Cambridge Assessment International Education

Cambridge O Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **October/November 2021**

1 hour

You must answer on the multiple choice answer sheet.

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 Four features found in cells are listed.

1 cell membrane

2 chloroplasts

3 nucleus

4 starch grains

Which two features are found in animal cells?

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

2 Which statement about diffusion is correct?

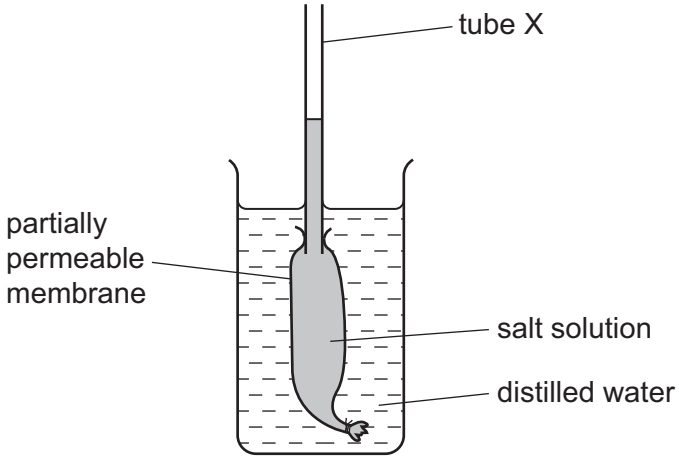
A Diffusion always involves the movement of water molecules.

B Diffusion depends on the presence of a partially permeable membrane.

C Diffusion only happens to molecules in a solution.

D Diffusion only involves molecules moving down a concentration gradient.

3 An experiment to investigate osmosis is set up as shown.



What happens to the height of the liquid in tube X and the concentration of the salt solution?

	height of the liquid in tube X	concentration of the salt solution
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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4 Which statement about enzymes is always correct?

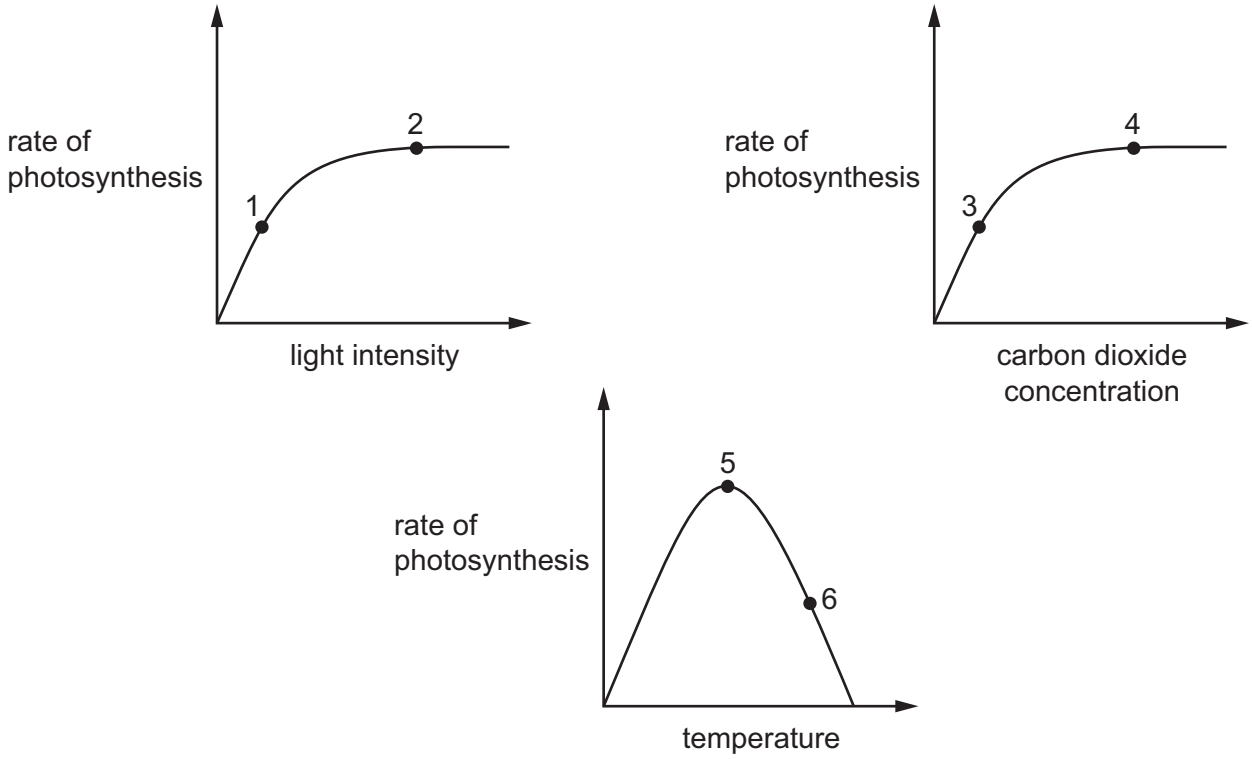
A They change reactions to produce different end products.

