓ = effect occurs

✗ = effect does not occur

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

What causes this change in pH?

A anaerobic respiration of lactose

B coagulation of milk proteins

C production of ethanol

D release of bubbles of carbon dioxide

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[Turn over

27 During the production of alcohol, why must air be kept out of the fermenter?

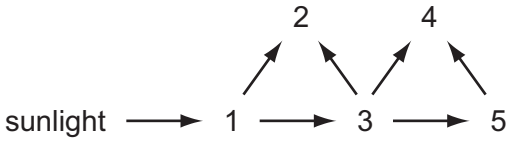
A to allow production of carbon dioxide

B to inhibit the growth of yeast

C to prevent aerobic respiration

D to prevent anaerobic respiration

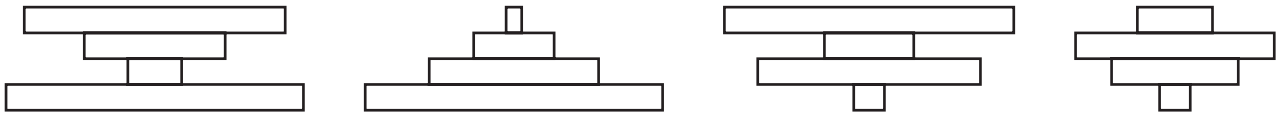
28 The diagram shows energy flow in a food web.



Which number represents an organism that eats both plants and animals?

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

29 A tree has insect larvae burrowing in its leaves. The emerging insects are eaten by birds and the birds have parasitic fleas living amongst their feathers.

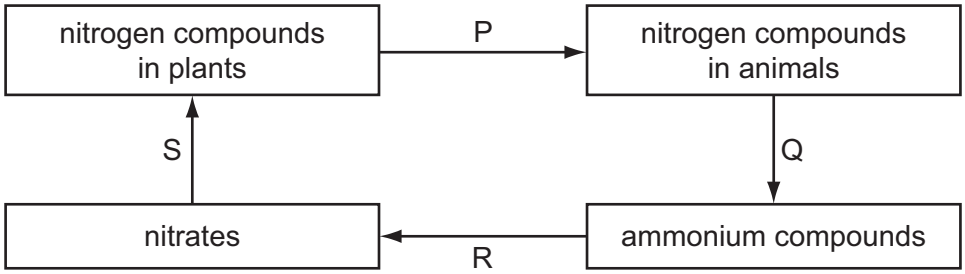


Which is a pyramid of biomass and which is a pyramid of numbers for this food chain?

	pyramid of mass	pyramid of numbers
A	1	3
B	1	4
C	2	3
D	2	4

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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 Which factor does **not** help to make the mosquito an effective vector of malaria?

A Mosquitoes are attracted to warmth and carbon dioxide.

B Mosquitoes lay their eggs in water.

C Mosquito saliva stops blood from clotting.

D The malaria pathogens live in mosquito salivary glands.

32 Cutting down tropical rain forest trees has many consequences.

Which of these consequences could lead to global warming?

A fewer organisms decomposing

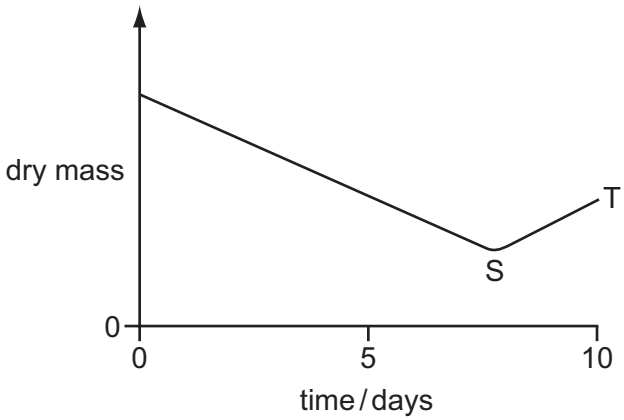
B fewer roots in ground

C less carbon dioxide absorbed

D soil eroded

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33 The graph shows changes in the dry mass of a seed as it germinates.



What causes the change shown between points S and T?

