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Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/22**

Paper 2 Multiple Choice (Extended) **February/March 2022**

45 minutes

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)

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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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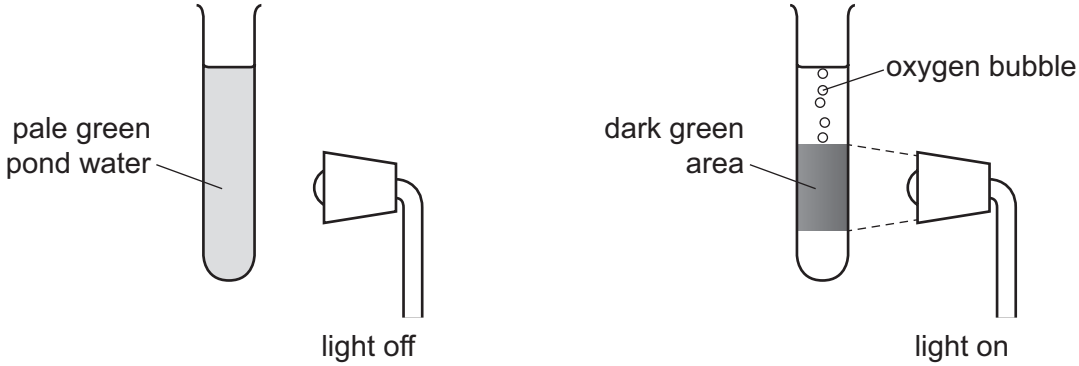
1 The diagrams show a test-tube containing pond water. The green colour is caused by microorganisms that have chloroplasts.



Which characteristics of living organisms are shown?

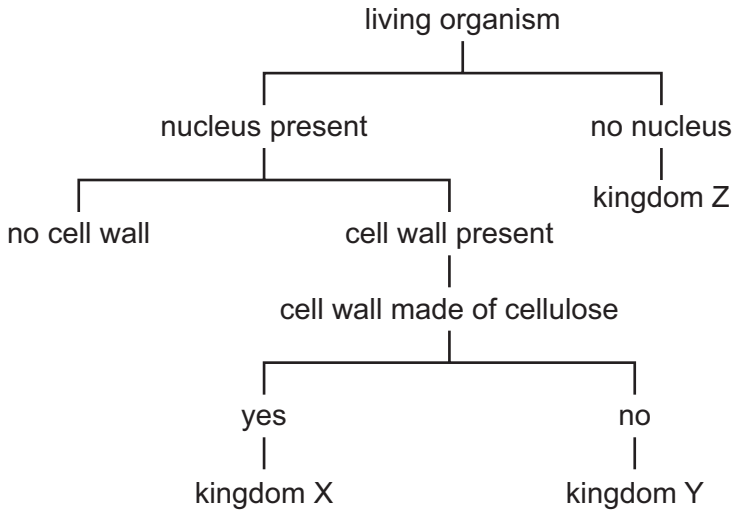
A excretion, growth and movement

B movement, nutrition and sensitivity

C nutrition, reproduction and respiration

D reproduction, sensitivity and growth

2 The key shows some features of living organisms that can be used to place them into one of three different kingdoms.



Which row correctly identifies these three kingdoms?

	X	Y	Z
A	fungi	plant	prokaryote
B	fungi	plant	protoctist
C	plant	fungi	prokaryote
D	plant	fungi	protoctist

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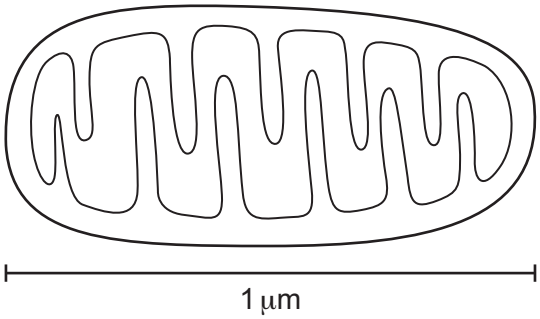
3 The diagram shows a mitochondrion. The scale bar shows the actual size of the mitochondrion.



The diagram is 70 mm long.

What is the magnification of the diagram?