B They change the rate of reactions.

C They catalyse reactions inside body cells.

D They catalyse reactions at body temperature.

5 The graphs show factors affecting the rate of photosynthesis.

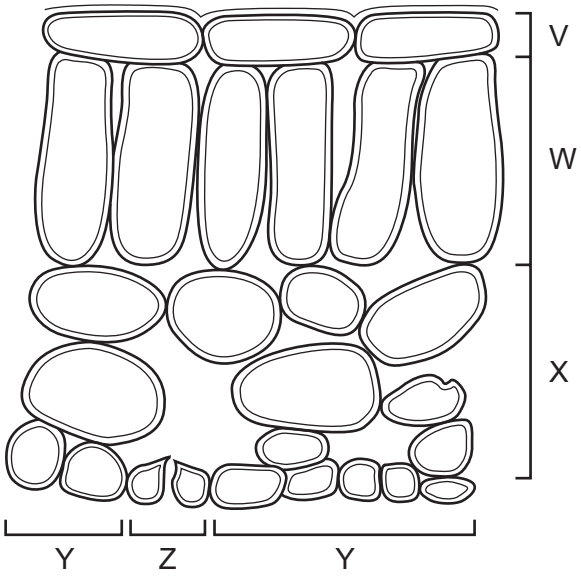


At which points on the graphs could the rate of photosynthesis be limited by carbon dioxide concentration?

A 1, 3 and 5 **B** 1, 4 and 6 **C** 2, 3 and 5 **D** 2, 4 and 6

6 The diagram shows the arrangement of cells inside a green leaf. Different types of cells are indicated by the brackets.

No cell contents are shown.



Which types of cells contain chloroplasts?

A V, W and X **B** V, W and Y **C** W, X and Y **D** W, X and Z

7 What will happen to a plant that does **not** receive enough magnesium ions from the soil?

A It will have elongated stems and yellow leaves.

B It will have elongated stems and green leaves.

C It will have stunted growth and yellow leaves.

D It will have stunted growth and green leaves.

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8 The table shows the colours obtained after testing three different foods for carbohydrates, fats and proteins.

test	food X	food Y	food Z
Benedict's	red	blue	blue
iodine	black	brown	brown
biuret	blue	violet	blue
ethanol emulsion	clear	clear	milky white

Which nutrients are present in foods X, Y and Z?

	food X	food Y	food Z
A	carbohydrates	proteins	fats
B	fats	proteins	carbohydrates
C	carbohydrates	fats	proteins
D	proteins	carbohydrates	fats

9 Which statement about chemical digestion in the human alimentary canal is correct?

A Digestion of carbohydrates is completed in the colon.

B Enzymes are secreted to break down cellulose in the duodenum.

C Protein digestion is completed in the ileum.

D The stomach secretes enzymes to break down starch.

10 Which two nutrients can lead to deformed bones if there is a deficiency of either of them in the diet?

A calcium and iron

B calcium and vitamin D

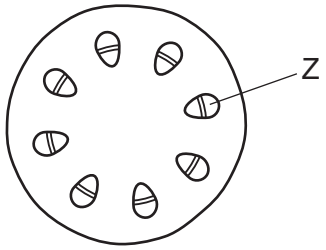
C iron and vitamin C

D vitamin C and vitamin D

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[Turn over

11 The diagram shows a section through a plant stem.



Which process is responsible for moving substances in region Z?

A diffusion

B osmosis

C translocation

D transpiration

12 What is transpiration?

A evaporation of water from the stomata

B evaporation of water at the surface of mesophyll cells and its loss through the stomata

C the movement of water through the cuticle

D the movement of water in the xylem from the roots to the leaves

13 How do veins differ from arteries?

	width of lumen in veins	wall thickness of veins	elastic fibres	muscles in wall
A	narrower	thicker	more	fewer
B	narrower	thinner	fewer	more
C	wider	thicker	more	more
D	wider	thinner	fewer	fewer

14 Sickle cell anaemia is an inherited condition which causes abnormal red blood cells.

Which health problem will be caused by this change in the red blood cells?

