Cambridge Assessment International Education

Cambridge O Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2022**

1 hour

You must answer on the multiple choice answer sheet.

4074054332

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

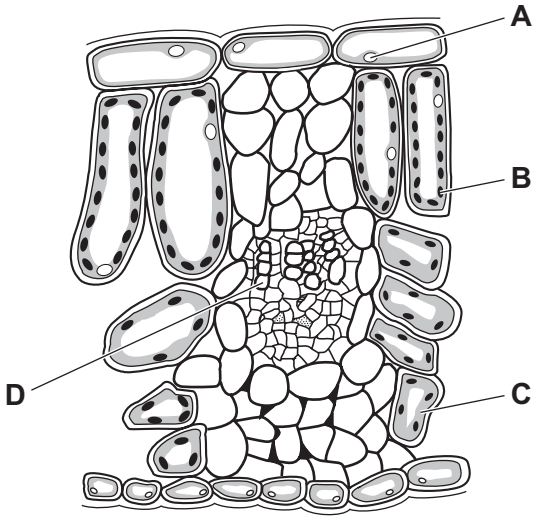
- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

This document has **20** pages. Any blank pages are indicated.

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1 The diagram shows cells from a plant leaf.

Which structure contains a high concentration of magnesium?

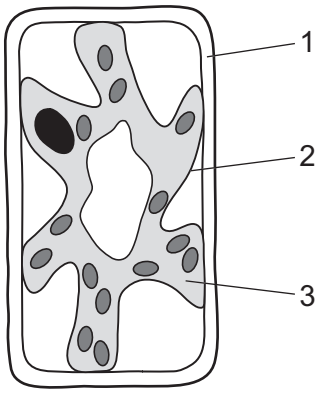


2 What are the functions of xylem vessels?

	strengthening roots and stems	supporting leaf shape	transporting sugars
A	✓	✗	✗
B	✓	✓	✗
C	✗	✓	✓
D	✗	✗	✓

key
✓ = yes
✗ = no

3 The diagram shows a typical plant cell which has been in a concentrated salt solution for 10 minutes.



Which numbered structures are partially permeable?

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

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4 Which row applies to active transport?

	movement occurs from region of higher concentration to region of lower concentration	movement occurs from region of lower concentration to region of higher concentration	an example is ion uptake by root hairs	an example is water uptake by root hairs
A	✓	✗	✓	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✓	✗	✓

key

✓ = yes

✗ = no

5 Which statements are correct?

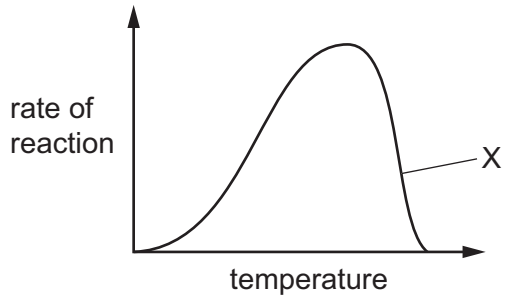
1 Enzymes are proteins and function as catalysts.

2 Enzymes are changed by the reaction they catalyse.

3 The 'lock and key' hypothesis explains the way that enzymes function.

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

6 The diagram shows the effect of temperature on the rate of an enzyme-controlled reaction.



What is the explanation for the part of the graph labelled X?

A The temperature is dropping.

B The substrate is starting to run out.

C The enzyme is becoming denatured.

D The enzyme is starting to run out.

7 A small mountain lake has aquatic plants growing under water on the lake bed. Shortly after heavy rainfall, the mud on the lake bed becomes stirred up and the water level rises.

Why does this cause the rate of photosynthesis of these plants to fall?

A extra carbon dioxide

B extra dissolved nitrates

C lower light intensity

D lower oxygen concentration

8 Some plants have large leaves and are growing well but the leaves are turning yellow.

Which factor is likely to be causing this problem?