A ×0.0007 **B** ×70 **C** ×7000 **D** ×70 000

4 Two types of cell, one animal and one plant, were examined using a light microscope.

Which row shows the correct combination of structures that would be observed in the cells?

	cell structure observed			
	animal cell		plant cell	
A	chloroplast	membrane	vacuole	cytoplasm
B	cytoplasm	nucleus	chloroplast	membrane
C	membrane	cell wall	cytoplasm	nucleus
D	nucleus	chloroplast	cell wall	membrane

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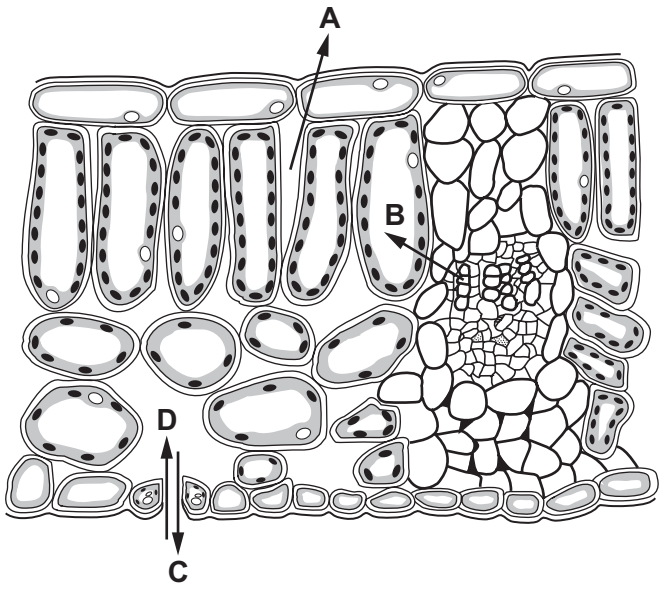
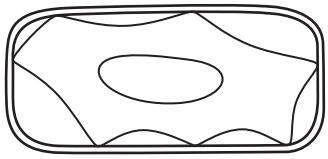
5 The diagram shows a cross-section through a leaf.

Which arrow shows the direction of diffusion of carbon dioxide on a sunny day?



6 The diagram shows a plant cell after it has been submerged in a solution, P, for 20 minutes.



Which row describes the water potential of solution P at the start of the experiment and the condition of the cell after 20 minutes?

	water potential of solution P at the start of the experiment	condition of the cell after 20 minutes
A	higher than the inside of the cell	plasmolysed and turgid
B	higher than the inside of the cell	under high turgor pressure
C	lower than the inside of the cell	plasmolysed and flaccid
D	the same as the inside of the cell	under low turgor pressure

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7 Which row is correct for a positive food test for vitamin C?

	colour of the food test reagent at the start	heat required	final colour of the food test reagent
A	colourless	yes	purple
B	blue	no	colourless
C	colourless	no	blue
D	blue	yes	orange

8 In which molecule are cross-links formed between bases?

A carbohydrate

B DNA

C fat

D glycogen

9 What controls the speed of chemical reactions in all living cells?

A enzymes

B hormones

C ions

D vitamins

10 Enzymes have an optimum temperature at which they are most active.

Which row explains why enzyme activity decreases if the temperature is **not** optimum?

	below optimum temperature	above optimum temperature
A	enzymes denature	enzymes denature
B	enzymes denature	enzymes have less kinetic energy
C	enzymes have less kinetic energy	enzymes denature
D	enzymes have less kinetic energy	enzymes have less kinetic energy

