

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

BIOLOGY

5090/01

Paper 1 Multiple Choice

October/November 2006

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



1 The table shows some characteristics of four types of cell.

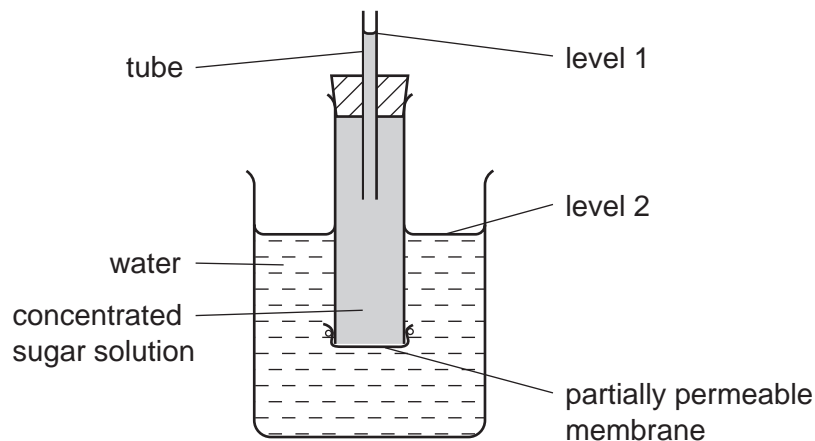
Which cell could be a root hair cell?

	nucleus	chloroplast	
A	✓	✓	key ✓ = present x = absent
B	✓	x	
C	x	✓	
D	x	x	

2 Which processes can take place in a root hair cell when oxygen is **not** available?

- A** active transport only
- B** diffusion only
- C** active transport and osmosis only
- D** diffusion and osmosis only

3 The diagram shows apparatus used to investigate osmosis.

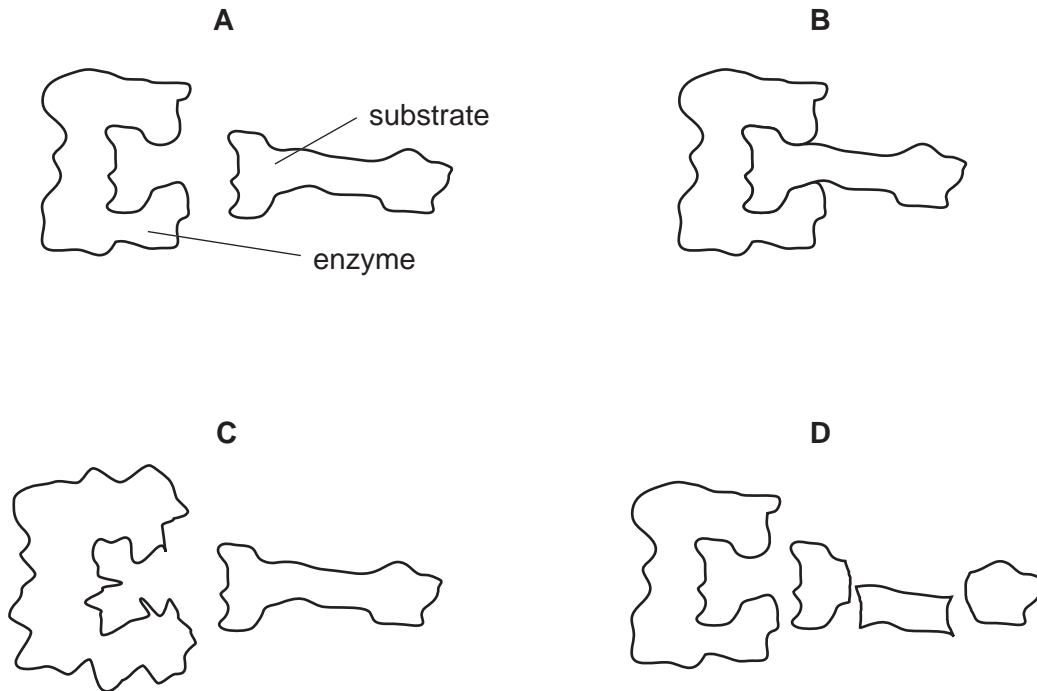


Which molecules will move across the partially permeable membrane and which changes in levels will occur?

