Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/23**

Paper 2 Multiple Choice (Extended) **October/November 2023**

45 minutes

You must answer on the multiple choice answer sheet.

3773899572

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.

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1 What are characteristics of all living organisms?

A breathing, growth and movement

B egestion, nutrition and reproduction

C digestion, excretion and respiration

D reproduction, respiration and sensitivity

2 Using the binomial system, the name of a lion is *Panthera leo*.

Which statement is correct?

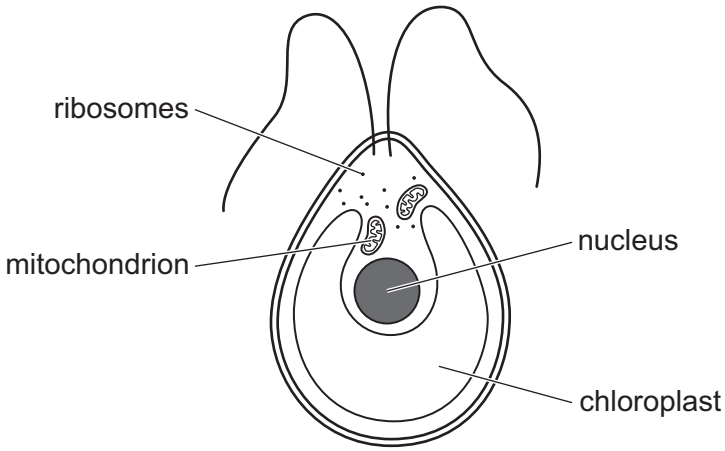
A The lion belongs to the kingdom *Panthera*.

B The lion belongs to the genus *Panthera*.

C The lion belongs to the species *Panthera*.

D The lion belongs to the genus *leo*.

3 The diagram shows an organism called *Chlamydomonas*.



Which processes can *Chlamydomonas* carry out?

A photosynthesis and respiration only

B photosynthesis, respiration, and protein synthesis

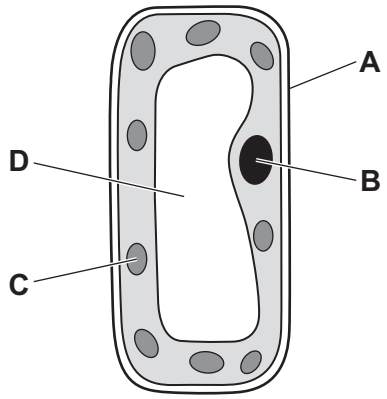
C protein synthesis and respiration only

D respiration only

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4 The diagram shows the structure of a palisade cell from a leaf.

Which structure contains chlorophyll?



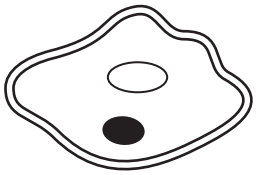
5 A diagram of a white blood cell has a diameter of 76 mm. The magnification of the diagram is ×8000.

What is the actual diameter of the white blood cell?

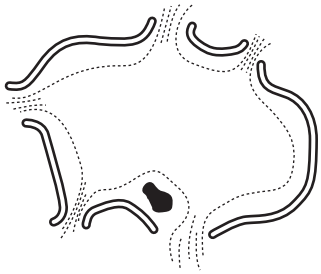
A 0.095 µm **B** 0.95 µm **C** 9.5 µm **D** 95.0 µm

6 Which diagram shows the appearance of a plant cell after it is placed in pure water?

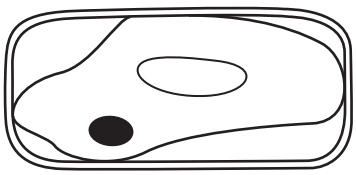
A



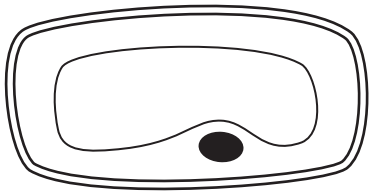
B



C



D



7 Which process requires active transport?

A oxygen movement from the alveoli to the blood

B ion uptake by root hair cells from the soil

C water movement through a plant by transpiration pull

D absorption of water into a lacteal in a small intestine villus

8 Which row shows the chemical elements contained in fats?

	carbon	hydrogen	nitrogen	oxygen
A	✓	✓	✗	✓
B	✓	✗	✓	✗
C	✗	✓	✓	✓
D	✓	✓	✗	✗

key

✓ = present

✗ = absent

9 Glycogen is a large molecule made from smaller molecules.

Which smaller molecules is glycogen made from?

