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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY **5090/01**

Paper 1 Multiple Choice

May/June 2005

1 hour

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

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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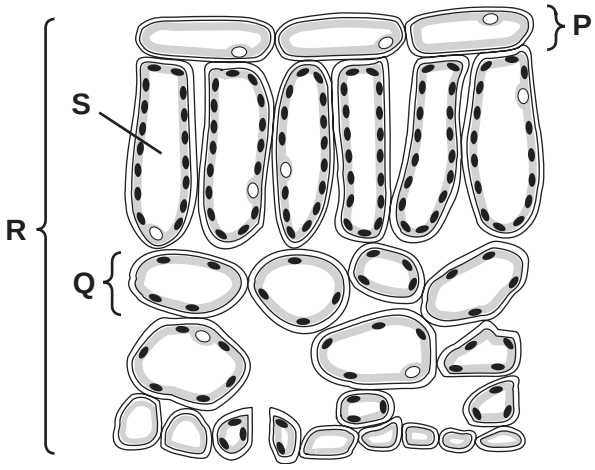
1 The diagram shows a section through a leaf.



Which is an organ and which is a tissue?

	organ	tissue
A	**P**	**R**
B	**Q**	**S**
C	**R**	**P**
D	**S**	**Q**

2 What causes water to enter plant roots from the soil?

A Water potential in root hairs and the soil is equal.

B Water potential in root hairs and xylem is equal.

C Water potential in root hairs is higher than in the soil.

D Water potential in root hairs is lower than in the soil.

3 Which process may require energy from respiration?

A movement of carbon dioxide into the alveoli

B movement of oxygen into red blood cells

C uptake of glucose by cells in the villi

D uptake of water by root hair cells

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4 Protease enzyme breaks down protein to amino acids.

In the 'lock and key' hypothesis, what is the lock and what is the key?

	lock	key
A	amino acid	protease
B	protease	amino acid
C	protease	protein
D	protein	protease

5 Where and how does carbon dioxide enter a plant?

	where	how
A	root hair cells	active uptake
B	root hair cells	diffusion
C	stomata	active uptake
D	stomata	diffusion

6 In which conditions will a plant photosynthesise fastest?

	carbon dioxide concentration / %	temperature / °C
A	0.04	15
B	0.04	25
C	0.01	15
D	0.01	25

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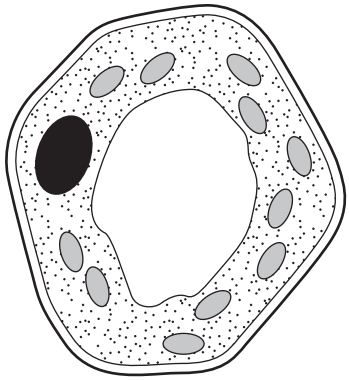
7 The diagram shows one type of plant cell.



What type of cell is it?

A epidermal cell of a leaf

B mesophyll cell of a leaf

C root hair cell

D xylem cell

8 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

9 A lack of which nutrient causes gums to bleed?

A calcium

B iron

C vitamin C

D vitamin D

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10 The table shows some of the nutrients present in four foods.

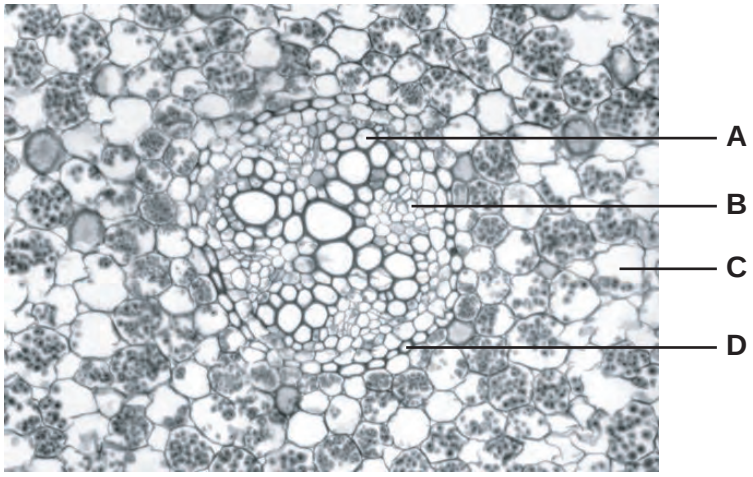
food	iron / mg per 100 g of food	calcium / mg per 100 g of food	vitamin C / mg per 100 g of food	vitamin D / μg per 100 g of food
1 bananas	0.4	7	10	0
2 fish	0.4	35	0	6.38
3 lentils	7.6	30	0	0
4 milk	0.1	120	0.5	0.002

Which two foods are best to help the healthy growth of bones and teeth of a child?