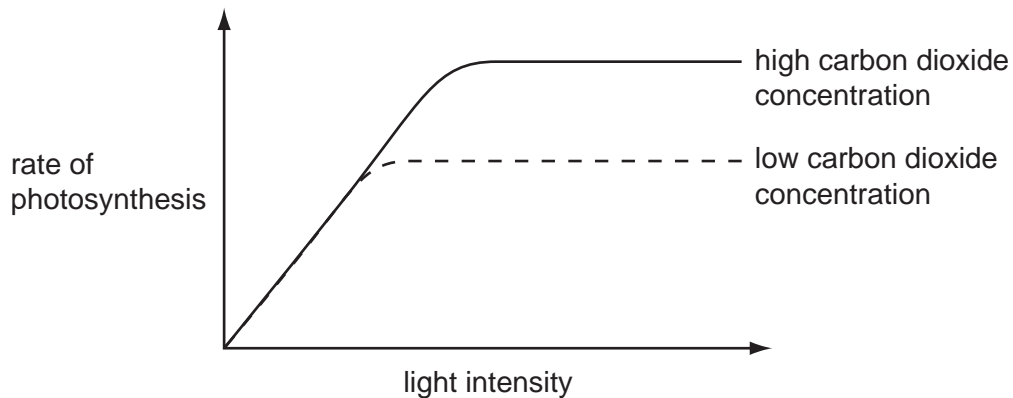
	molecules	level 1	level 2
A	sugar	fall	rise
B	water	fall	rise
C	sugar	rise	fall
D	water	rise	fall

- 4 The diagrams represent an enzyme molecule and its substrate.

Which diagram shows these molecules after they are heated to 100°C?



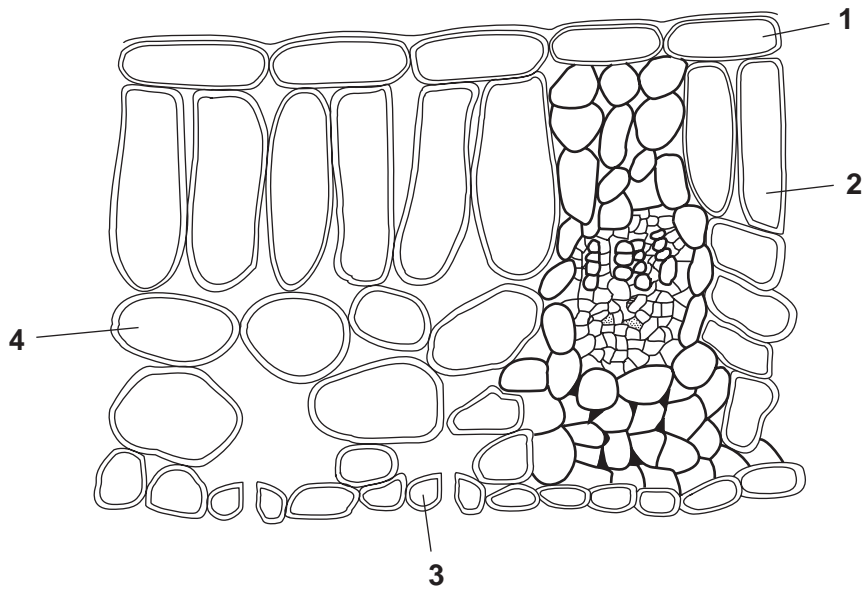
- 5 The graph shows the effect of changing light intensity on the rate of photosynthesis in a plant at two different carbon dioxide concentrations.



Which statement is correct?

- A At low light intensities carbon dioxide is the limiting factor.
- B At high light intensities carbon dioxide is the limiting factor.
- C When the carbon dioxide concentration is high, there is no limiting factor.
- D When carbon dioxide concentration is low, the plant cannot photosynthesise.

6 The diagram shows the shapes of the cells in a section of a leaf.

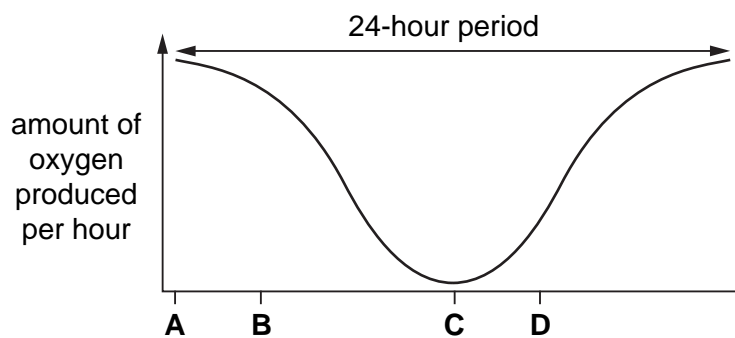


Which cells would contain chloroplasts?