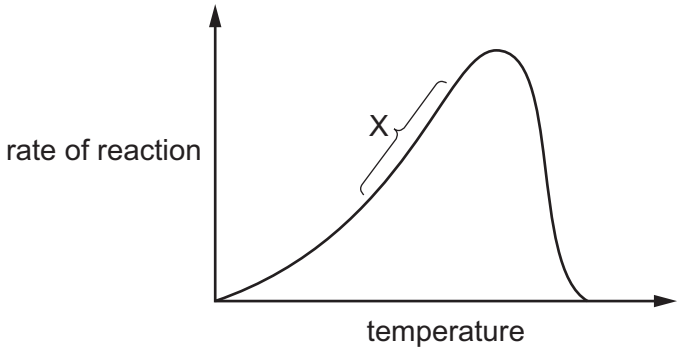
A amino acids

B fatty acids

C glucose

D glycerol

10 The graph shows the effect of temperature on the rate of a reaction catalysed by an enzyme.



Which statement explains the shape of the graph at section X?

A The enzyme is **not** the correct one to act on this substrate.

B The enzyme is starting to denature.

C The number of active sites is increasing.

D The frequency of enzyme-substrate collisions is increasing.

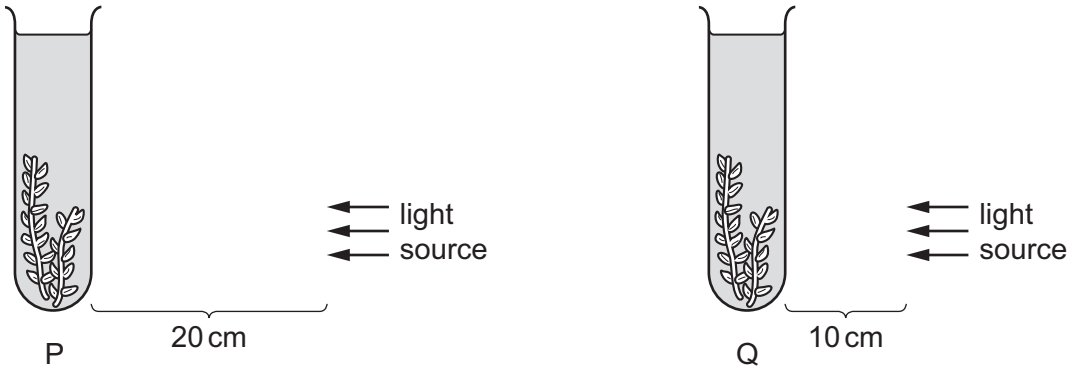
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11 During growth, potato plants produce flowers and underground storage organs called tubers.

During this time, which parts of the plant act as sources and sinks for translocation?

	flowers	leaves	potato tubers
A	sink	sink	source
B	sink	source	sink
C	source	sink	source
D	source	source	sink

12 The diagram shows an experiment investigating the effect of light intensity on an aquatic plant.



Photosynthesis occurred in both test-tube P and test-tube Q. Both test-tubes were kept at the same temperature. The number of bubbles produced in test-tube P was 12 bubbles per minute.

What is the most likely number of bubbles produced in one minute in test-tube Q?