A a lack of magnesium in the soil

B a lack of water in the soil

C not enough sunlight

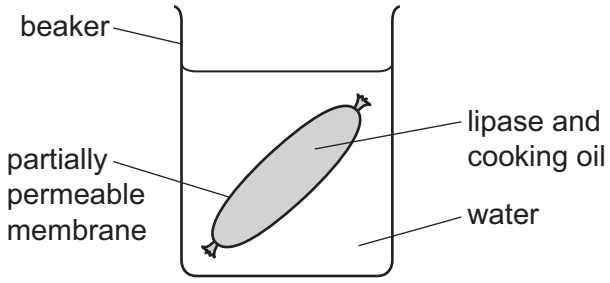
D too much nitrate in the soil

9 Which row shows the average daily energy requirement for the people in the table?

	7500 kJ	9000 kJ	10 500 kJ	15 000 kJ
A	6-year-old child	pregnant woman	male manual labourer	teenage girl
B	6-year-old child	teenage girl	pregnant woman	male manual labourer
C	teenage girl	6-year-old child	male manual labourer	pregnant woman
D	teenage girl	pregnant woman	6-year-old child	male manual labourer

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10 The diagram shows an experiment.



After 30 minutes, tests were carried out on the contents of the membrane bag and on the water in the beaker.

Which row shows the results of the tests?

	biuret test on water in the beaker	biuret test on the contents of the bag	pH of water in the beaker
A	blue	blue	6.0
B	blue	purple	5.5
C	red	purple	7.0
D	purple	blue	8.0

11 Which function is **not** carried out by the liver?

A breakdown of alcohol

B conversion of glycogen to glucose

C formation of urea

D secretion of digestive enzymes

12 Which statements about root hairs are correct?

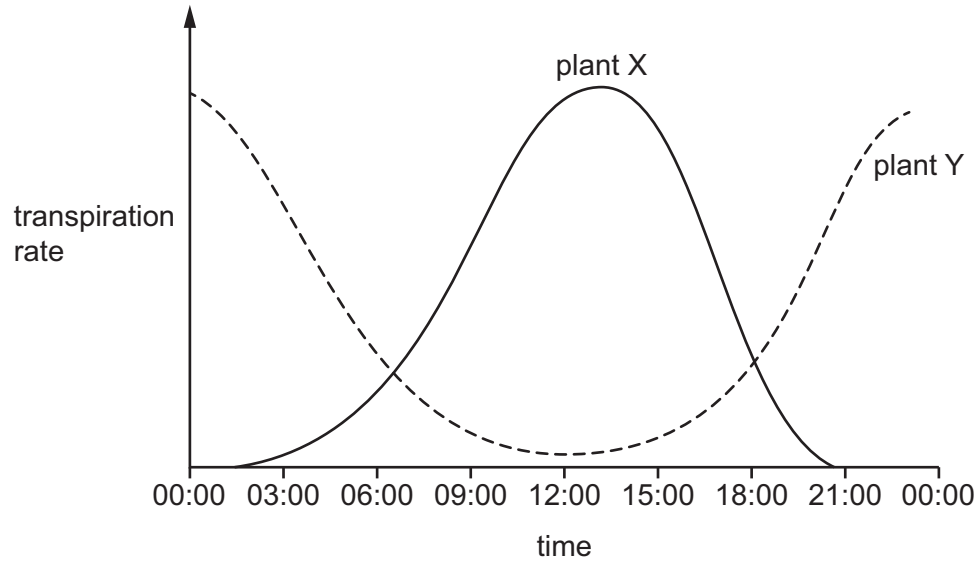
1 The cell membrane can allow movement of water and ions into the cell.

2 The cell vacuole extends into the root hair.

3 They are formed as an extension of the outer layer of root cells.

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

13 The graph shows the transpiration rates of two plants during one day. Both plants were grown under identical conditions.



Which statement explains what the graph shows?

A Plant X closes its stomata during the brightest part of the day.

B Plant Y closes its stomata during the brightest part of the day.

C Plants X and Y close their stomata during the brightest part of the day.

D Plant Y has no stomata.

14 Some people have a rare heart condition in which the lower left chamber of the heart has not developed properly and is much smaller than normal.

The immediate result of this condition is to cause lower than normal blood flow into which blood vessel?