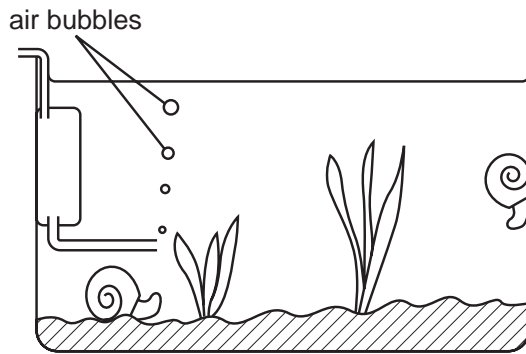
- A 1 and 2 only
- B 2 only
- C 2 and 3 only
- D 2, 3 and 4 only

7 The graph shows the amount of oxygen produced by a green plant, growing outdoors, during a 24-hour period.

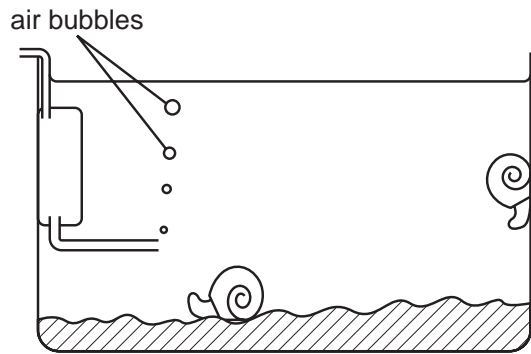
Which letter represents midday?



8 Two aquarium tanks are set up as shown.



tank X
contains animals and plants



tank Y
contains animals

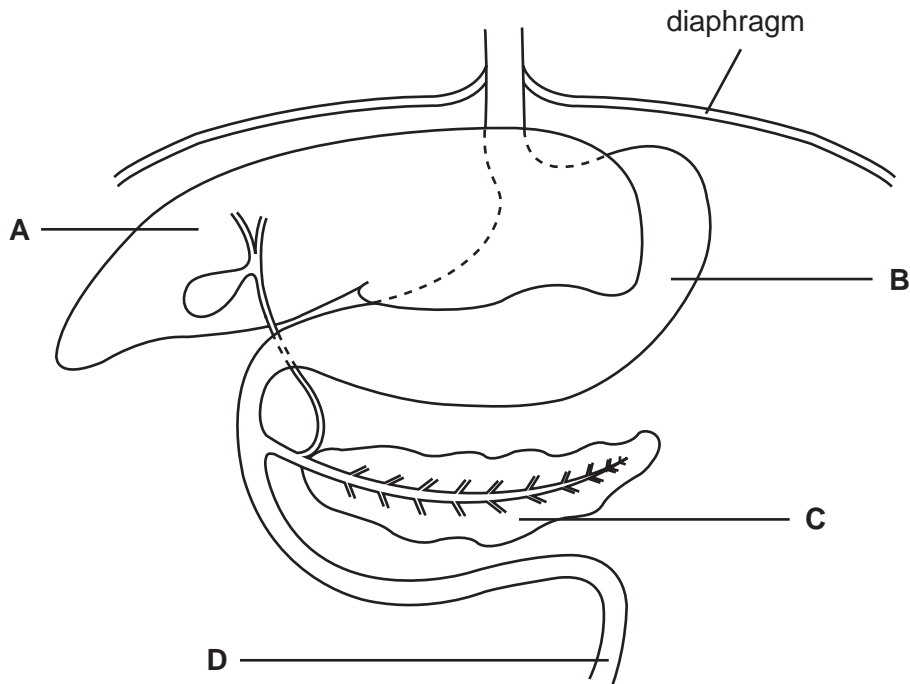
After a week, all the animals in tank Y show signs of distress.

This was because the animals have run out of

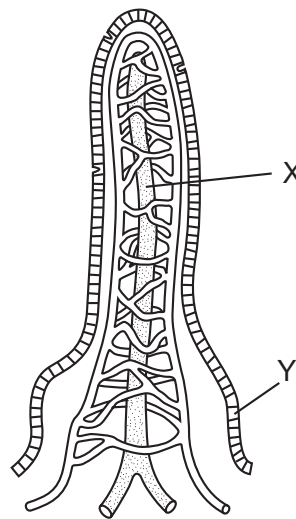
- A carbon dioxide.
 - B food.
 - C nitrate.
 - D oxygen.
- 9 Which substances are needed in the diet to prevent rickets?
- A calcium and vitamin C
 - B calcium and vitamin D
 - C iron and vitamin C
 - D iron and vitamin D

10 The diagram shows part of the human digestive system.

Which part secretes an acidic digestive juice containing a protease?