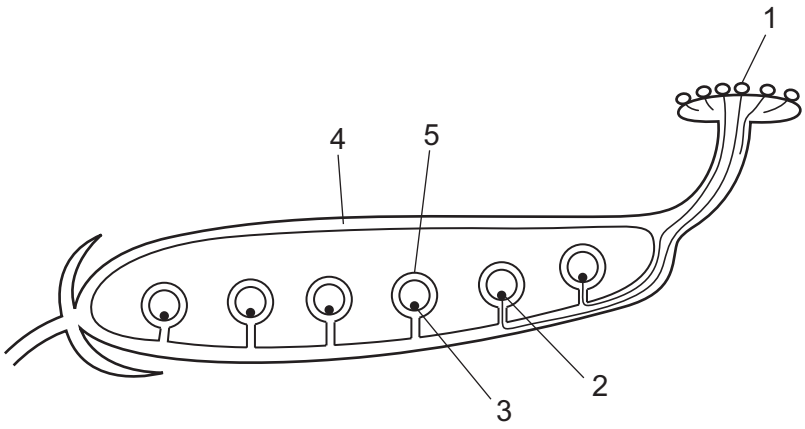
A osmosis

B photosynthesis

C respiration

D transpiration

34 The diagram shows part of a flower after it has been pollinated.



Which labelled structures are diploid and which are haploid?

	diploid	haploid
A	1	4
B	2	1
C	3	2
D	4	5

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35 Where does the placenta allow the exchange of materials to take place between mother and fetus?

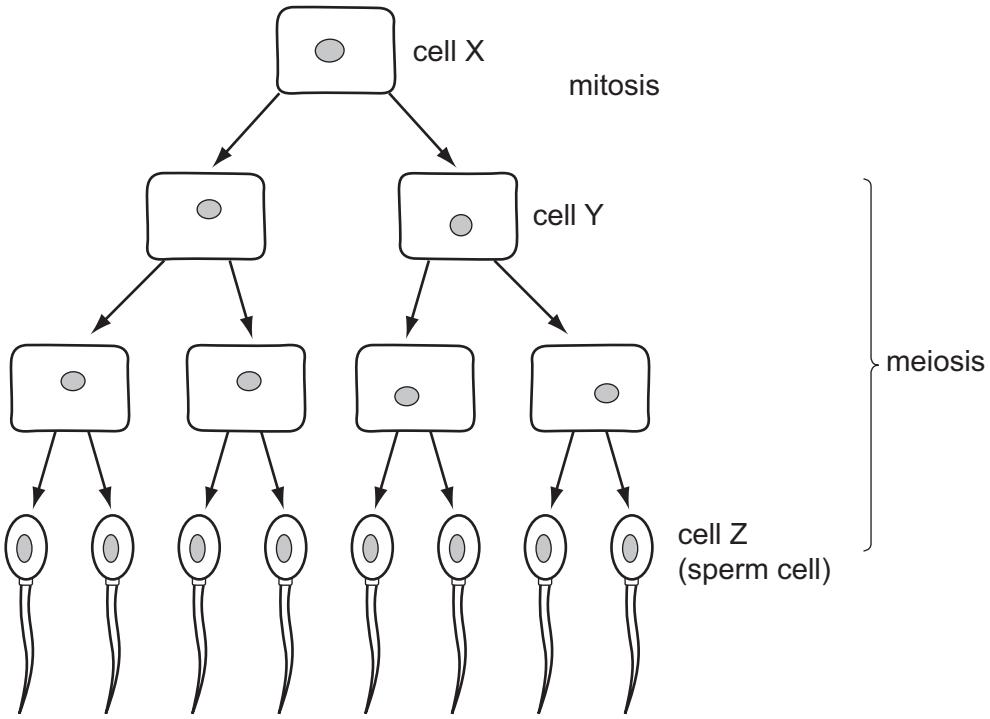
A oviduct wall

B umbilical cord

C uterus wall

D vagina wall

36 The diagram shows some stages in cell division in a fruit fly.



Cell X contains 8 chromosomes.

How many chromosomes are in cell Y and in cell Z?

	cell Y	cell Z
A	4	4
B	4	8
C	8	4
D	8	8

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37 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.

38 In a large family, half the children were blood group A and half were blood group B.

If the father was blood group O, what was the mother's blood group?

A A **B** B **C** AB **D** O

39 How many chromosomes are there in a zygote which develops into a baby with Down's syndrome?

A 23 **B** 24 **C** 46 **D** 47

40 Which statement describes an example of artificial selection?

A It has been found that some strains of bacteria produce antibiotics.

B It is common practice to mate bulls with cows that produce the most milk.

C It is possible to control caterpillars on food crops by releasing small wasps which lay their eggs in caterpillars and kill them.

D Mosquitoes have developed strains that are resistant to insecticides.

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