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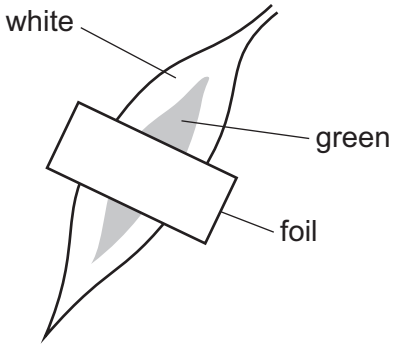
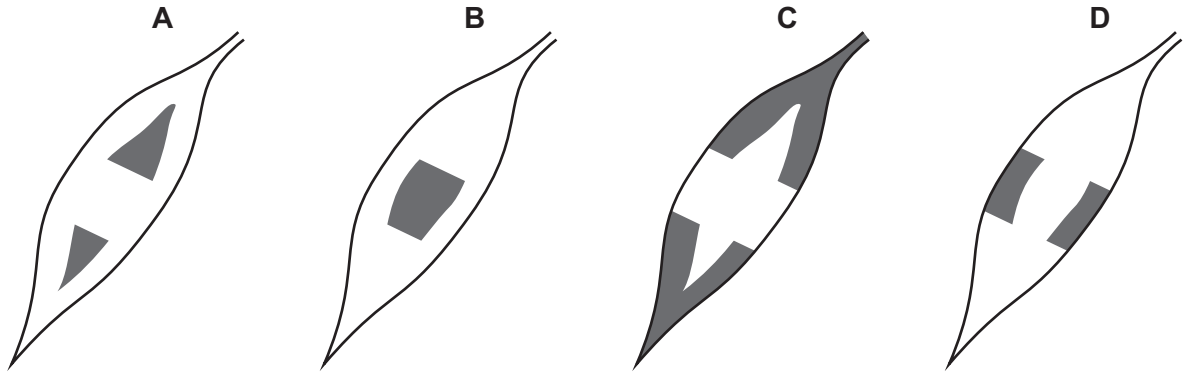
11 A piece of foil was placed over one green and white leaf on a plant.

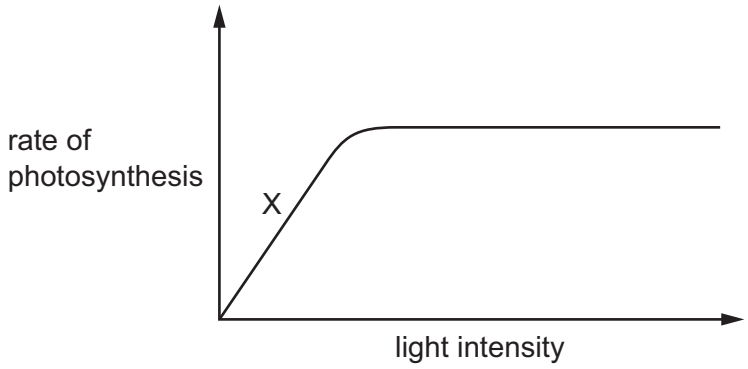


The plant was placed under a bright light for 24 hours and then tested for starch with iodine solution.

Which diagram shows the areas of the leaf that would stain blue-black with iodine solution?



12 The graph shows the effect of light intensity on the rate of photosynthesis.



Which environmental factor is limiting the rate of photosynthesis at X on the graph?

A carbon dioxide concentration

B light intensity

C oxygen concentration

D temperature

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13 Which condition can be caused by a lack of fibre in the diet?