11 The diagram shows a section through a villus.



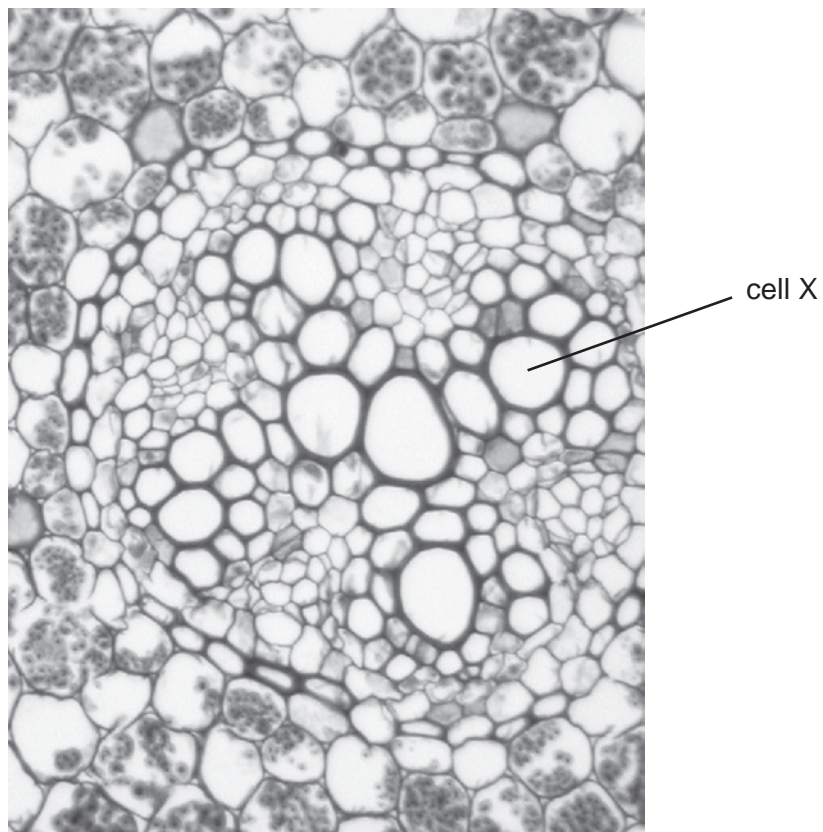
What is a function of structure X and of structure Y?

	X	Y
A	to absorb amino acids	to digest starch
B	to carry blood	to secrete mucus
C	to transport fats	to secrete enzymes
D	to transport glucose	to help peristalsis

12 Which of the following environmental conditions would cause rapid transpiration?

	air	light	temperature
A	damp	bright	cold
B	damp	dim	warm
C	dry	bright	warm
D	dry	dim	cold

13 The photomicrograph shows part of a section of a plant.



Samples of the contents of cell X were tested.

What results are expected?

	Benedict's reagent	iodine
A	+	+
B	+	-
C	-	+
D	-	-

key

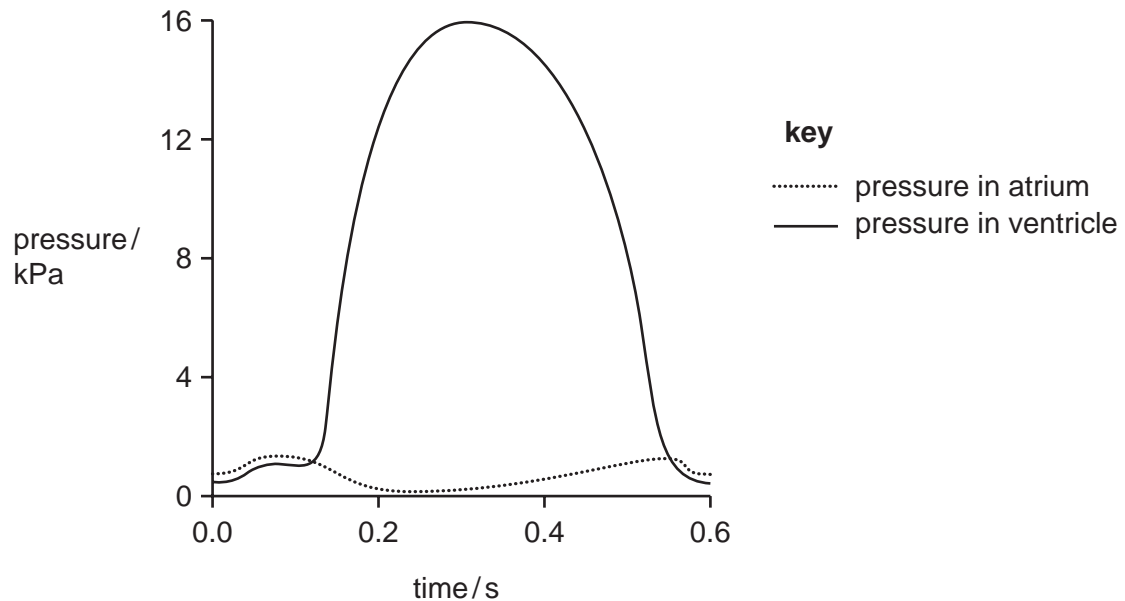
+ = positive result

- = negative result

14 How does tissue fluid differ from blood plasma?

- A Tissue fluid contains dissolved food.
- B Tissue fluid contains less protein.
- C Tissue fluid does not contain dissolved oxygen.
- D Tissue fluid does not contain white blood cells.