A 0 **B** 3 **C** 12 **D** 48

13 Which human teeth are used for biting and cutting food?

A canines and molars

B incisors and canines

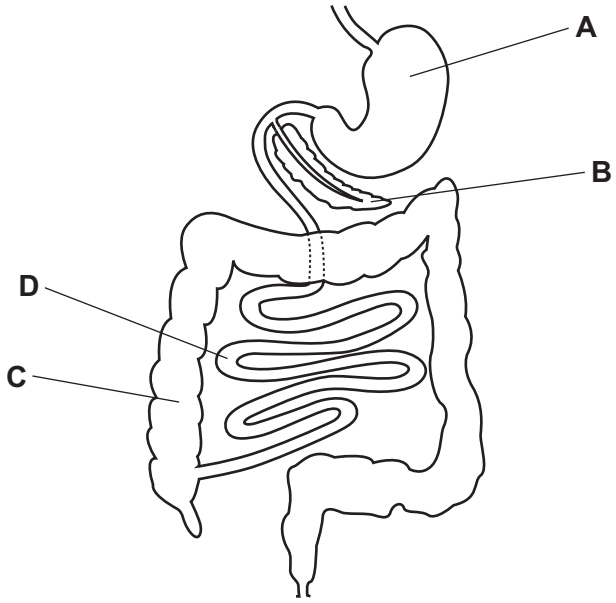
C molars and premolars

D premolars and incisors

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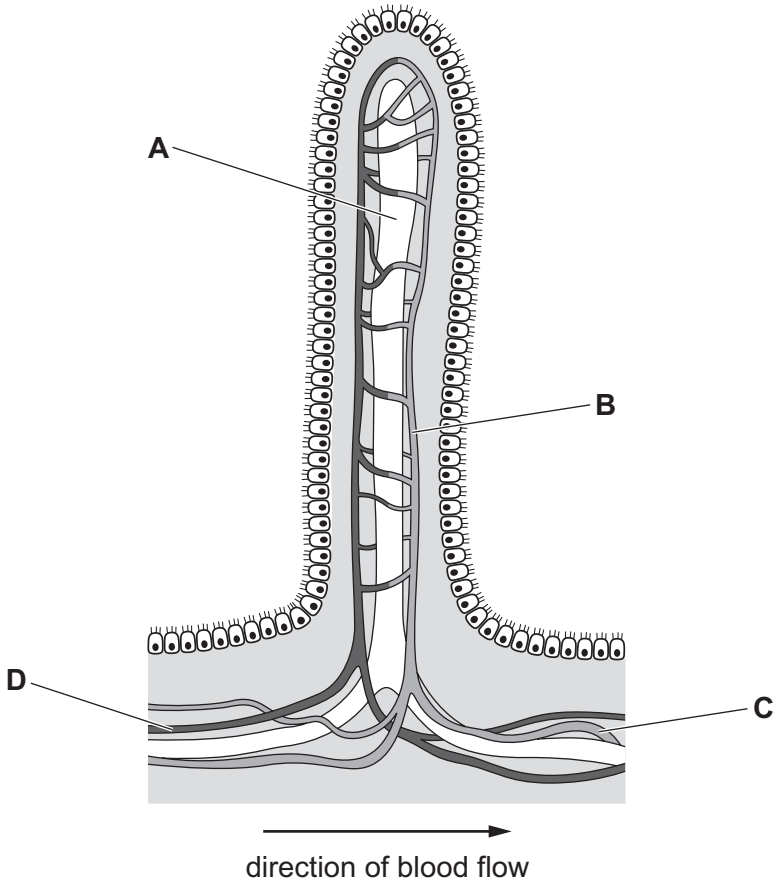
14 The diagram shows part of the human digestive system.

Which organ produces hydrochloric acid?



15 The diagram shows the structure of a villus. The artery, capillary, lacteal and vein are labelled with letters.

Which letter shows where nutrients are absorbed into the blood?



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16 By which process is water vapour lost from a leaf?

A active transport

B diffusion

C osmosis

D photosynthesis

17 The pathway taken by water through a plant is shown.

root hair cells → root cortex cells → Z → mesophyll cells

Which part of the pathway is Z?

