Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/22**

Paper 2 Multiple Choice (Extended) **February/March 2020**

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)

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. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.

This document has **16** pages. Blank pages are indicated.

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1 Which characteristic do **all** living organisms show?

A breathing

B excretion

C photosynthesis

D tropism

2 Using the binomial naming system, the Arctic fox is called *Vulpes lagopus*.

Which row is correct?

	Vulpes	*lagopus*
A	genus	kingdom
B	genus	species
C	species	genus
D	species	kingdom

3 What is a characteristic of both insects and arachnids?

A eight legs

B exoskeleton

C three pairs of legs

D wings

4 What structures can be found in both plant and animal cells?

A cell walls and cell membranes

B nuclei and cell walls

C cytoplasm and chloroplasts

D cell membranes and nuclei

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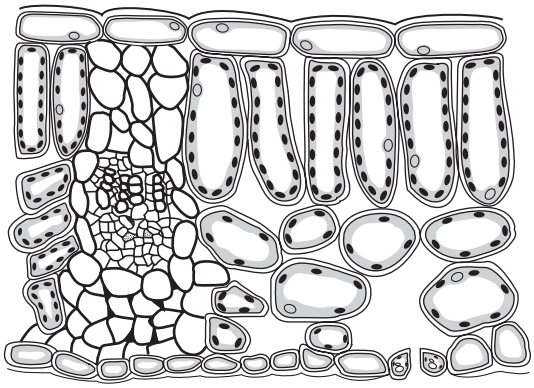
5 The actual thickness of the leaf shown in the diagram is 2000 μm, but its thickness in the diagram is 50 mm.



What is the magnification of the diagram?

A ×0.025 **B** ×25 **C** ×100 **D** ×100 000

6 What is the function of a root hair cell?

A absorption

B photosynthesis

C reproduction

D support

7 Which row describes osmosis?

	movement of water	energy from respiration used	movement through a partially permeable membrane
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key
✓ = yes
✗ = no

8 A student made the following statements about the movement of ions by active transport.

1 It is the net movement of particles from a low concentration to a high concentration.

2 It is the net movement of particles from a high concentration to a low concentration.

3 It requires the use of energy from respiration.

4 It can only take place in living cells.

Which statements are correct?

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

9 A test was performed on a food substance. A positive result was shown by a colour change to blue-black.

What solution was used for the test?