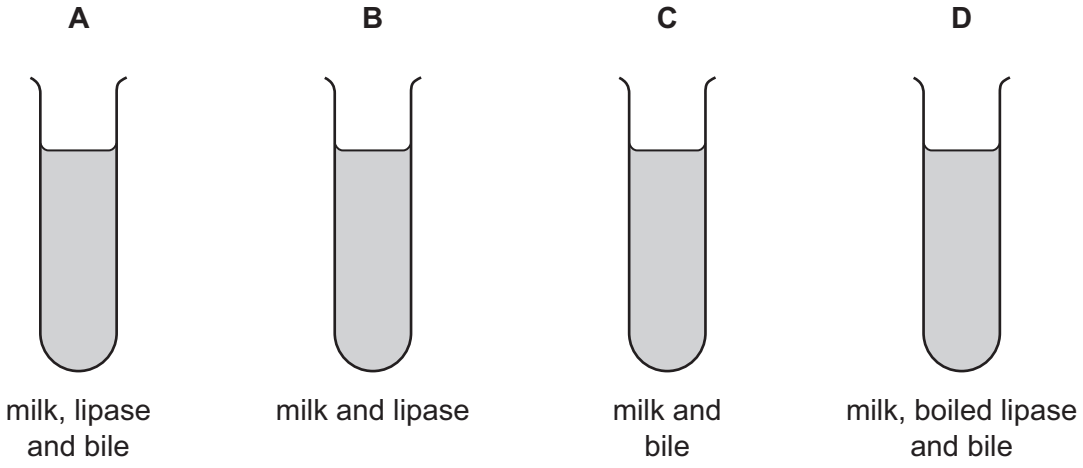
A constipation

B obesity

C scurvy

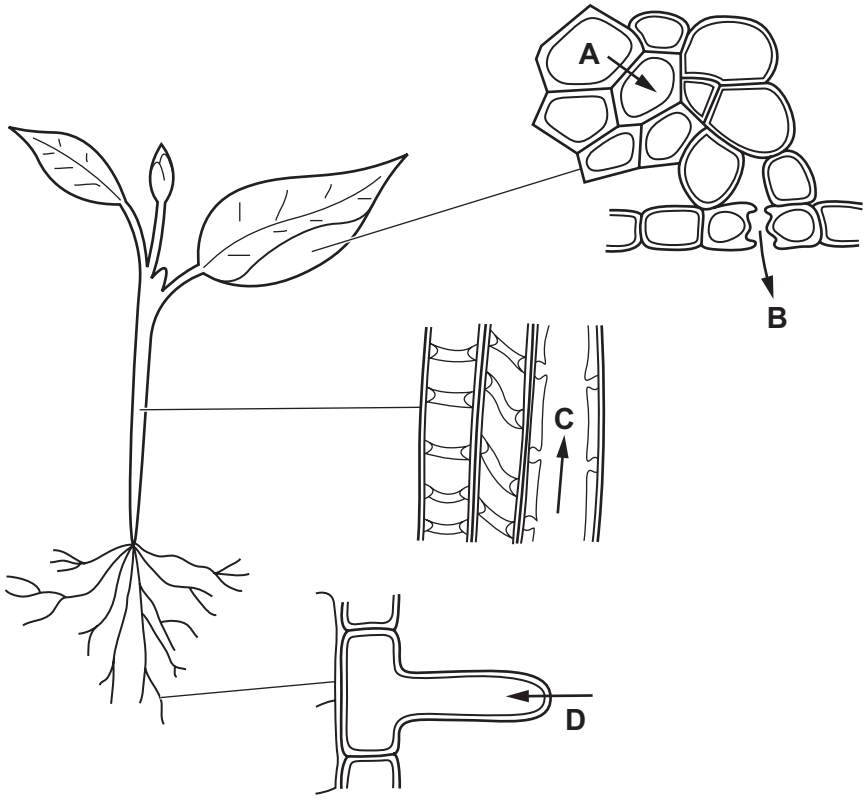
D starvation

14 In which test-tube will the breakdown of fat be fastest?



15 The diagrams show stages in the passage of water through a plant.

Which arrow shows water moving in the form of water vapour?



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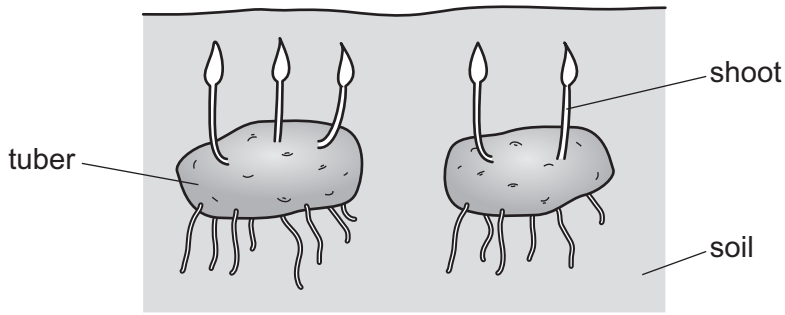
16 The diagram shows some potato tubers. New shoots are beginning to grow.

Sucrose is being translocated from source to sink.



Which statement is correct?

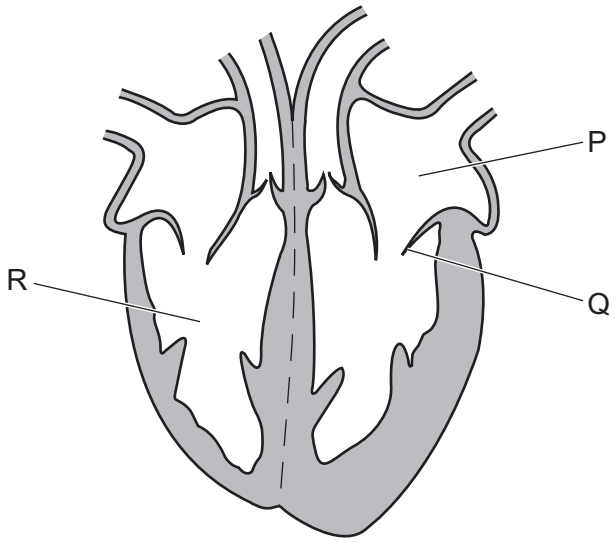
A The tuber is a sink.