A palisade cells

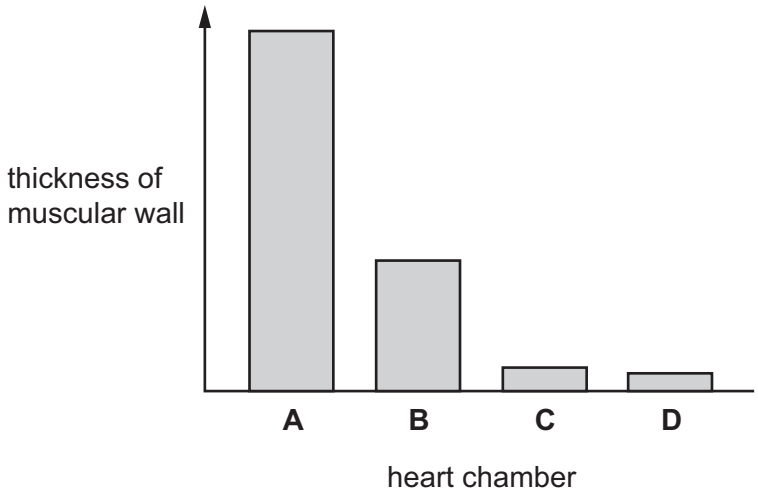
B phloem

C stomata

D xylem

18 The graph shows the thickness of the muscular wall in each of the four chambers of the mammalian heart.

Which chamber is the right ventricle?



19 Which row shows correct features of the circulatory system of a fish?

	number of atria	number of ventricles	number of times blood flows through the heart during one circuit of the body
A	one	one	one
B	one	two	two
C	two	one	two
D	two	two	two

20 Cholera infection can cause the following events.

1 Cells lining the small intestine secrete chloride ions.

2 Cholera bacteria produce a toxin.

3 Chloride ions move into the small intestine.

4 Water from the blood moves into the small intestine by osmosis.

5 Water potential of fluid in the small intestine becomes lower.

Which sequence of events will cause diarrhoea?

A $1 \rightarrow 3 \rightarrow 2 \rightarrow 4 \rightarrow 5$

B $2 \rightarrow 1 \rightarrow 3 \rightarrow 5 \rightarrow 4$

C $3 \rightarrow 1 \rightarrow 4 \rightarrow 5 \rightarrow 2$

D $2 \rightarrow 3 \rightarrow 1 \rightarrow 4 \rightarrow 5$

21 Which row shows the composition of expired air from a healthy person?

	carbon dioxide %	oxygen %	water vapour
A	0.04	21	saturated
B	0.04	16	variable
C	4	21	variable
D	4	16	saturated

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22 The table shows the relative concentrations of urea in the blood entering and leaving the kidneys and liver.

Which row is correct?

	highest concentration of urea in the blood	lowest concentration of urea in the blood
A	entering kidneys	leaving liver
B	entering kidneys	entering liver
C	leaving kidneys	entering liver
D	leaving kidneys	leaving liver

23 Which statement about anaerobic respiration is correct?

A Anaerobic respiration requires oxygen and releases less energy per glucose molecule than aerobic respiration.

B Anaerobic respiration requires oxygen and releases more energy per glucose molecule than aerobic respiration.

C Anaerobic respiration does **not** require oxygen and releases less energy per glucose molecule than aerobic respiration.

D Anaerobic respiration does **not** require oxygen and releases more energy per glucose molecule than aerobic respiration.

24 During exercise an oxygen debt may occur in muscles.

What is the cause of this oxygen debt?

A Aerobic respiration causes a decrease in lactic acid.

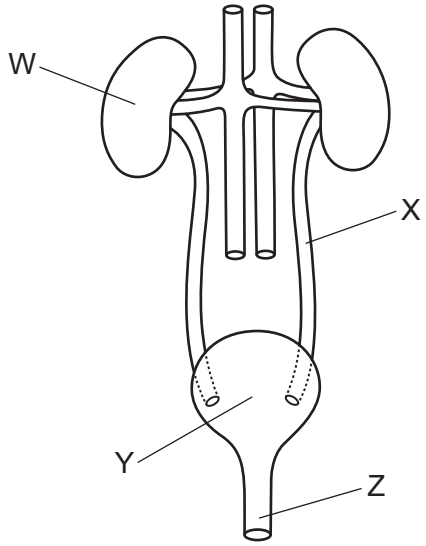
B Aerobic respiration causes an increase in lactic acid.

C Anaerobic respiration causes a decrease in lactic acid.

D Anaerobic respiration causes an increase in lactic acid.