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

11 The diagram shows a transverse section from the middle of a root of a dicotyledonous plant.

In which tissue are sugars and amino acids transported?



12 A young plant may wilt when dug up and re-planted in another place.

What causes this?

A The leaves lose less water.

B The roots cannot take up mineral salts.

C The stem cannot transport water.

D The surface area of the root is reduced.

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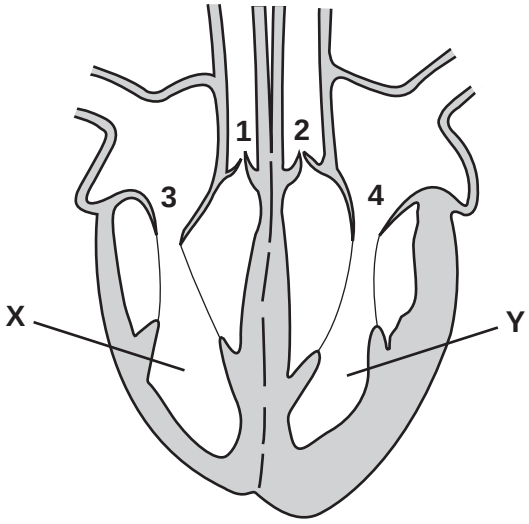
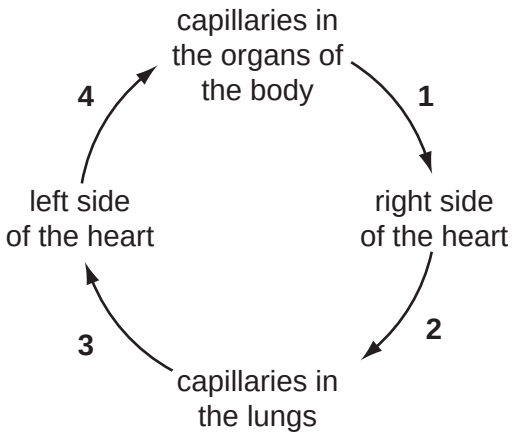
13 The diagram shows a section through the heart.



While chambers **X** and **Y** are emptying of blood, which valves are open and which are closed?

	valves **1** and **2**	valves **3** and **4**
A	closed	closed
B	closed	open
C	open	closed
D	open	open

14 The diagram represents blood flow through the human body.



At which stages does the blood contain the most oxygen?

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

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15 The table shows substances passing between capillaries and tissues in a part of the body.

substance	into the capillaries from the tissues	out of the capillaries into the tissues
oxygen		✓
carbon dioxide	✓	
amino acids		✓
urea	✓	

key

✓ = does pass

In which part of the body are these capillaries?

A between the alveoli

B in the kidney

C in the liver

D in the villi

16 What is the equation for aerobic respiration?

A carbon dioxide + water ⟶ glucose + oxygen + energy

B carbon dioxide + water ⟶ alcohol + oxygen + energy

C oxygen + glucose ⟶ carbon dioxide + alcohol + energy

D oxygen + glucose ⟶ water + carbon dioxide + energy

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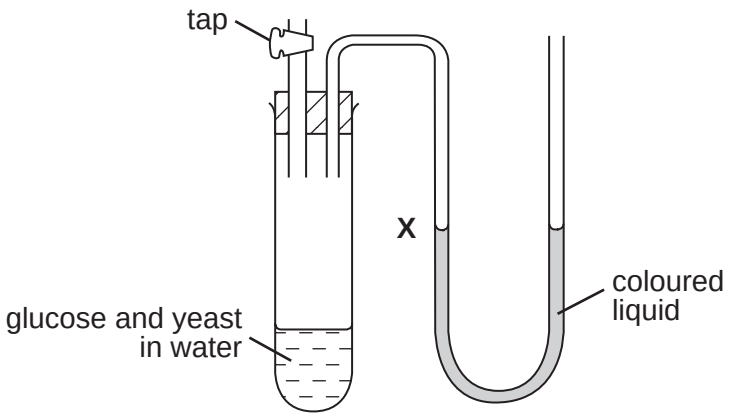
17 The test-tube contains glucose and yeast in water.