B The soil is a sink.

C The shoots are sources.

D The shoots are sinks.

17 The diagram shows a section through the heart.



What is the function of the structure labelled Q?

A It controls the amount of blood leaving the heart.

B It increases the pressure in part R.

C It prevents backflow of blood into part P.

D It prevents blood flowing into the vena cava.

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18 During the process of blood clotting, damage to blood vessels stimulates L, and M is converted to N.

What are L, M and N?

	L	M	N
A	fibrin	platelets	fibrinogen
B	fibrinogen	platelets	fibrin
C	platelets	fibrin	fibrinogen
D	platelets	fibrinogen	fibrin

19 Which statement about passive immunity is correct?

A Antibodies are acquired.

B It gives a long-term effect.

C It is inherited.

D Memory cells are produced.

20 Compared with inspired air, which description of expired air is correct?

A It has less oxygen and less carbon dioxide.

B It has less oxygen and more carbon dioxide.

C It has more oxygen and less carbon dioxide.

D It has more oxygen and more carbon dioxide.

21 Which row shows the features of the gas exchange surface in humans?

	surface area	thickness
A	large	thick
B	large	thin
C	small	thick
D	small	thin

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22 Yeast is placed inside a container full of a glucose solution with no air.

Which word equation summarises the process that takes place inside the container?

A glucose → alcohol + carbon dioxide

B glucose → lactic acid

C glucose + oxygen → carbon dioxide + water

D glucose + oxygen → alcohol

23 Which process uses energy released in respiration?

A diffusion

B evaporation

C growth

D osmosis

24 Which term describes the removal of the nitrogen-containing part of amino acids to form urea?

A assimilation

B deamination

C denaturation

D digestion

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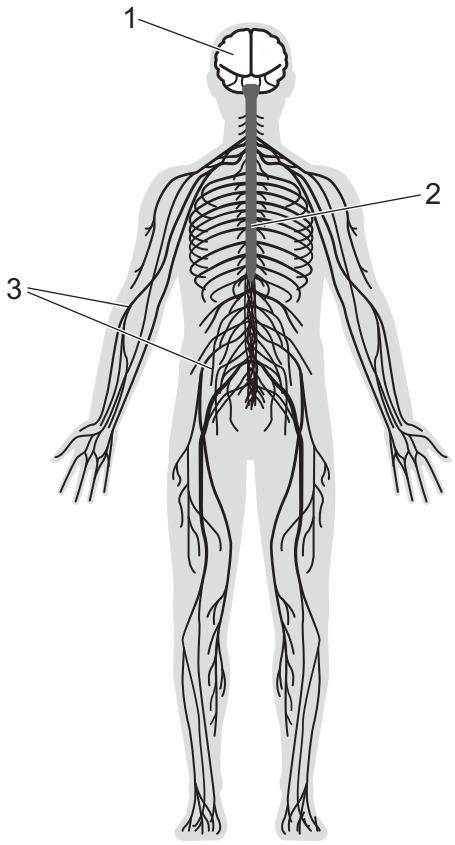
25 Which numbered parts form the central nervous system?



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

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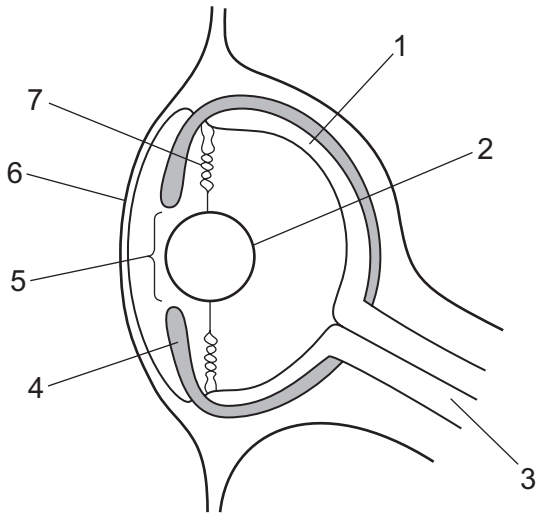
26 The diagram shows a section through the eye of an octopus. Octopuses have eyes that are similar in structure and function to human eyes.