A aorta

B pulmonary artery

C pulmonary vein

D vena cava

15 Tissue transplants are normally rejected by the body unless the transplant tissue and the patient are very carefully matched.

Which component of the blood is responsible for the rejection of transplanted tissue?

A plasma

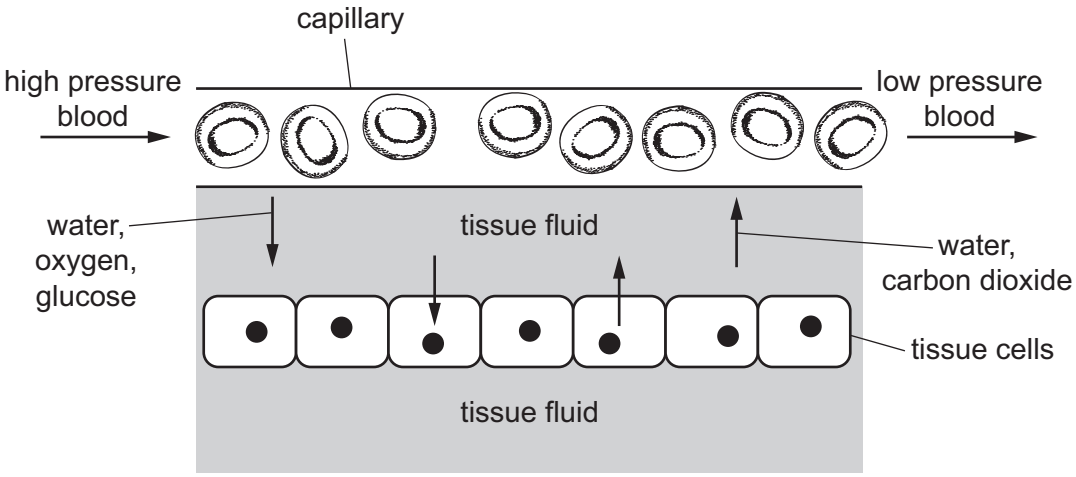
B platelets

C red blood cells

D white blood cells

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16 The diagram shows movement of substances between blood in a capillary and tissue fluid.



By which process does water move from tissue fluid to capillary?

A active transport

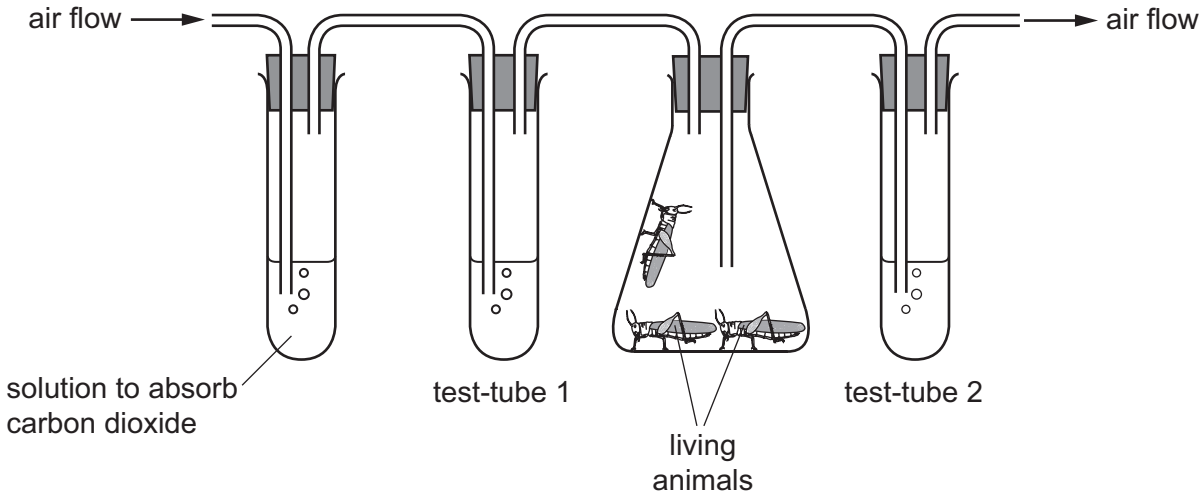
B water pressure

C osmosis

D assimilation

17 An experiment is set up, as shown.

Test-tubes 1 and 2 contain limewater. Limewater is a clear solution that turns cloudy in the presence of carbon dioxide. Air is pumped through the apparatus.