A biuret solution

B DCPIP solution

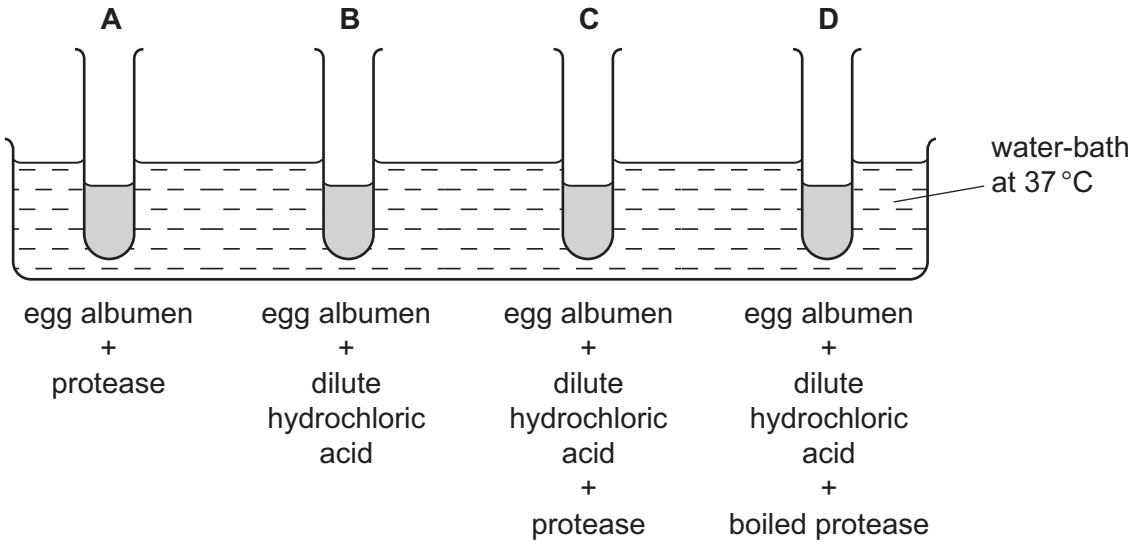
C iodine solution

D Benedict's solution

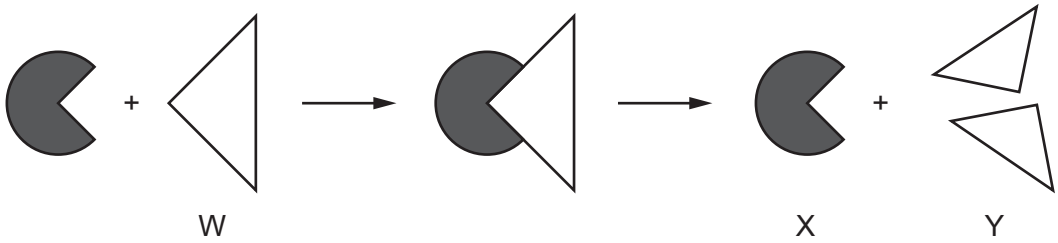
10 The diagram shows an experiment on the digestion of the protein in egg albumen by protease.

The protease was taken from a human stomach.

In which test-tube will the protein be digested most quickly?



11 The diagram represents enzyme action.



What are parts W, X and Y in this chemical reaction?

	enzyme	product	substrate
A	W	X	Y
B	X	W	Y
C	X	Y	W
D	Y	W	X

12 A student drew a diagram to show the substances used and produced in photosynthesis in a leaf.

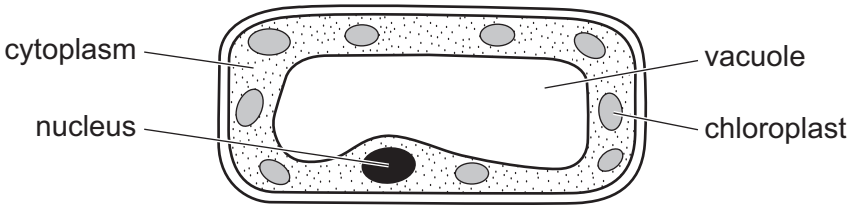
1 + 2 are used by the leaf

3 + 4 are produced by the leaf

Which row shows the correct labels for the diagram?

	1	2	3	4
A	carbon dioxide	glucose	oxygen	water
B	water	carbon dioxide	glucose	oxygen
C	oxygen	water	carbon dioxide	glucose
D	glucose	oxygen	water	carbon dioxide

13 The diagram shows a type of plant cell.



In which tissue is this cell found?

A leaf epidermis

B palisade mesophyll

C root epidermis

D xylem

14 The list shows some human health problems.

1 chronic obstructive pulmonary disease

2 constipation

3 coronary heart disease

4 obesity

Which problems can be caused by malnutrition?

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

15 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 → 3 → 2 → 4 → 5

B 2 → 1 → 3 → 5 → 4

C 3 → 1 → 4 → 5 → 2

D 2 → 3 → 1 → 4 → 5

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16 Which food group is chemically digested in the mouth, passes through the stomach and continues to be broken down by chemical digestion in the small intestine?

A carbohydrates

B mineral salts

C proteins

D vitamins

17 When stems with white flowers are cut and placed in a blue stain the petals turn blue.

Which tissue in the stem does the stain travel through to reach the petals?

A epidermis

B mesophyll

C phloem

D xylem

18 Which process releases water vapour into the atmosphere from the leaves of trees?

A active transport

B osmosis

C respiration

D transpiration

19 Mammals have a double circulation.

Which shows the correct sequence for the movement of blood in a mammal?

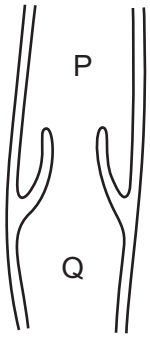
A body → heart → lungs → heart

B body → lungs → body → heart

C heart → lungs → body → heart

D heart → body → lungs → heart

20 The diagram shows a section through a blood vessel.



Which type of blood vessel is shown, and in which direction does the blood flow?

	type of vessel	direction of flow
A	artery	P to Q
B	artery	Q to P
C	vein	P to Q
D	vein	Q to P

21 The antibodies that give immunity to a disease can be acquired in the following different ways.

1 feeding on breast milk

2 infection by disease

3 vaccination

Which give active immunity?