A Blood will not be able to clot when bleeding occurs.

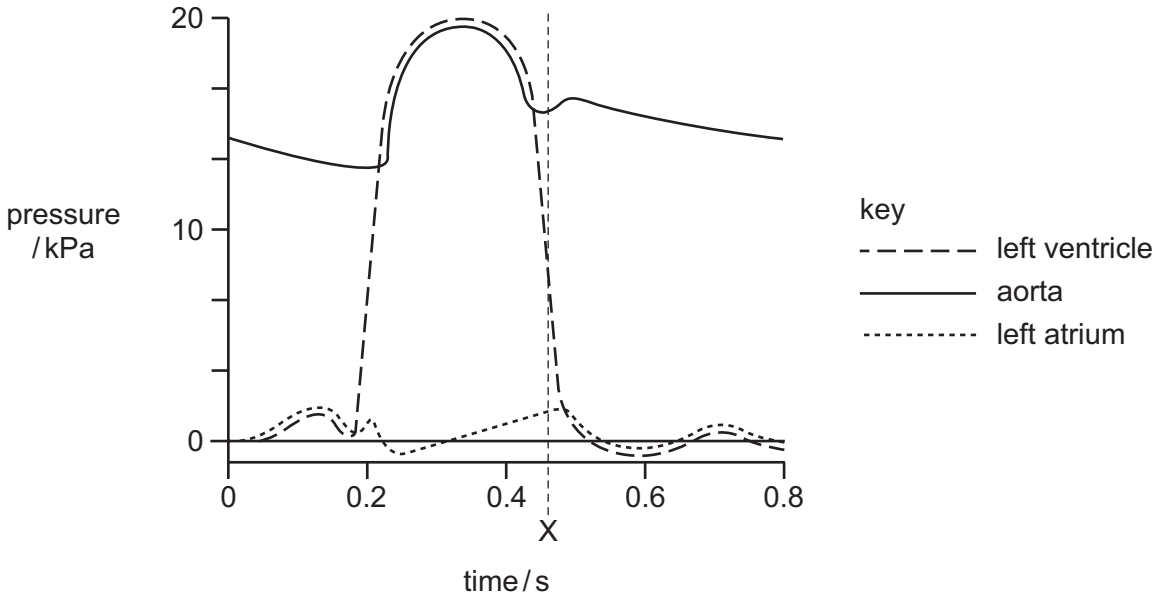
B Blood cells will not be able to form antibodies when needed.

C Glucose levels in the blood plasma will become too low.

D Blood will not be able to carry the normal amount of oxygen.

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15 The diagram shows the pressures in the left side of the heart during one heartbeat.



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

16 What are uses of energy from respiration?

	active transport	diffusion	cell division	osmosis
A	✓	✓	✗	✓
B	✓	✗	✓	✗
C	✗	✗	✓	✗
D	✗	✓	✗	✓

key
✓ = yes
✗ = no

17 Which statements about gaseous exchange in the alveoli are correct?

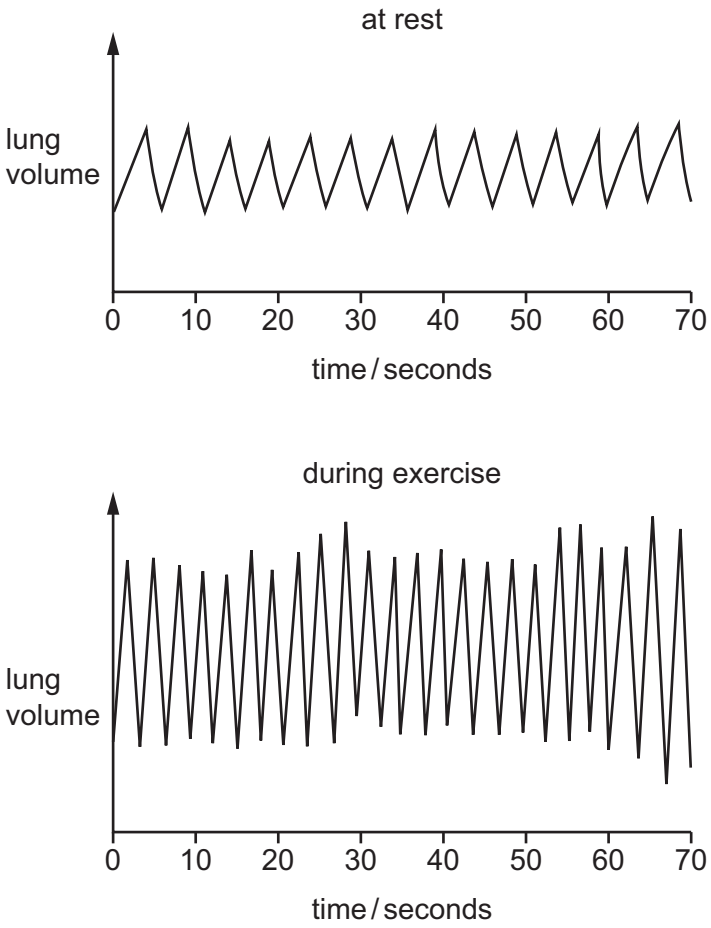
1 The alveolus wall is one cell thick.