What is the appearance of the limewater in test-tubes 1 and 2 after a period of 10 minutes?

	test-tube 1	test-tube 2
A	clear	clear
B	clear	cloudy
C	cloudy	clear
D	cloudy	cloudy

18 Which equation represents anaerobic respiration in yeast?

A glucose → ethanol

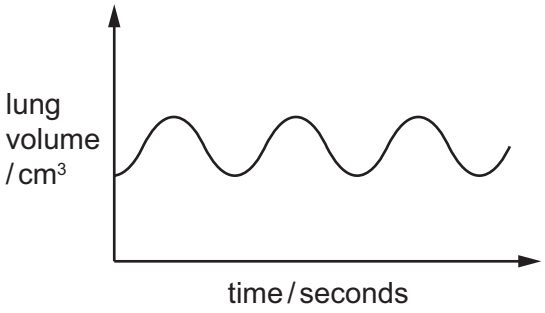
B glucose → ethanol + lactic acid

C glucose → lactic acid + carbon dioxide

D glucose → ethanol + carbon dioxide

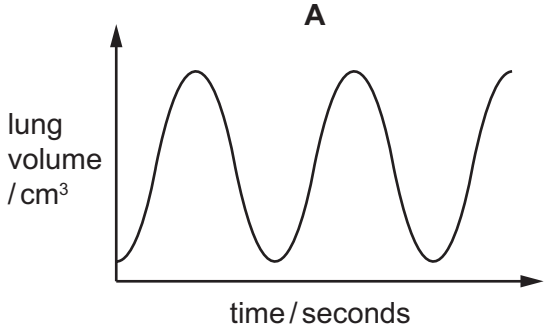
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19 The graph shows the rate and depth of breathing at rest.

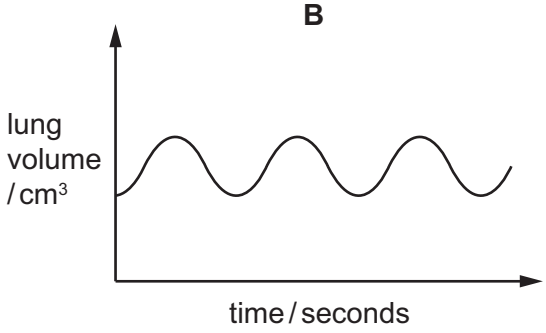


Which graph shows the rate and depth of breathing during exercise?

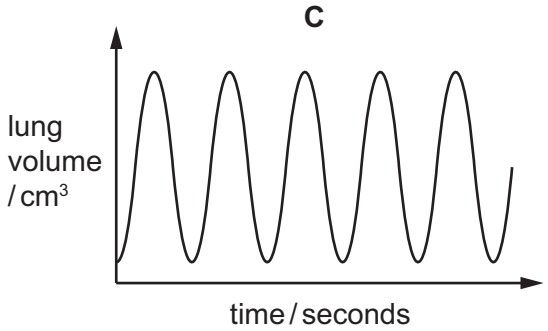
A



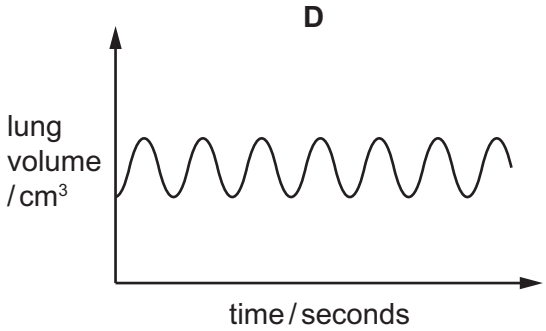
B



C



D



20 How do the concentrations of oxygen and urea in the renal artery compare to their concentrations in the renal vein?

	oxygen in renal artery	urea in renal artery
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