Which row identifies the structures of the octopus eye?

	pupil	cornea	lens	iris
A	4	6	7	3
B	5	1	2	3
C	4	1	7	5
D	5	6	2	4

27 A person eats a large bowl of rice. Rice contains starch.

What happens to the amounts of insulin and glucagon in their body?

	insulin	glucagon
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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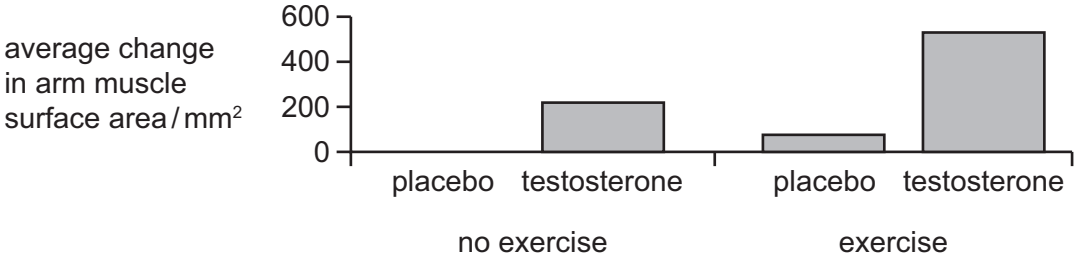
28 A study investigated the effect on arm muscle surface area of taking testosterone and doing exercise. The participants in the study were given either testosterone or a placebo. The placebo does not contain any testosterone.

The bar chart shows the results of the study.



Which conclusion about the data in the graph is correct?

A Exercise has **no** effect on arm muscle surface area.

B No exercise and **not** taking testosterone has the greatest effect on arm muscle surface area.

C Exercise has the same effect on arm muscle surface area as **no** exercise.

D Taking testosterone increases arm muscle surface area.

29 Which statement about reproduction is correct?

A All living species can reproduce asexually.

B Gametes are needed for asexual reproduction.

C Only organisms that are separated from other organisms of the same species can reproduce asexually.

D Some organisms reproduce asexually and sexually.

30 What will happen if a woman smokes during pregnancy?

A Nicotine can cross the placenta and affect the fetus.

B Nicotine can cause COPD in the lungs of the fetus.

C The woman can become addicted to carbon monoxide.

D Carbon monoxide can cause cancer in the lungs of the fetus.

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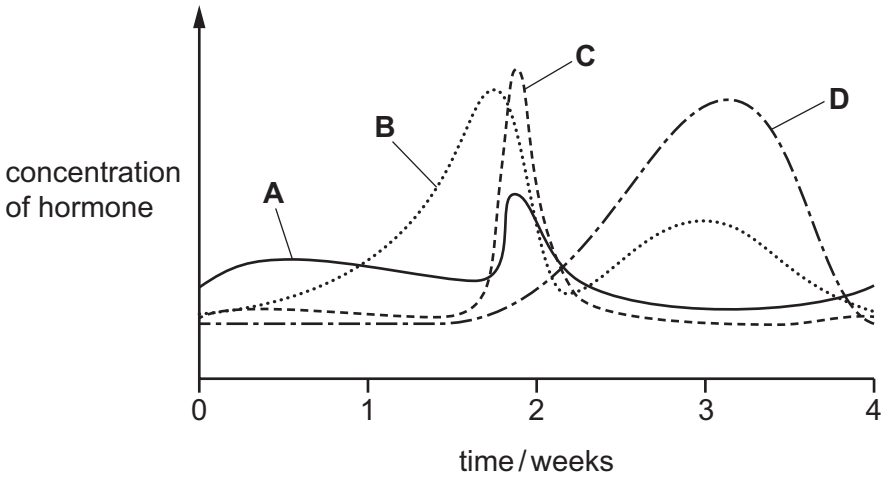
31 The graph shows the four hormones that control the menstrual cycle.