2 Carbon dioxide can diffuse through the alveolus wall.

3 Oxygen dissolves in moisture on the surface of the alveolus before diffusing into the blood.

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

18 The graphs show records of a person's breathing at rest and during exercise.



What is the increase in breathing rate when the person is at rest and then exercises?

A 9 breaths per minute

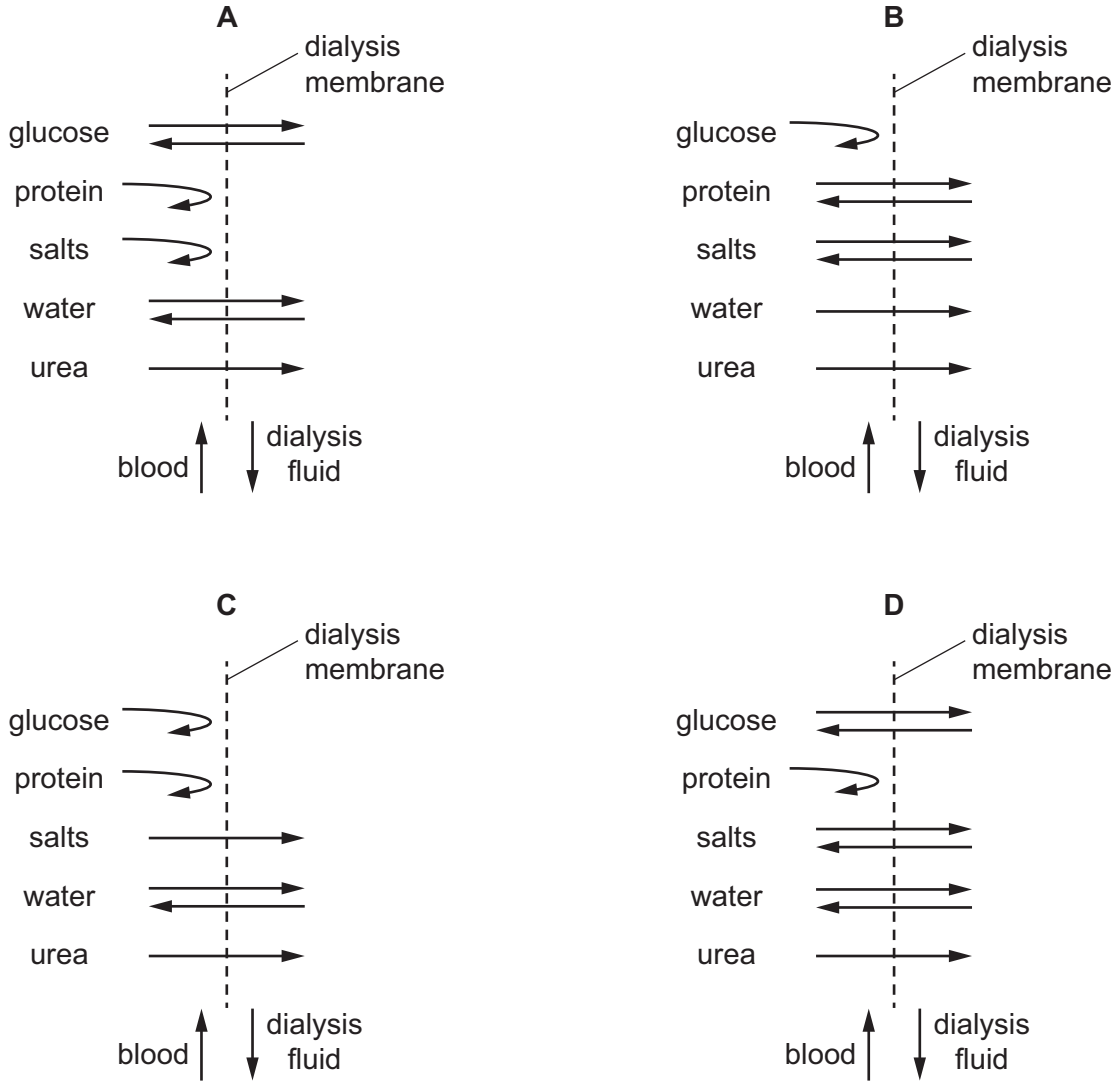
B 12 breaths per minute

C 21 breaths per minute

D 60 breaths per minute

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19 Which diagram shows the diffusion of substances between the blood and dialysis fluid during dialysis?



20 After exercise, human body temperature often rises above normal.

What will help to return the temperature to normal?

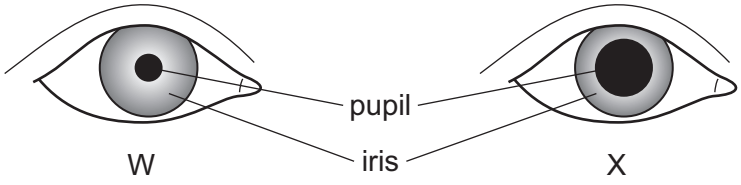
A an increase in the fat layer under the skin

B a hormonal response causing shivering

C a positive feedback mechanism