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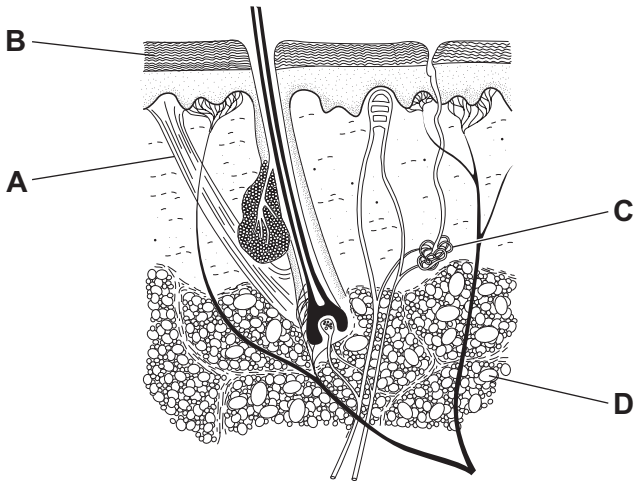
[Turn over

21 Which changes 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

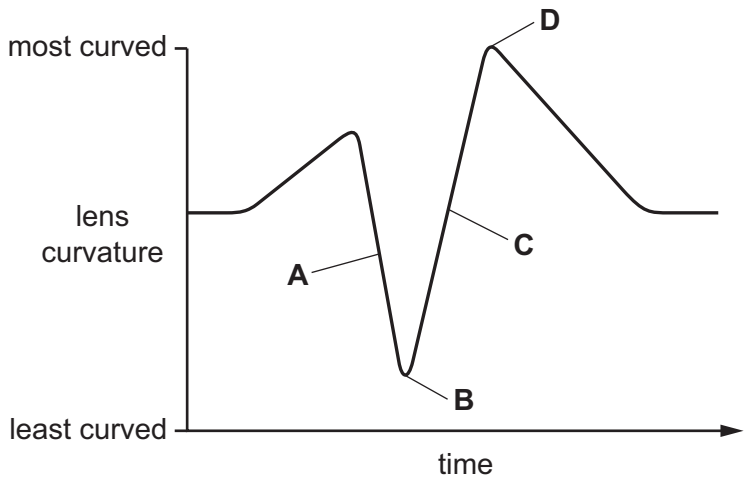
22 The diagram shows a section through part of the skin.

Which structure is the best insulator?

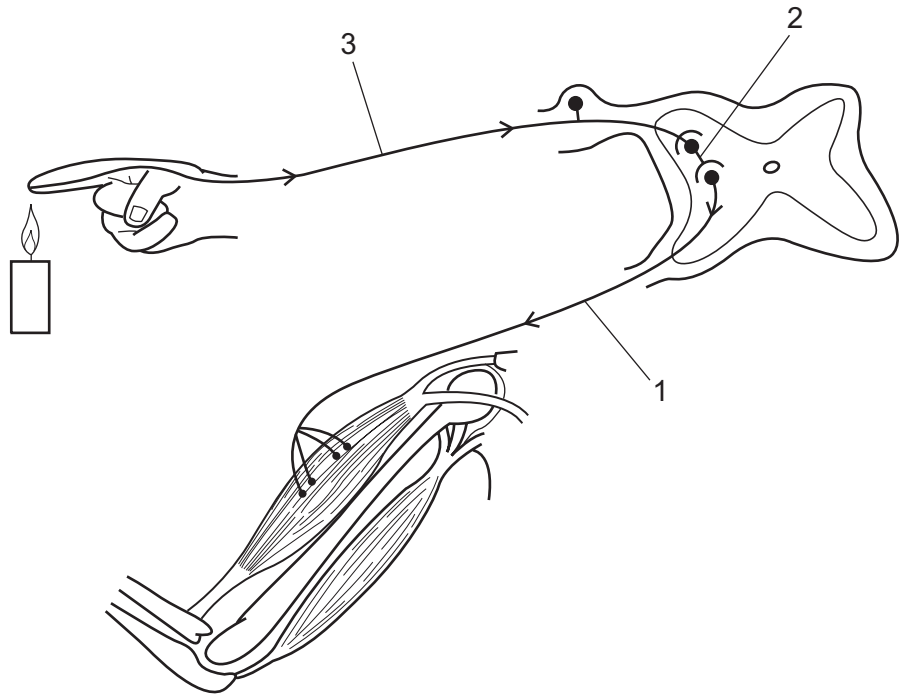


23 The graph shows changes in the shape of the lenses of a person's eyes while watching a bird flying.

At which point is the bird flying most rapidly towards the person?