Which curve on the graph represents the hormone LH?



32 What happens to the mass of DNA in a nucleus before mitosis occurs?

A It doubles.

B It halves.

C It stays the same.

D It halves and then halves again.

33 In a species of pea plant, height is controlled by one gene. The allele for tall is dominant to the allele for short.

A test cross is done to identify the genotype of a tall pea plant.

The table shows the possible phenotypes of the offspring and a description of the genotypes of the tall parent pea plant.

	phenotypes of the offspring	description of the genotype of the tall parent pea plant
1	all tall	heterozygous
2	all tall	homozygous dominant
3	all short	homozygous dominant
4	tall and short	heterozygous

If a large number of offspring are produced, which rows are possible?

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

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34 Which statement about variation is correct?

A Continuous variation results in few phenotypes with no intermediates.

B Discontinuous variation results in few phenotypes with no intermediates.

C Phenotypic variation is caused by environmental factors only.

D Phenotypic variation is caused by genetic factors only.

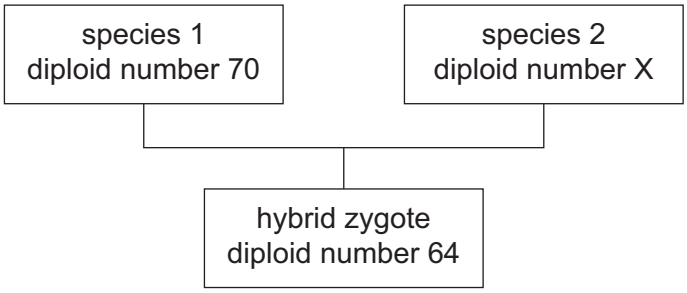
35 Some plants have small leaves with thick waxy cuticles.

Which row describes the effect of these features on water loss and the type of plant that has these features?

	effect on water loss	type of plant
A	decreases	hydrophyte
B	decreases	xerophyte
C	increases	hydrophyte
D	increases	xerophyte

36 Some plants of different species can be crossed with each other to form hybrids that have a diploid number different from either of the two parent species.

The diagram shows a cross between plants with different diploid numbers.



What is the diploid number of species 2?

A 29 **B** 32 **C** 35 **D** 58

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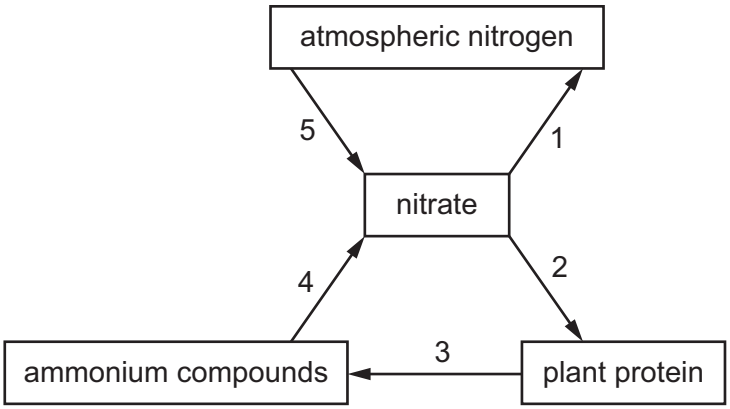
37 The diagram shows some of the stages involved in the nitrogen cycle.



Which processes are carried out at each stage?

	absorption	decomposition	denitrification	nitrification	nitrogen fixation
A	2	4	5	1	3
B	2	3	1	4	5
C	1	5	2	3	4
D	1	2	3	5	4

38 Genetically engineered bacteria are used to produce human proteins.

Into which component of the bacterial cell is human DNA inserted to produce human proteins?

A cell wall

B nucleus

C plasmid

D rough endoplasmic reticulum

39 The sugar in milk is digested by an enzyme.

Which row matches the name of the enzyme with the sugar it digests?

	enzyme	sugar in milk
A	lactase	glucose
B	lactose	lactase
C	lactase	lactose
D	lactose	sucrose

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40 The list shows activities that happen in a forest.

1 cutting down only selected trees

2 educating people about forests

3 replanting trees

4 cutting down trees to grow crop plants

Which activities are likely to ensure the forest is used sustainably?

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

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