D dilation of blood vessels in the skin

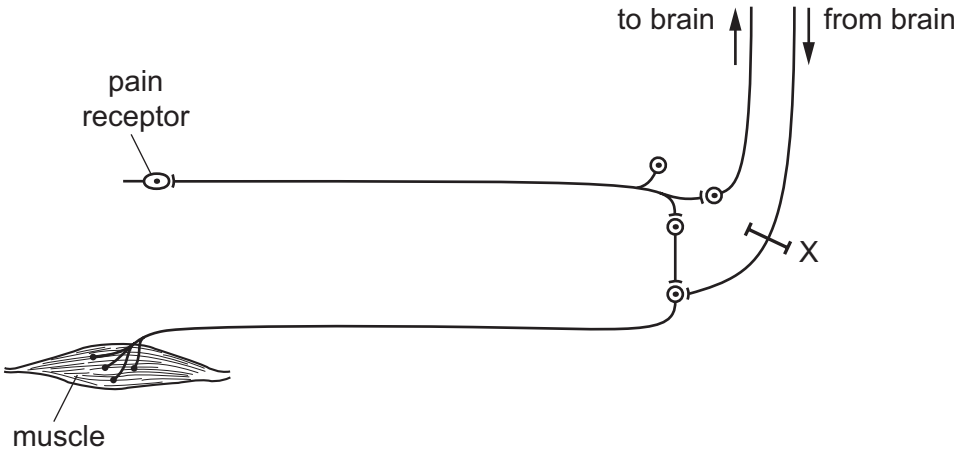
21 The diagrams show the front view of the pupil and iris of the eye in different light intensities.



Which row correctly describes diagram X?

	eye is in	circular muscles of the iris are	radial muscles of the iris are
A	bright light	relaxed	contracted
B	bright light	contracted	relaxed
C	dim light	relaxed	contracted
D	dim light	contracted	relaxed

22 The diagram shows some of the nerve pathways associated with a reflex action.



If the pathway at X is damaged, how does this affect the reflex?

A The person will not be aware that the reflex is occurring.

B The reflex cannot be controlled consciously.

C The response will occur without any stimulus.

D There is no response to the stimulus.

23 What occurs after an injection of insulin?

A More adrenaline is released into the blood.

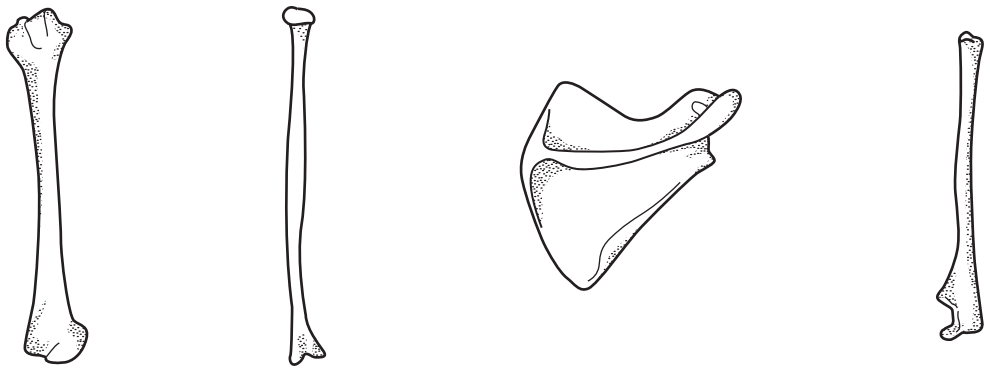
B More glycogen is released from the liver.