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

22 During physical activity, what stimulates the brain to increase the breathing rate?

A decreased oxygen concentration in the blood

B decreased oxygen concentration in the lungs

C increased carbon dioxide concentration in the blood

D increased carbon dioxide concentration in the lungs

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23 The table shows some of the changes that occur during breathing.

	from contracted to relaxed	from relaxed to contracted
diaphragm	P	X
external intercostal muscles	Q	Y
internal intercostal muscles	R	Z

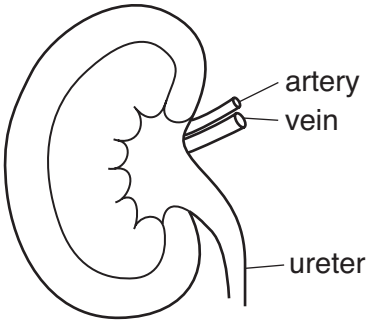
Which changes occur to cause inspiration?

A P, Q and Z **B** X, Q and R **C** X, Y and R **D** X, Y and Z

24 How many molecules of ethanol are released from the anaerobic respiration of one molecule of glucose?

A 1 **B** 2 **C** 4 **D** 6

25 The diagram shows a kidney and its blood vessels.



In a healthy person, which structure(s) transport glucose?

A artery only

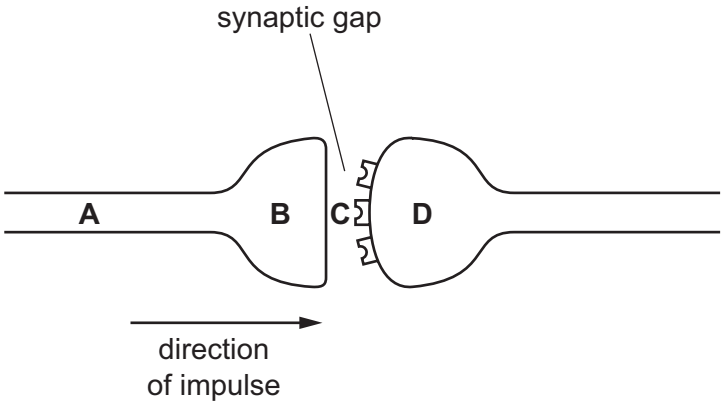
B artery and ureter

C artery and vein

D ureter and vein

26 The diagram shows a synapse.

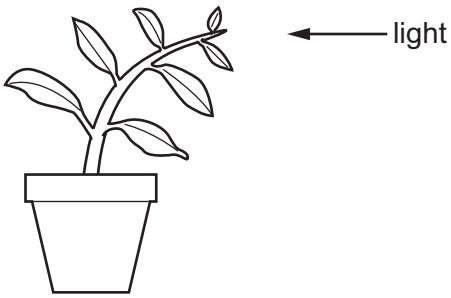
Where are vesicles containing neurotransmitter molecules found?



27 Which row shows the state of the ciliary muscles and suspensory ligaments, when the eye is focusing on a near object?

	ciliary muscles	suspensory ligaments
A	contracted	slack
B	contracted	tense
C	relaxed	slack
D	relaxed	tense

28 The diagram shows a shoot growing towards light.



Which statement about the role of auxin in phototropism is correct?

A Auxin will move to the dark side of the shoot and cause cells to elongate.

B Auxin will move to the dark side of the shoot and prevent cells from elongating.

C Auxin will move to the light side of the shoot and cause cells to elongate.

D Auxin will move to the light side of the shoot and prevent cells from elongating.

29 Bacteria such as MRSA are resistant to several different antibiotics. Some suggested actions for reducing the development of antibiotic resistance in bacteria are listed.