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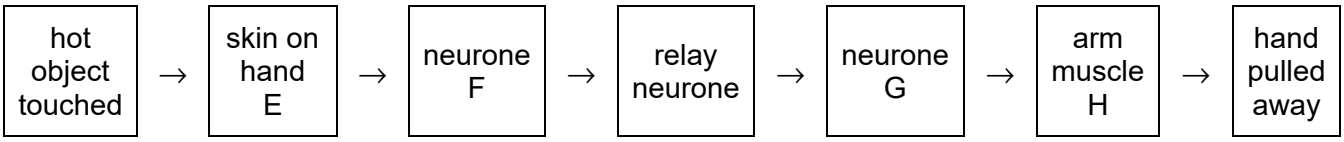
25 The diagram shows parts of the body involved in excretion in humans.



What are the labelled parts?

	W	X	Y	Z
A	bladder	ureter	kidney	urethra
B	kidney	ureter	bladder	urethra
C	bladder	urethra	kidney	ureter
D	kidney	urethra	bladder	ureter

26 The diagram shows a reflex action when a person touches a hot object and pulls their hand away.



Which letter correctly identifies a structure?

A E is called the effector.

B F is called the motor neurone.

C G is called the motor neurone.

D H is called the receptor.

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27 A light source is placed on one side of a growing plant.

What is the correct explanation of the role of auxin in shoot growth?

A Auxin is equally distributed in response to light and stimulates cell elongation.

B Auxin is equally distributed in response to light and inhibits cell elongation.

C Auxin is unequally distributed in response to light and stimulates cell elongation.

D Auxin is unequally distributed in response to light and inhibits cell elongation.

28 Which statement about antibiotics is correct?

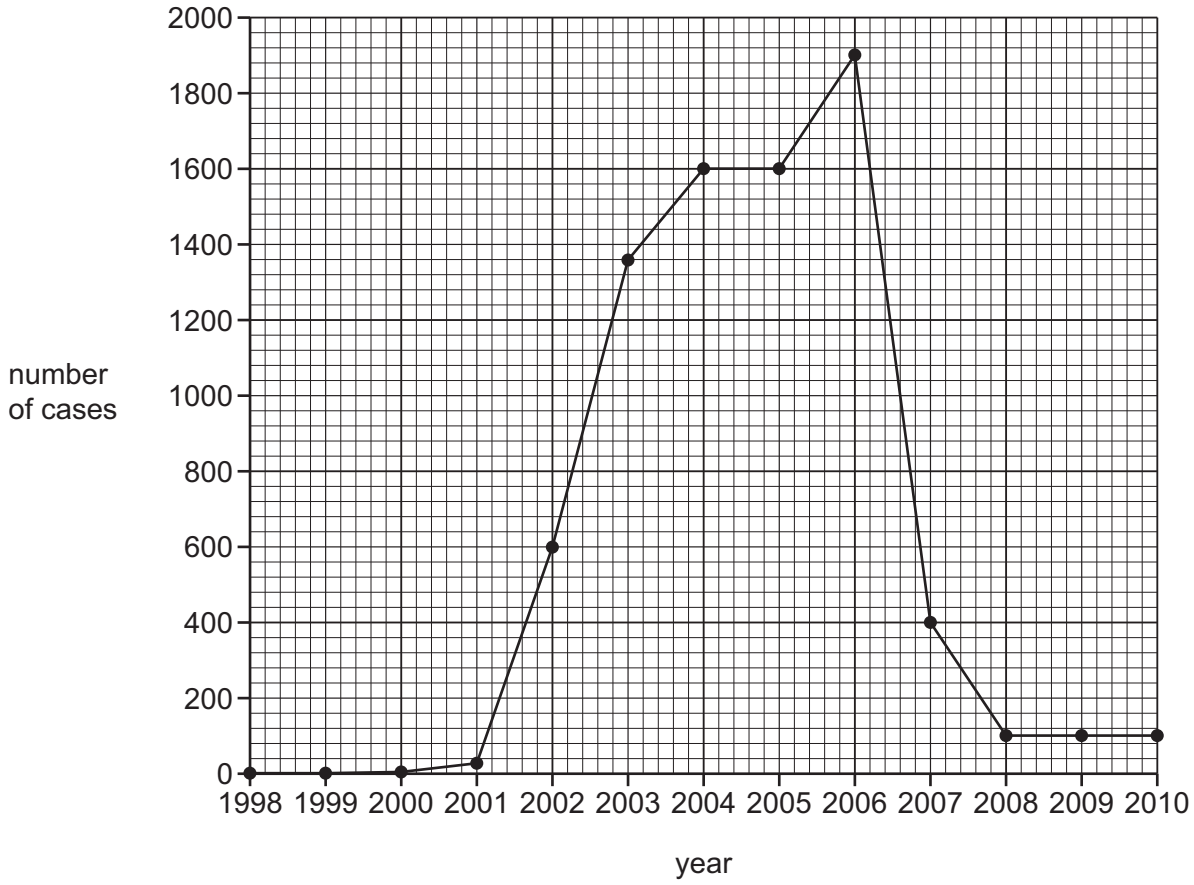
A Antibiotics are drugs.