The tap is closed and the yeast respires anaerobically.

What is observed at **X** and which explanation is correct?

	observation at **X**	explanation
A	liquid level falls	carbon dioxide is produced
B	liquid level falls	oxygen is used
C	liquid level rises	carbon dioxide is produced
D	liquid level rises	oxygen is used

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.

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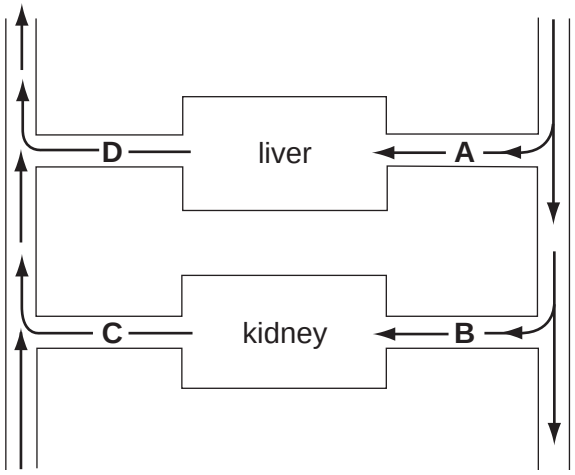
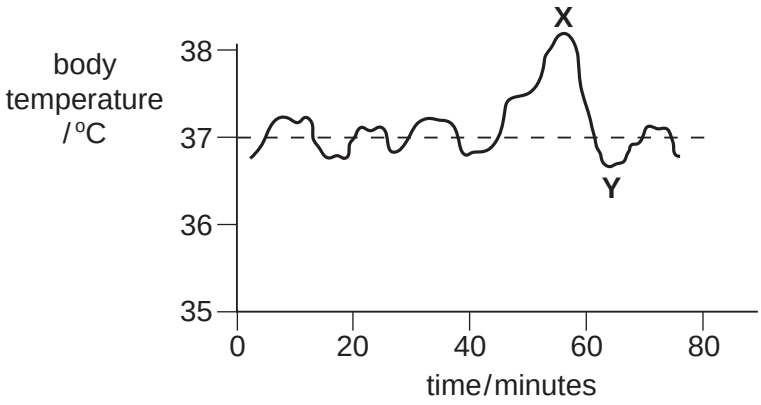
19 The diagram represents the liver, kidney and some associated blood vessels.

In which vessel will the blood contain the lowest concentration of urea?



20 The graph shows changes in a person's body temperature plotted against time.



What causes the change in temperature between **X** and **Y**?

A increased air temperature

B increased evaporation of sweat

C reduced blood flow through surface capillaries

D shivering

21 Why does emphysema cause severe breathlessness?

A The alveoli become coated with tar.

B The cilia lining the trachea are destroyed.

C The lungs become cancerous.

D The surface area of the lungs is reduced.

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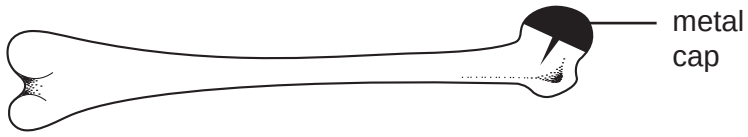
22 The diagram shows a bone from the forelimb (arm). One end of the bone has been replaced with a metal cap.



Which bone is this, and which joint does the metal cap repair?