15 The graph shows pressure changes in the left side of the heart, while at rest, during a single heart beat.



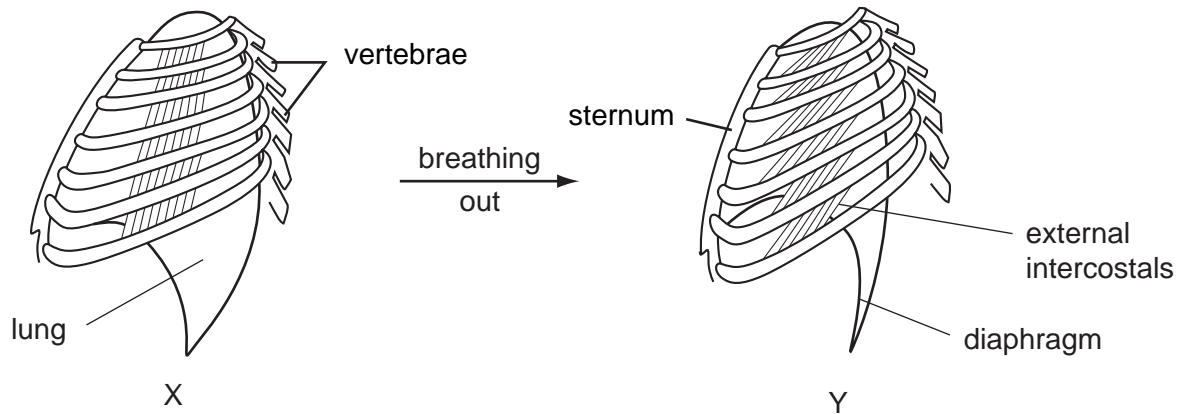
What is the number of times that this person's heart beats in one minute, while at rest?

- A 60
- B 70
- C 100
- D 120

16 Which statement explains why humans are said to have a double circulation?

- A As blood circulates it passes twice through the heart.
- B Each side of the heart has two chambers.
- C Each side of the heart has two valves.
- D There are two different sets of arteries leaving the heart.

17 The diagram shows the ribs and some of the muscles used in breathing.



Which muscles relax in moving from position X to position Y?

	diaphragm	external intercostals
A	no	no
B	no	yes
C	yes	no
D	yes	yes

18 Which substance is produced in both aerobic respiration in humans and anaerobic respiration in yeast?

- A** carbon dioxide
- B** ethanol
- C** lactic acid
- D** water

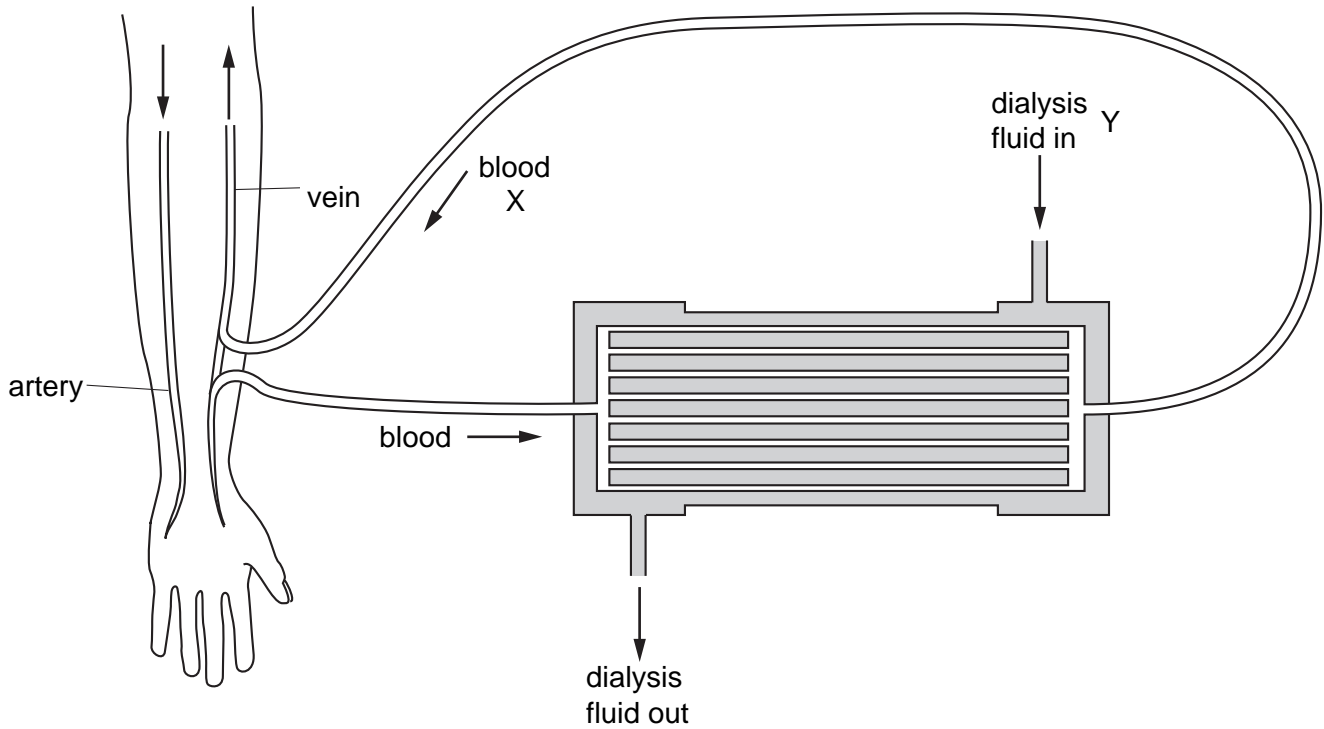
19 The table shows ventilation rates of an adult while resting and while exercising.