C The blood glucose concentration increases.

D The production of glycogen increases.

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24 The diagram shows the bones of the forelimb.



1 2 3 4

Which bones form the hinge joint of the forelimb?

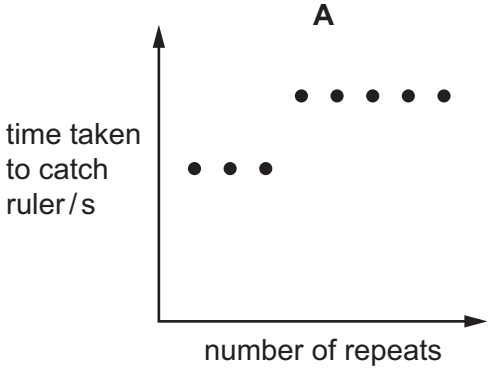
A 1, 2 and 3 **B** 1, 2 and 4 **C** 1, 3 and 4 **D** 2, 3 and 4

25 In an experiment, a person tested their reactions by measuring the time taken to catch a ruler that was dropped by another person.

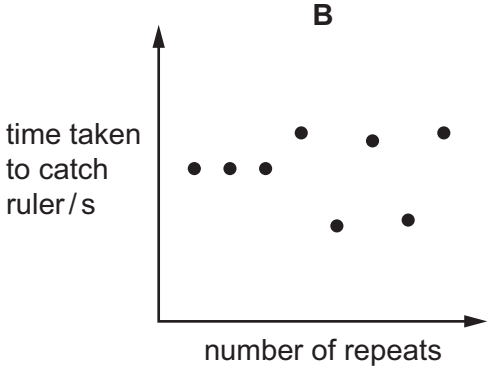
They then repeated the test some time after drinking alcohol.

Which graph shows their results?

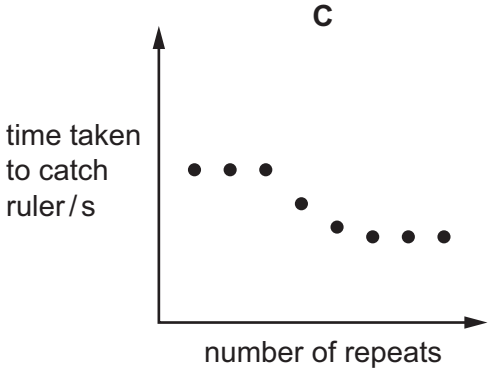
A



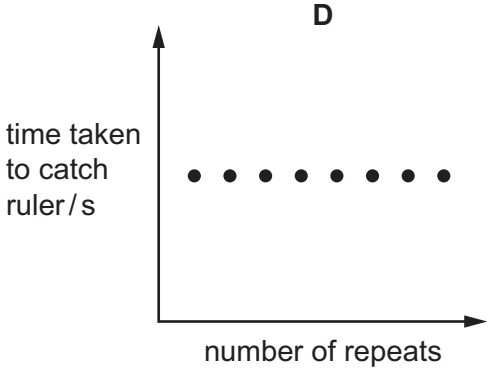
B



C



D



26 What is a feature of all bacteria?

A They are parasites.

B They have a nucleus.

C They are made of hyphae.

D They are single-celled organisms.

27 What is the main role of yeast in the production of beers and wines?

A to carry out aerobic respiration of sugar

B to produce ethanol by fermentation

C to release bubbles of carbon dioxide

D to reduce the amount of sugar in the product

28 What is a food chain?

A a diagram showing an organism getting its energy by feeding on other organisms

B a diagram showing an organism's diet

C a diagram showing the flow of energy through a chain of organisms

D a diagram showing the names of trophic levels

29 Why is it important that carbon is cycled in nature?

A Carbon compounds needed by living organisms are produced in respiration.