	bone	joint
A	humerus	elbow
B	humerus	shoulder
C	ulna	elbow
D	ulna	shoulder

23 What is controlled by the medulla in the brain?

A balance

B breathing

C memory

D vision

24 When a person is frightened, which substance increases the blood sugar levels?

A adrenaline

B carbon dioxide

C insulin

D lactic acid

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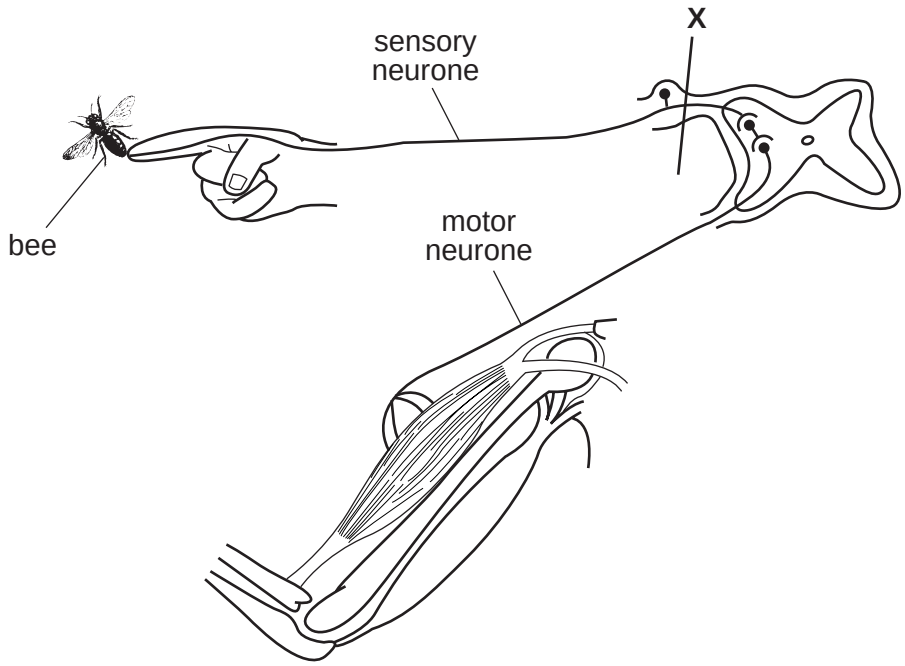
25 The diagram shows part of a person's nervous system that has been cut at **X**.



A bee stings the finger, as shown.

What are the effects of this sting on the person?

	pain felt	arm moved
A	no	no
B	no	yes
C	yes	no
D	yes	yes

26 When yeast is used in bread-making, what type of respiration occurs and which product is useful?

	respiration	useful product
A	aerobic	carbon dioxide
B	aerobic	ethanol
C	anaerobic	carbon dioxide
D	anaerobic	ethanol

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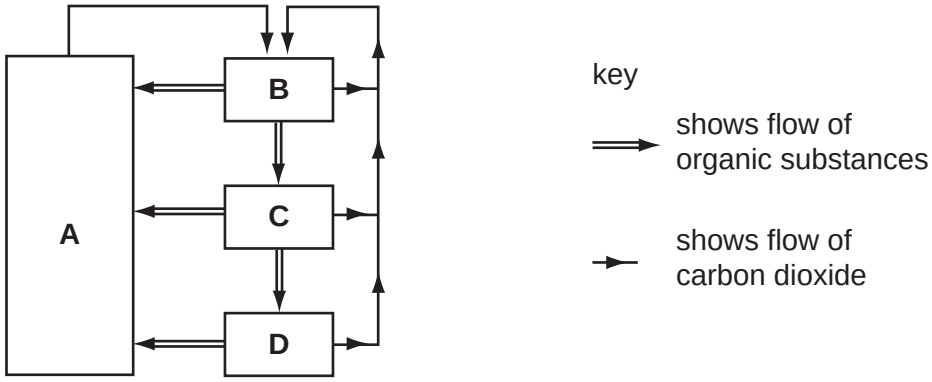
27 In cheese production, which micro organism is involved, what is a product of respiration and what effect does it have?

	micro organism	product	effect
A	bacteria	acids	solidifies
B	bacteria	alcohols	digests
C	yeast	acids	digests
D	yeast	alcohols	solidifies

28 The diagram represents the flow of substances within a balanced ecosystem.

The boxes are various trophic levels.

Which box represents herbivores?