adult	volume of air inhaled per breath / cm ³	number of breaths per minute	volume of air exchanged per minute / cm ³
resting	400	20	8000
exercising	1200	40	?

What is the volume of air exchanged per minute while exercising?

- A** 16 000 cm³
- B** 24 000 cm³
- C** 32 000 cm³
- D** 48 000 cm³

20 The diagram shows the flow of blood and dialysis fluid through a kidney machine.



Which substances have the lowest concentration at X and the highest concentration at Y?

	lowest at X	highest at Y
A	glucose	salts
B	salts	glucose
C	urea	water
D	water	urea

21 The body can regulate both its temperature and the amount of water in its cells.

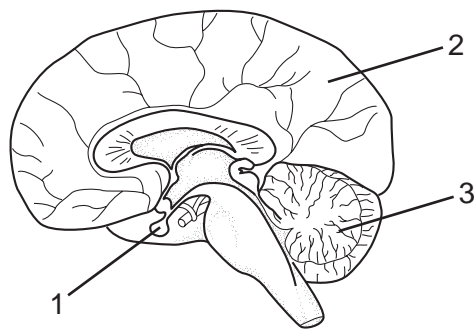
What are these processes?

- A** assimilation
- B** excretion
- C** homeostasis
- D** osmosis

- 22 In temperature control of the body, which types of neurones carry information from skin receptors to the brain, and from the brain to sweat glands?

	from skin receptors to the brain	from the brain to sweat glands
A	motor	sensory
B	relay	motor
C	sensory	motor
D	sensory	relay

- 23 What are the labels for the parts of the brain?

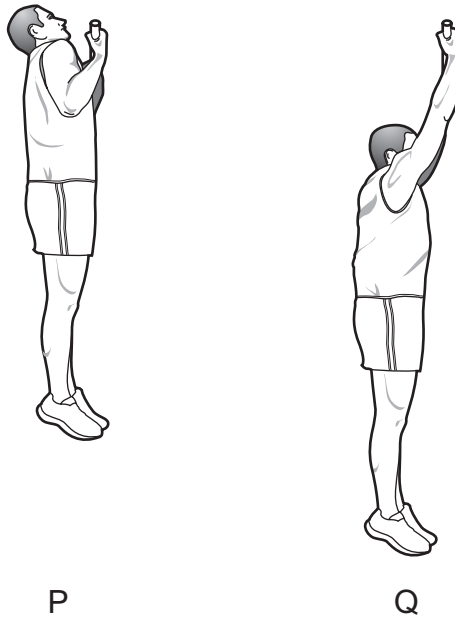


	1	2	3
A	cerebellum	cerebrum	pituitary gland
B	cerebrum	cerebellum	pituitary gland
C	pituitary gland	cerebrum	cerebellum
D	pituitary gland	cerebellum	cerebrum

- 24 What structures cover the pupil of a human eye?

- A** conjunctiva and cornea
- B** conjunctiva and sclera
- C** cornea and retina
- D** retina and sclera

25 The diagram shows a person exercising on a horizontal bar.



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

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

26 Tar and carbon monoxide are present in tobacco smoke.

What are their effects on health?

	tar	carbon monoxide
A	causes high blood pressure	damages haemoglobin
B	causes high blood pressure	is addictive
C	causes lung cancer	damages haemoglobin
D	causes lung cancer	is addictive

27 Why must the milk used in the production of yoghurt be free from all traces of antibiotics?

- A** Antibiotics cause artificial selection of the bacteria in the yoghurt.
- B** Antibiotics cause the yoghurt to decompose.
- C** Antibiotics kill the starter culture bacteria.
- D** Antibiotics support the growth of yeasts in the culture.