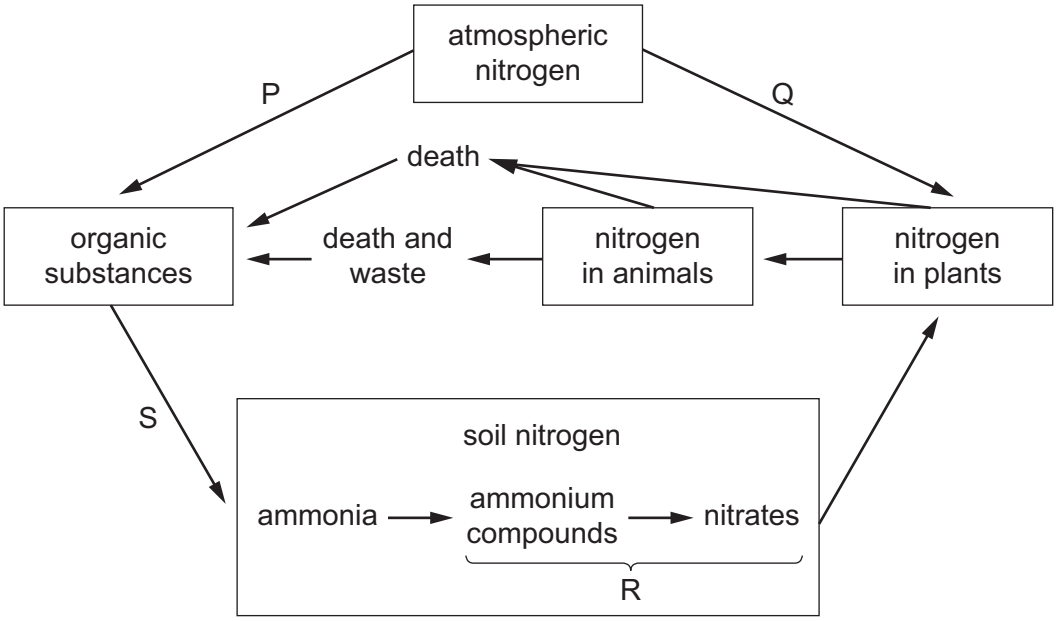
B Carbon dioxide is needed by animals for respiration.

C Living organisms need carbon compounds to make new proteins.

D Trees take in less carbon dioxide for photosynthesis than they produce in respiration.

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30 The diagram shows part of the nitrogen cycle.



What are processes P, Q, R and S?

	P	Q	R	S
A	nitrification	nitrification	decomposition	nitrogen fixation
B	nitrification	nitrogen fixation	nitrification	decomposition
C	nitrogen fixation	nitrification	decomposition	nitrogen fixation
D	nitrogen fixation	nitrogen fixation	nitrification	decomposition

31 Draining stagnant water is one method of controlling the malarial mosquito.

Which stages in the mosquito life cycle does this method affect?

A egg, larva, adult

B egg, larva, pupa

C egg, pupa, adult

D larva, pupa, adult

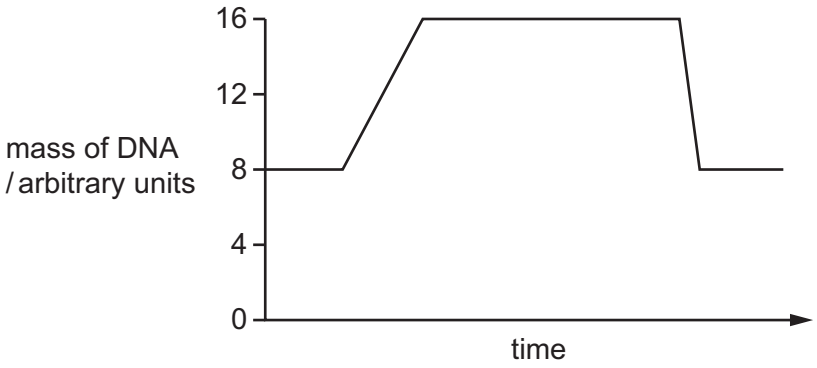
32 The table shows the source and the effect of four air pollutants.

air pollutant	source	effect
1	fossil fuels	acid rain
2	fossil fuels	greenhouse effect
3	rice fields	greenhouse effect
4	motor vehicles	acid rain

What are the four pollutants?