24 The diagram shows the nerve pathway in a reflex action when a person accidentally touches something hot.



Which row correctly identifies a sensory neurone, a relay neurone and a motor neurone?

	1	2	3
A	motor neurone	relay neurone	sensory neurone
B	sensory neurone	relay neurone	motor neurone
C	relay neurone	motor neurone	sensory neurone
D	motor neurone	sensory neurone	relay neurone

25 A patient shows symptoms of unexplained weight loss, severe thirst and frequent need of urination.

A test shows high levels of glucose in the urine.

Which condition is diagnosed?

A cardiovascular disease

B diabetes

C anaemia

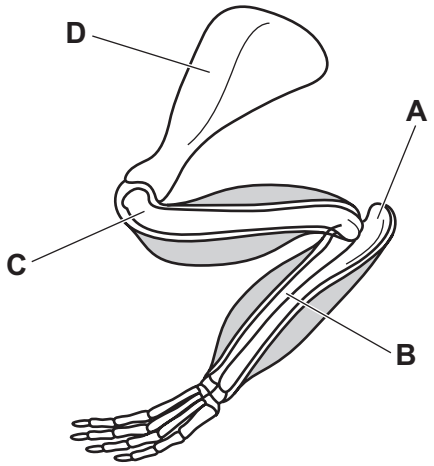
D obesity

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[Turn over

26 The diagram shows the forelimb of a rabbit.

Which labelled bone is the ulna?



27 Which activity is most likely to cause lung disease?

A excessive use of antibiotics

B excessive consumption of alcohol

C injection of heroin

D smoking cigarettes

28 The table shows some features of three types of microorganism.

type of microorganism	cell wall	cell membrane	nucleus	cytoplasm
1	✗	✗	✗	✗
2	✓	✓	✗	✓
3	✓	✓	✓	✓

key

✓ = present

✗ = absent

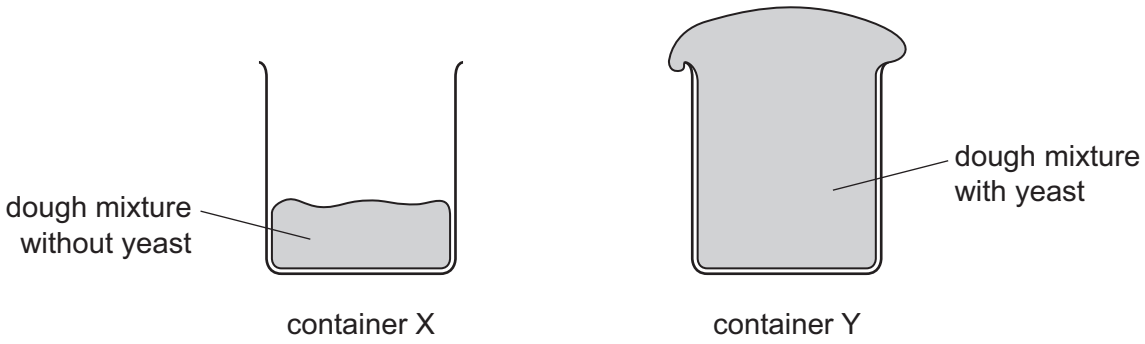
Which row identifies each type of microorganism?

	microorganism 1	microorganism 2	microorganism 3
A	bacterium	virus	fungus
B	fungus	bacterium	virus
C	virus	bacterium	fungus
D	virus	fungus	bacterium

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29 Two containers, X and Y, were filled with equal amounts of dough mixture for making bread. The mixture in Y had yeast in it.

The containers were then left in a warm place for two hours. The diagram shows their appearance after this time.



Which substance produced by the yeast causes the difference between the dough in X and Y?