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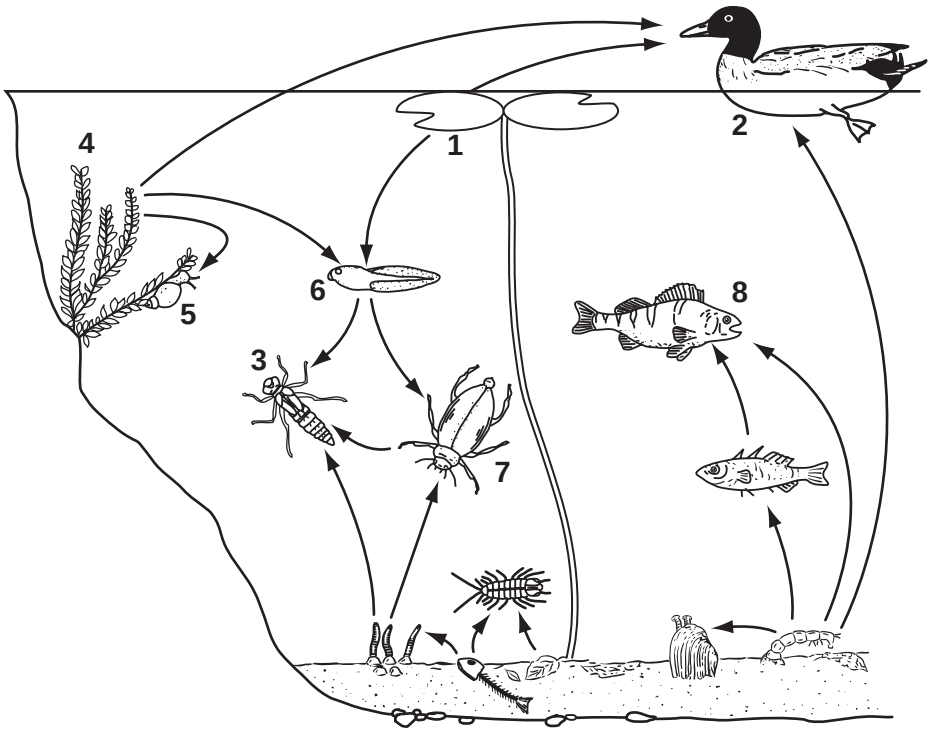
29 The diagram shows a food web in a freshwater pond.



Which of the organisms is a producer, a herbivore or a carnivore?

	producer	herbivore	carnivore
A	**1**	**6**	**7**
B	**2**	**4**	**5**
C	**4**	**2**	**6**
D	**7**	**3**	**8**

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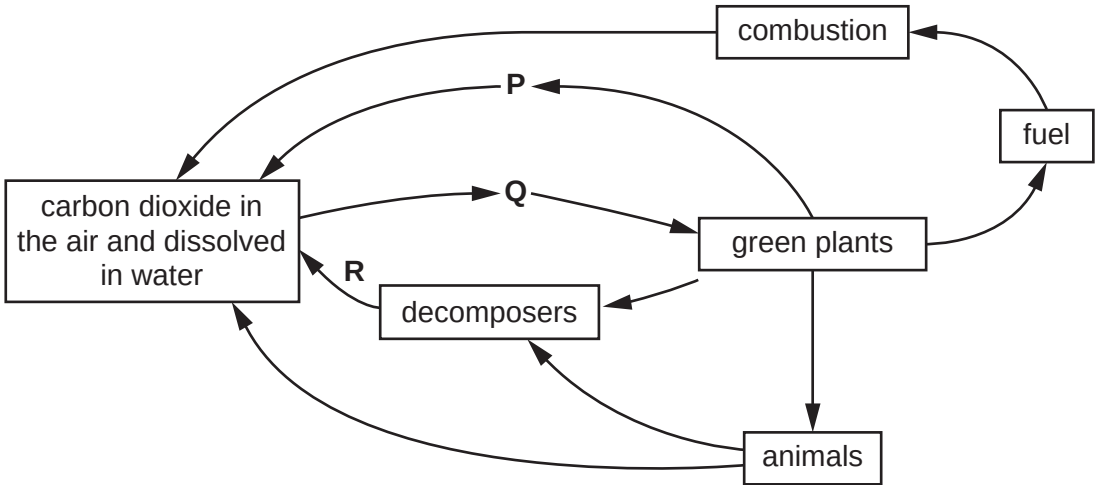
30 The diagram shows the carbon cycle.



What are processes **P**, **Q**, and **R**?

	P	Q	R
A	photosynthesis	photosynthesis	respiration
B	respiration	respiration	photosynthesis
C	photosynthesis	respiration	photosynthesis
D	respiration	photosynthesis	respiration

31 Pest control in hot countries includes these processes.

1 draining ponds

2 keeping cattle away from ponds

3 spraying oil on ponds

Which are used to control the malarial mosquito?

A **2** only **B** **1** and **2** **C** **1** and **3** **D** **1**, **2** and **3**

32 What will be the effect of increasing nitrate levels in rivers?

A Animals will absorb the nitrates and make more urea.

B Animals will absorb the nitrates and form more proteins.

C Plants will absorb the nitrates and make more urea.

D Plants will absorb the nitrates and form more proteins.