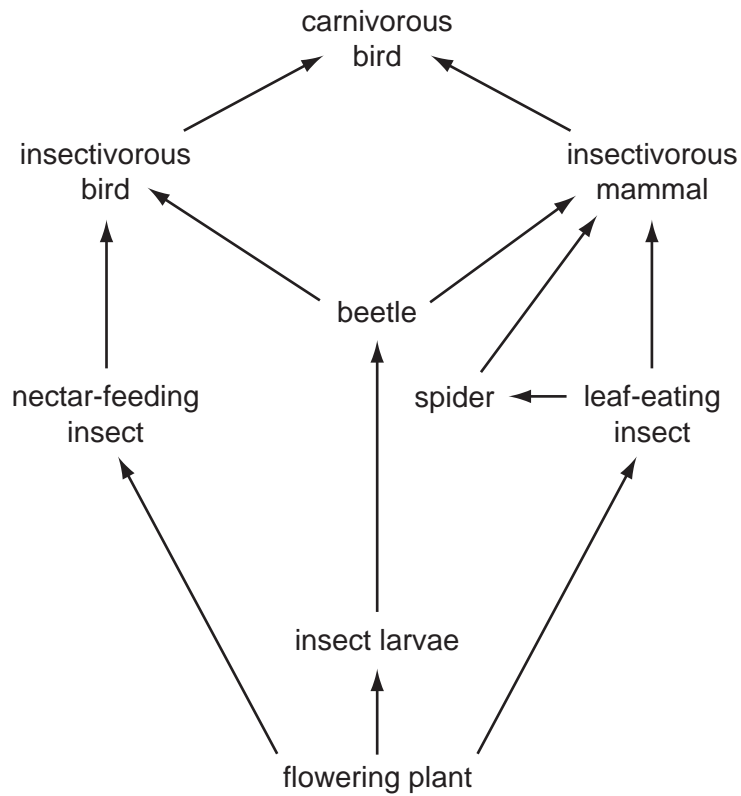
28 Using the key, which organism is a virus?

1. Has a cell wall..... go to 2
Does not have a cell wall..... go to 3
2. Cell wall is made of chitin..... organism **A**
Cell wall is made of cellulose..... organism **B**
3. Has a protein coat..... organism **C**
Has a cell membrane..... organism **D**

29 Which is a possible sequence for energy flowing through a food web?

	lost as heat	present in glucose	present in protein	recycled for photosynthesis
A	–	2	1	3
B	1	–	3	2
C	2	3	–	1
D	3	1	2	–

30 The diagram shows part of a food web.

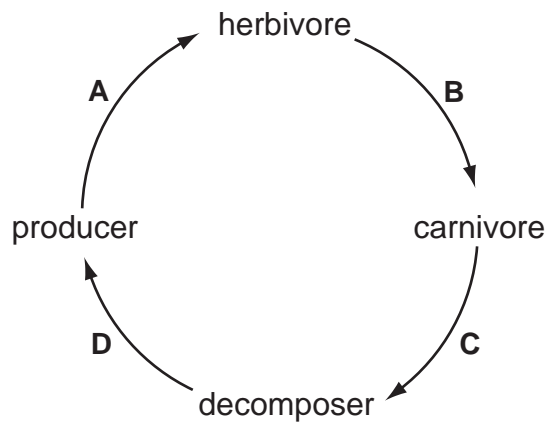


Which is a primary consumer?

- A beetle
- B carnivorous bird
- C insectivorous mammal
- D nectar-feeding insect

31 The diagram shows how **carbon** circulates in nature.

Through which stage does most **energy** flow?



32 The female mosquito is an effective vector for malaria.

What makes it an effective vector?

- A It has wings.
- B It lays many eggs.
- C It makes a noticeable noise.
- D It mates several times.

33 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?

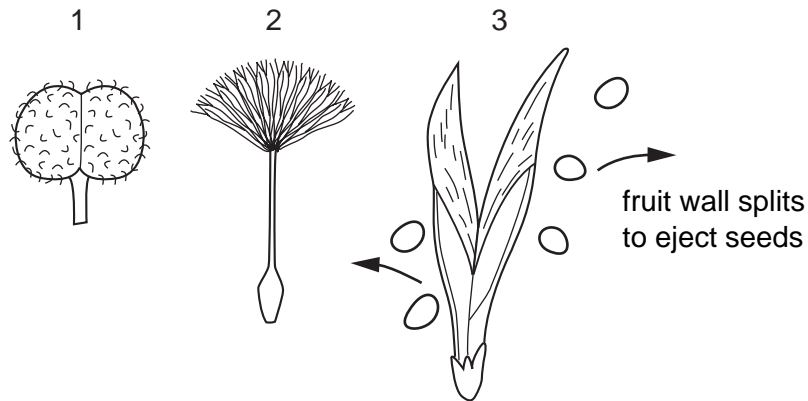
	→			
A	increase in algae	algae die	increase in bacteria	drop in oxygen
B	increase in algae	drop in oxygen	increase in bacteria	algae die
C	increase in bacteria	drop in oxygen	increase in algae	algae die
D	increase in bacteria	increase in algae	algae die	drop in oxygen