A alcohol

B carbon dioxide

C lactic acid

D oxygen

30 Which types of microorganism carry out decomposition in the nitrogen cycle?

A bacteria and fungi only

B bacteria and viruses only

C fungi and viruses only

D bacteria, fungi and viruses

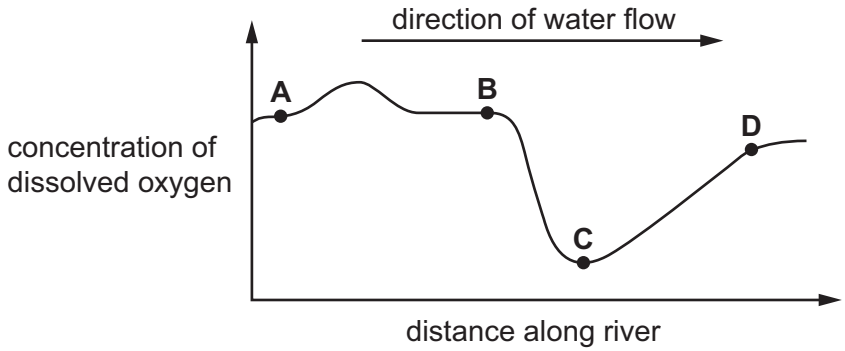
31 Which actions can be used to control the malarial pathogen?

	releasing carnivorous fish in ponds and lakes	applying antibiotic creams to the skin	spraying insecticides on buildings	vaccination with the malarial vector
A	yes	yes	no	no
B	yes	no	yes	no
C	no	yes	no	yes
D	no	no	yes	yes

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32 The graph shows the concentration of dissolved oxygen at different points along a river.

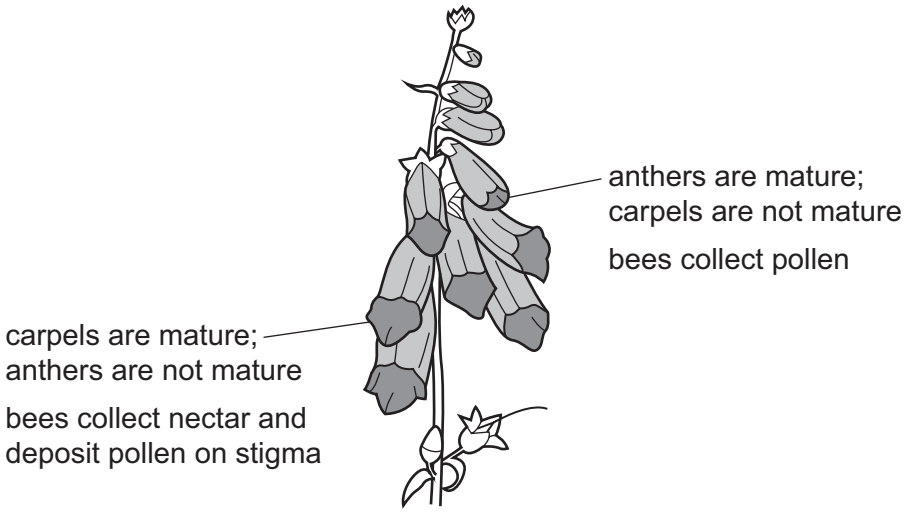
At which point is sewage emptied into the river?



33 The diagram shows how bees visit a species of flowering plant that has tall spikes of flowers.

In the flowers at the base of the spike, the carpels are mature but the anthers are not yet mature.

In the flowers at the top of the spike, the anthers are mature but the carpels are not yet mature.



Which statements are correct?

1 Bees visit two flowers for successful pollination.

2 The difference in maturing times for anthers and carpels ensures pollination between flowers.

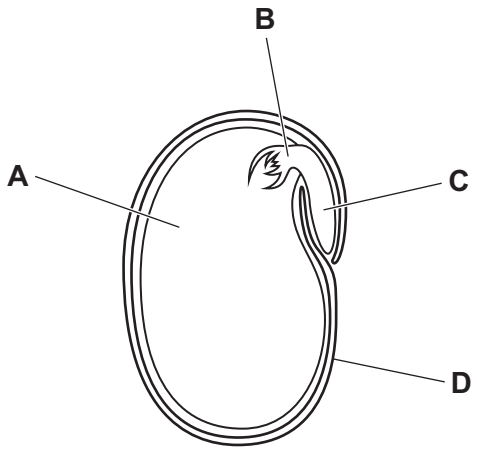
3 Seeds will develop first in the flowers at the top of the plant.