B Antibiotics are produced by white blood cells.

C Antibiotics can become resistant to bacteria.

D Antibiotics kill viruses.

29 The graph shows the number of cases of disease caused by MRSA bacteria in hospitals in one city between 1998 and 2010.



What was the percentage change in the number of cases between 2002 and 2003?

A 44% **B** 56% **C** 127% **D** 227%

30 Some descriptions of reproduction are listed.

1 formation of a zygote with a diploid nucleus

2 formation of a zygote with a haploid nucleus

3 fusion of diploid nuclei of two gametes

4 fusion of haploid nuclei of two gametes

Which are correct descriptions of sexual reproduction in humans?

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

31 Which statement about pollination in plants is correct?

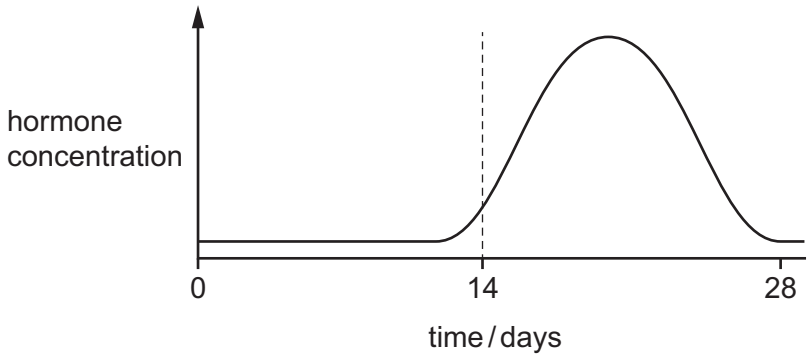
A Cross-pollination is the transfer of pollen from the anther of a flower to the style of the same flower.

B Cross-pollination is the transfer of pollen from the anther of a flower to the stigma of a flower on a different plant of the same species.

C Self-pollination is the transfer of pollen from the anther of a flower to the filament of the same flower.

D Self-pollination is the transfer of pollen from the anther of a flower to the stigma of a flower on a different plant.

32 The graph shows the changes in the concentration of a hormone that is involved in controlling the menstrual cycle.



What is the hormone?

A FSH

B LH

C oestrogen

D progesterone

33 Pea plants produce either yellow or green seeds. Yellow (Y) is dominant to green (y).

What are the most likely phenotypes of the offspring of a cross between YY and Yy plants?