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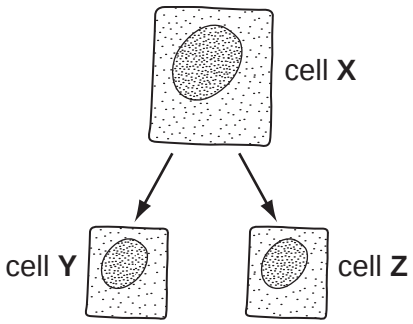
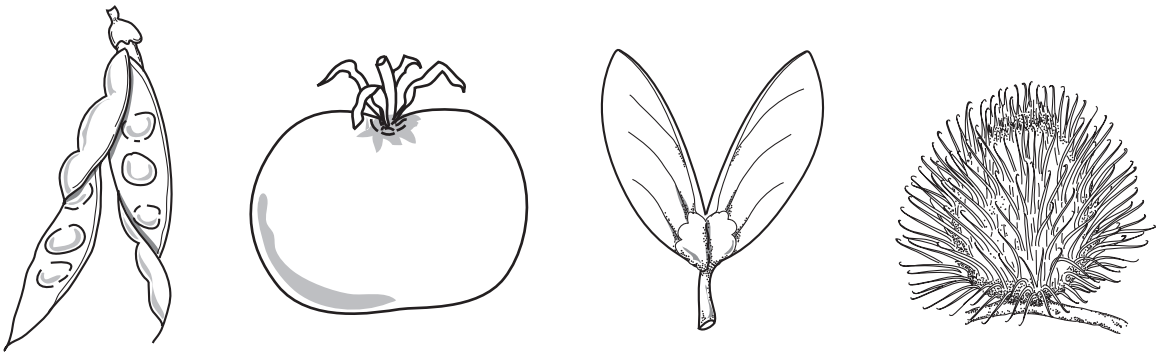
33 Cell **X** contains 24 chromosomes. It divides by mitosis to produce cells **Y** and **Z**.



How many chromosomes does cell **Z** contain?

A 8 **B** 12 **C** 24 **D** 48

34 The diagrams show four different fruits.



1 **2** **3** **4**

Which two fruits are dispersed by animals?

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

35 After sexual intercourse, sperm can survive for 3 days in the uterus and oviducts. Assume ovulation can occur any time from day 13 to day 15.

If an egg cell lives up to 2 days after ovulation, how long is the fertile phase of the menstrual cycle?

A 5 days **B** 6 days **C** 7 days **D** 8 days

36 What are the features of human eggs, when compared with sperm?

	size	number produced
A	larger	larger
B	larger	smaller
C	smaller	larger
D	smaller	smaller

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37 A man has blood group A, and his wife has blood group AB.

What are the possible blood groups of their children?

A A only

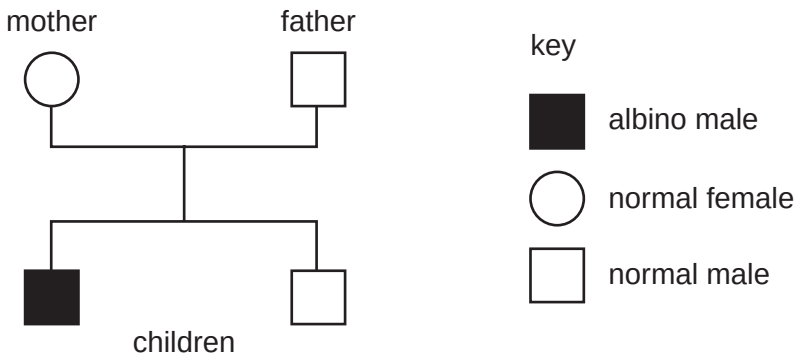
B AB only

C A and AB only

D A, B and AB

38 In humans the allele for albinism is recessive.

The diagram shows the inheritance of albinism in a family.



What are the genotypes of the parents?

	mother	father
A	heterozygous	heterozygous
B	heterozygous	homozygous dominant
C	homozygous recessive	homozygous dominant
D	homozygous recessive	homozygous recessive

39 A person with Down's syndrome is born with 47 chromosomes in each of his/her cells, instead of 46.

What could cause this?

A A mutation happened during the production of the egg cell.

B More than one sperm fused with the egg at fertilisation.

C Radiation caused a change in structure of a gene in the father's sperm.

D The mother was exposed to harmful chemicals while she was pregnant.

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40 Huntington's disease is an inherited condition caused by a dominant allele.

A person heterozygous for the disease and a person without the disease have a child.

What is the probability that their child will inherit the dominant allele for Huntington's disease?

A 0 **B** 0.25 **C** 0.5 **D** 0.75

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