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

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34 The diagram shows a section through a dicotyledonous seed.

Which structure provides most of the nutrients needed for the seed to grow after germination?



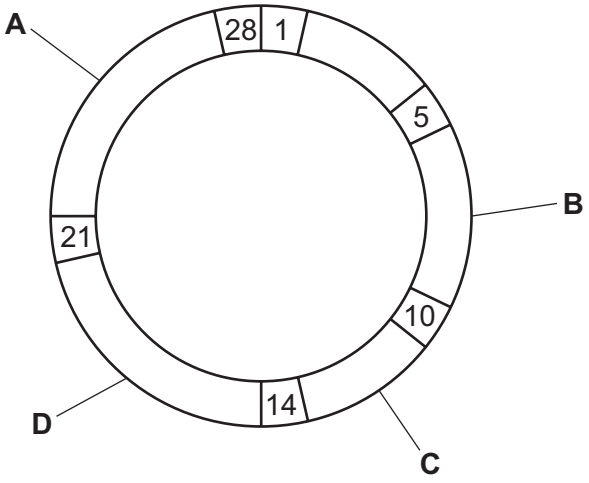
35 Human gametes are different from each other.

Which information about male gametes is correct?

	size	numbers released at one time	movement
A	large	normally one	cannot move on their own
B	large	millions	cannot move on their own
C	small	normally one	can swim
D	small	millions	can swim

36 The diagram shows the menstrual cycle. The numbers refer to the number of days after the beginning of menstruation.

Which label shows a point in the cycle when implantation is most likely to occur?



37 A variety of snail has an inherited condition that affects the thickness of the shell.

$S^t S^t$ have thick shells.

$S^t S^n$ have thin shells.

$S^n S^n$ do **not** survive.

Two heterozygous snails are mated.

What is the probability that a surviving snail of the next generation is a heterozygote?

A 0.00 **B** 0.25 **C** 0.50 **D** 0.67

38 A man of blood group A and his wife of blood group O had two children, both of blood group A. The man concluded that he must be homozygous for the allele I^A, since he thought half his children would be of group O if he were heterozygous.

Why was his conclusion unsound?

A Blood group mutations are common.

B Genetic ratios are unreliable for small numbers.

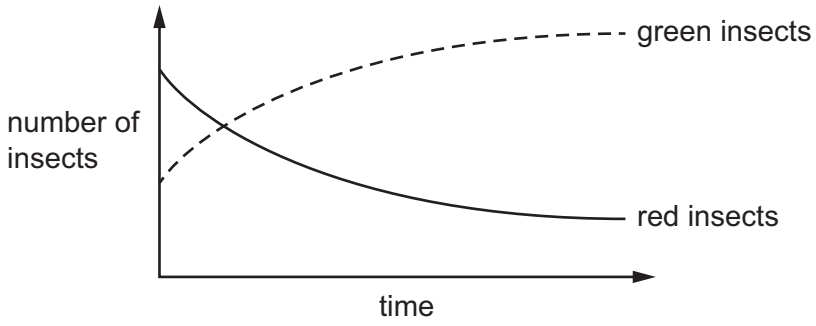
C His wife might have been heterozygous.

D The expected ratio for a heterozygous father and group O mother is 3 group A : 1 group O.

39 In a garden there is a species of insect which can be either red or green in colour. The green insects are well camouflaged.

Birds that eat insects start to live in the garden.

The graph shows how the populations of red and green insects then change.



What is this an example of?

A artificial selection

B continuous variation

C incomplete dominance

D natural selection

40 What can be the benefits of genetic engineering of crops?

1 crops that can be stored for longer

2 crops with a better flavour

3 less use of fertilisers

4 less use of pesticides

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1 and 2 only

D 3 and 4 only

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