	1	2	3	4
A	carbon dioxide	methane	nitrogen oxides	sulfur dioxide
B	sulfur dioxide	carbon dioxide	methane	nitrogen oxides
C	methane	sulfur dioxide	nitrogen oxides	carbon dioxide
D	sulfur dioxide	carbon dioxide	nitrogen oxides	methane

33 The diagram shows the mass of DNA in cells which are dividing.

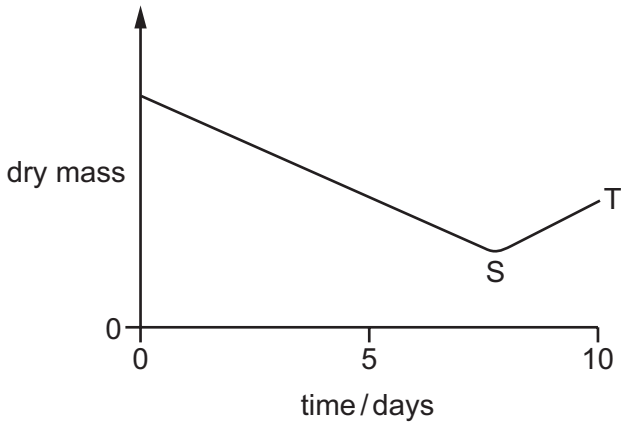


Which row describes this type of cell division?

	type of cell division	type of reproduction using this cell division	this type of cell division gives rise to
A	meiosis	asexual	genetically identical offspring
B	meiosis	sexual	genetically non-identical offspring
C	mitosis	asexual	genetically identical offspring
D	mitosis	sexual	genetically non-identical offspring

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34 The graph shows changes in the dry mass of a seed as it germinates and grows.



What causes the change shown between points S and T?

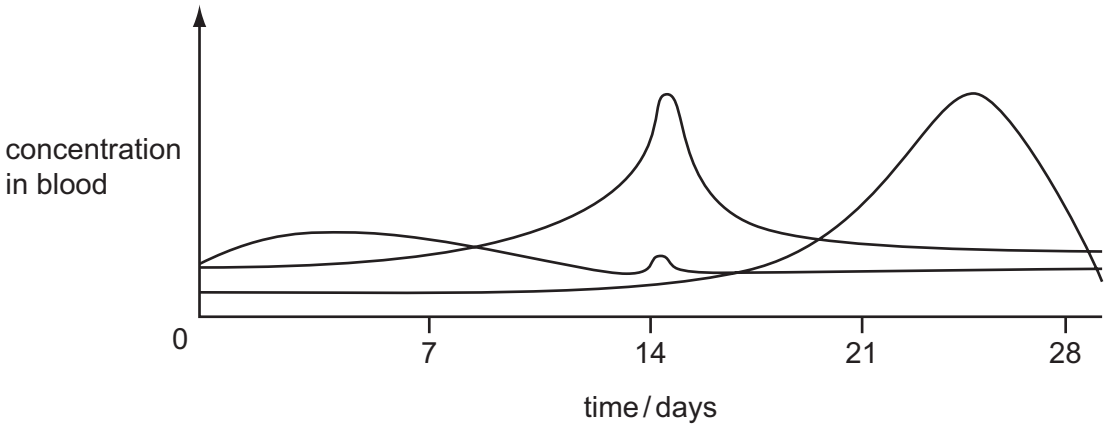
A osmosis

B photosynthesis

C respiration

D transpiration

35 The graph shows the concentration in the blood of three of the four hormones FSH, LH, oestrogen and progesterone during a menstrual cycle.



Which hormone is **not** shown?

A FSH

B LH

C oestrogen

D progesterone

36 The table gives statements about HIV.

Which row correctly marks the statements as true or false?

	all HIV-positive people develop AIDS	an unborn baby is at risk if their mother is HIV positive
A	✗	✓
B	✓	✗
C	✗	✗
D	✓	✓

key

✓ = true

✗ = false

37 What is an example of discontinuous variation in humans?

A height

B blood group

C hair colour

D mass

38 One gene has two codominant alleles, A^E and A^F, and one recessive allele, A^G.

How many different genotypes and phenotypes are possible?

	genotypes	phenotypes
A	3	3
B	4	6
C	6	4
D	6	6

39 What is a result of natural selection?

A dogs that are friendly to humans

B grapes that contain no seeds

C mosquitoes that are resistant to insecticides

D onion crops that have a pleasant taste

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40 During the division of a nucleus by meiosis, changes can happen that produce a gamete with an abnormal number of genes or chromosomes.

Which change might produce a gamete that can result in a child having Down's syndrome?

A a gamete with one extra chromosome

B a gamete that lacks one gene

C a gamete that lacks one chromosome

D a gamete with one extra gene

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