34 A plant has 20 chromosomes in its leaf cells. The plant reproduces both sexually and asexually.

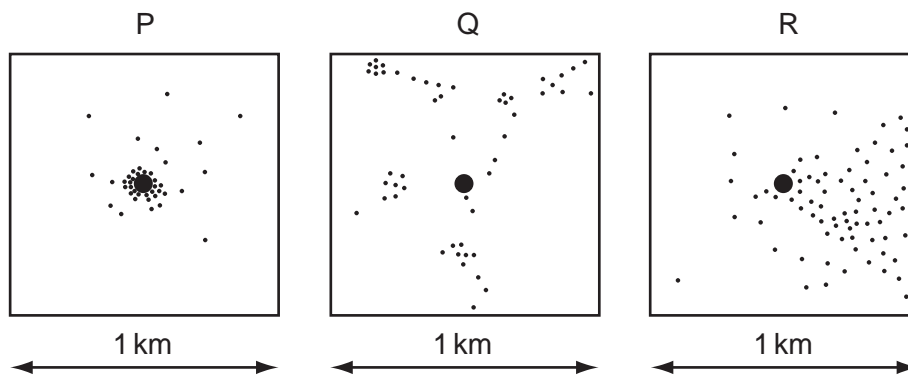
What is the correct number of chromosomes in the gametes and in cells used for asexual reproduction?

	number of chromosomes	
	gametes	cells used for asexual reproduction
A	10	10
B	10	20
C	20	10
D	20	20

35 The diagrams show the fruits of three species of plant.



P, Q and R are maps showing where the parent plants and their seedlings are growing.



Which map relates to which species?

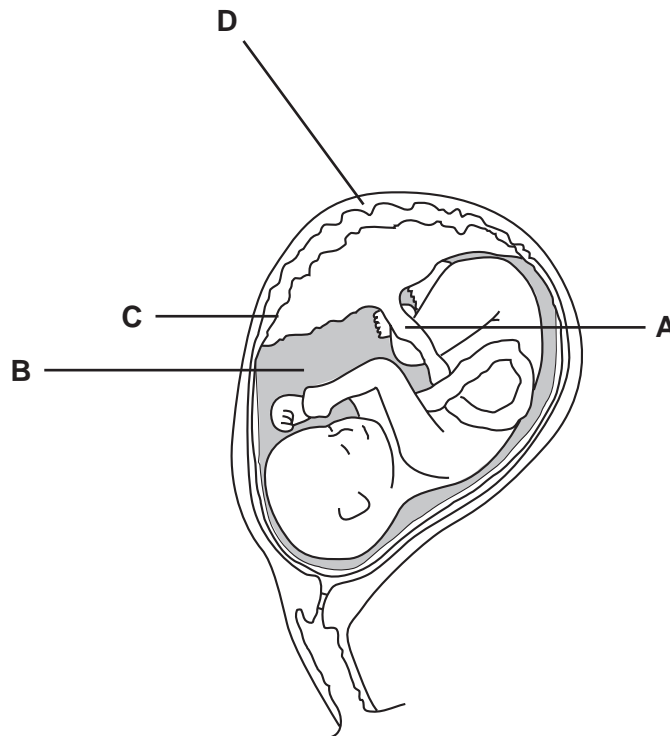
	species 1	species 2	species 3
A	P	Q	R
B	P	R	Q
C	Q	R	P
D	R	Q	P

36 What is true for syphilis?

	cause	symptoms develop after	treatment
A	bacterium	7-10 days	antibiotics
B	bacterium	number of years	vaccine
C	virus	7-10 days	antibiotics
D	virus	number of years	vaccine

37 The diagram shows a developing fetus.

Where does gaseous exchange between mother and fetus occur?



38 Dillip and Shabnam made four statements about themselves.

Dillip	Shabnam
1 I am a boy.	I am a girl.
2 I am 150 cm tall.	I am 153 cm tall.
3 I am not very good at games.	I am good at games.
4 My blood group is A.	My blood group is AB.

Which statements describe characteristics that show discontinuous variation?

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

- 39** Flower colour is controlled by a single pair of alleles, the allele for red colour is dominant to the allele for white colour.

A plant homozygous for red flower colour is crossed with a plant homozygous for white flower colour. All the resulting plants have red flowers (F_1 generation).

When these are crossed with each other, 18 plants were obtained. 12 plants have red flowers and 6 have white flowers (F_2 generation).

What ratio is expected in the F_2 generation and what ratio has been obtained?

	expected ratio red to white	obtained ratio red to white
A	1:1	1:1
B	1:1	2:1
C	3:1	2:1
D	3:1	3:1

- 40** A recessive homozygote is crossed with a heterozygote.

What will be the phenotypes of the F_1 generation?

- A** all dominant
- B** 0.75 dominant 0.25 recessive
- C** 0.5 dominant 0.5 recessive
- D** 0.25 dominant 0.5 heterozygous 0.25 recessive

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