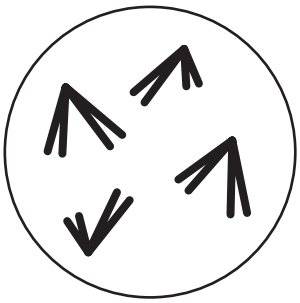
A 50% yellow and 50% green

B 75% yellow and 25% green

C 100% yellow

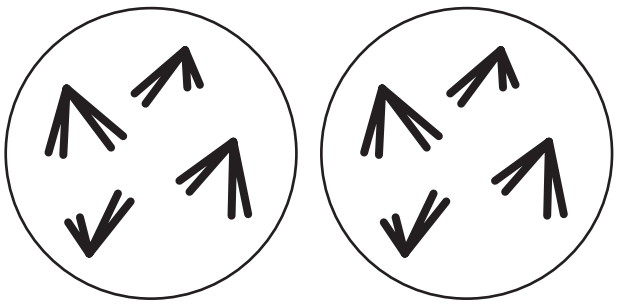
D 100% green

34 The diagram shows the chromosomes of a cell after they have replicated and just before the cell divides by mitosis.

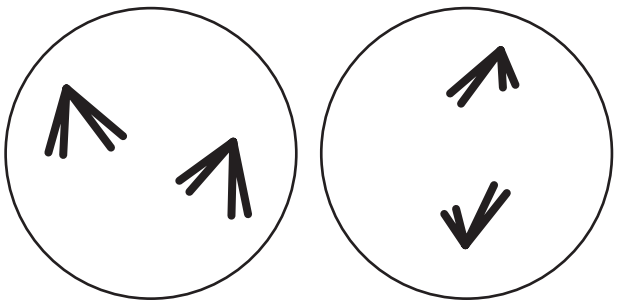


Which pair of cells will be produced at the end of mitosis?

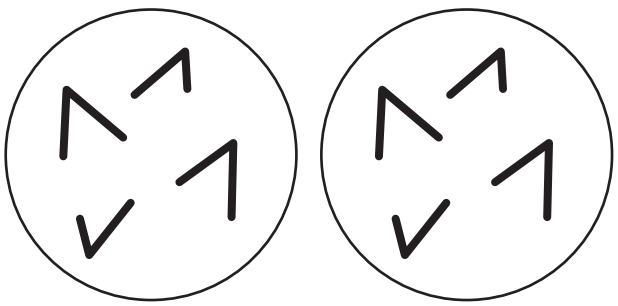
A



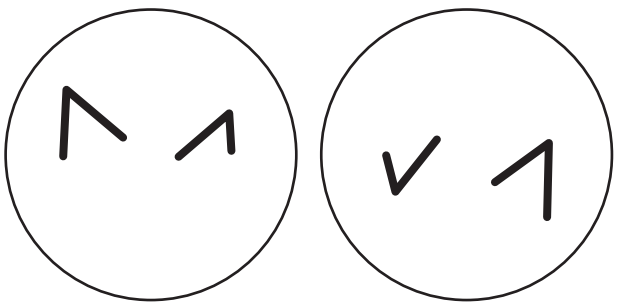
B



C



D



35 The table shows the number of stomata per mm^2 on the upper and lower epidermis of four different plants.

Which plant is **most** likely to be a hydrophytic plant?

	number of stomata per mm^2	
	upper epidermis	lower epidermis
A	25	16
B	70	88
C	460	0
D	0	150

36 In which process in the nitrogen cycle do microorganisms take nitrogen from the air and convert it into nitrogen compounds?

A decomposition

B denitrification

C nitrification

D nitrogen fixation

37 An increased concentration of nitrates in water may result in the death of fish because of eutrophication.

Some stages of eutrophication are given.

1 increased aerobic respiration by decomposers

2 increased decomposition after death of producers

3 increased growth of producers

4 reduction in dissolved oxygen

What is the order of these stages that results in the death of fish?

A $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

B $1 \rightarrow 2 \rightarrow 4 \rightarrow 3$

C $3 \rightarrow 2 \rightarrow 1 \rightarrow 4$

D $3 \rightarrow 4 \rightarrow 2 \rightarrow 1$

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38 Which word describes the number of different species in an area?

A biodiversity

B community

C ecosystem

D population

39 Which statement is an advantage of genetically modifying crops?

A Less pesticide is used if the genetically modified crop is resistant to pests.

B More herbicide is used if the genetically modified crop is resistant to herbicide.

C Seeds for genetically modified crops are more expensive.

D The genetically modified crop genes may be passed to other plants.

40 Which statements are correct descriptions of parts of the process of protein synthesis?

1 Amino acids are made by the ribosomes.

2 mRNA is copied.

3 The gene coding for the protein moves into the nucleus.

4 The ribosome assembles the amino acids into protein molecules.

5 The sequence of amino acids is determined by the sequence of bases in the mRNA.

A 1, 2, 3, 4 and 5

B 1, 3 and 4 only

C 2, 3 and 5 only

D 4 and 5 only

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