1 Only use antibiotics when necessary.

2 Only use antibiotics on resistant bacteria.

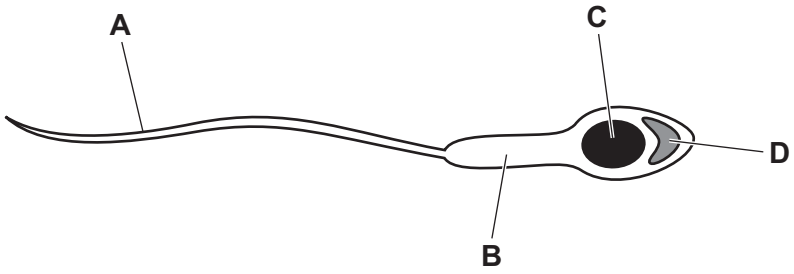
3 Do not use antibiotics to treat viral infections.

Which of the suggested actions are correct?

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

30 The diagram shows a sperm cell.

Which part contains mitochondria to release energy for movement?



31 What is a correct statement about lymphocytes?

A Lymphocytes engulf pathogens.

B Lymphocyte numbers can be reduced when a person is infected with HIV.

C Lymphocytes produce antigens.

D Lymphocytes transport oxygen to different parts of the body.

32 The statements describe how a protein is made.

1 mRNA passes through a ribosome.

2 mRNA molecules carry a copy of the gene to the cytoplasm.

3 The gene coding for the protein is copied in the nucleus.

4 Ribosomes assemble amino acids into proteins.

What is the order of statements that correctly describes how a protein is made?

A 2 → 1 → 3 → 4

B 2 → 3 → 4 → 1

C 3 → 1 → 2 → 4

D 3 → 2 → 1 → 4

33 Which row shows the features of stem cells?

	type of cell	type of cell division involved
A	specialised	meiosis
B	specialised	mitosis
C	unspecialised	meiosis
D	unspecialised	mitosis

34 Which statement is a correct description of the role of meiosis?

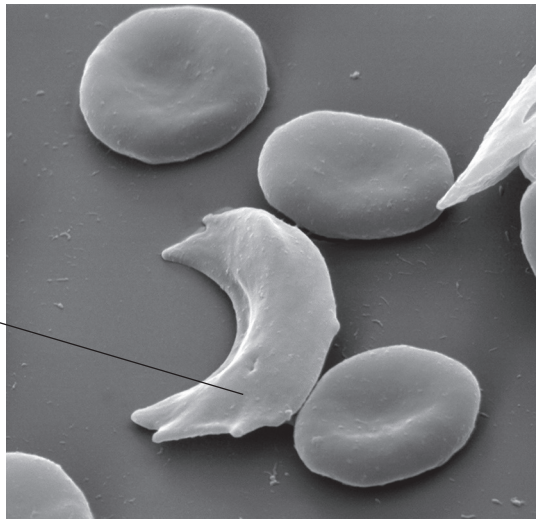
A to create genetically identical daughter cells

B to halve the chromosome number in the daughter cells

C to create diploid daughter cells

D to maintain the chromosome number in the daughter cells

35 The photomicrograph shows some red blood cells.



What are the possible genotype combinations of this person?

A Hb^SHb^A or Hb^SHb^S

B Hb^SHb^A or Hb^AHb^A

C Hb^AHb^A only

D Hb^SHb^S or Hb^AHb^A

36 The events listed may happen in a population.

1 Better adapted organisms survive.

2 Mutation results in variation.

3 Survivors pass on their alleles to the next generation.

4 There is a struggle for survival.

Which sequence may lead to evolution in the population?

A 1 → 2 → 3 → 4

B 2 → 4 → 1 → 3

C 3 → 2 → 4 → 1

D 4 → 1 → 2 → 3

37 Which row describes how energy flows through a biological system?

	type of energy		
	entering a biological system	transferred between organisms in a biological system	transferred from a biological system to the environment
A	chemical	heat	light
B	heat	chemical	heat
C	light	chemical	heat
D	light	heat	chemical

38 The diagram shows a food chain.

grass → mouse → owl

Which terms describe the position of the owl in this food chain?

	consumer	trophic level
A	secondary	second
B	secondary	third
C	tertiary	second
D	tertiary	third

39 Which method is used to produce lactose-free milk?

A filtering milk to remove lactose

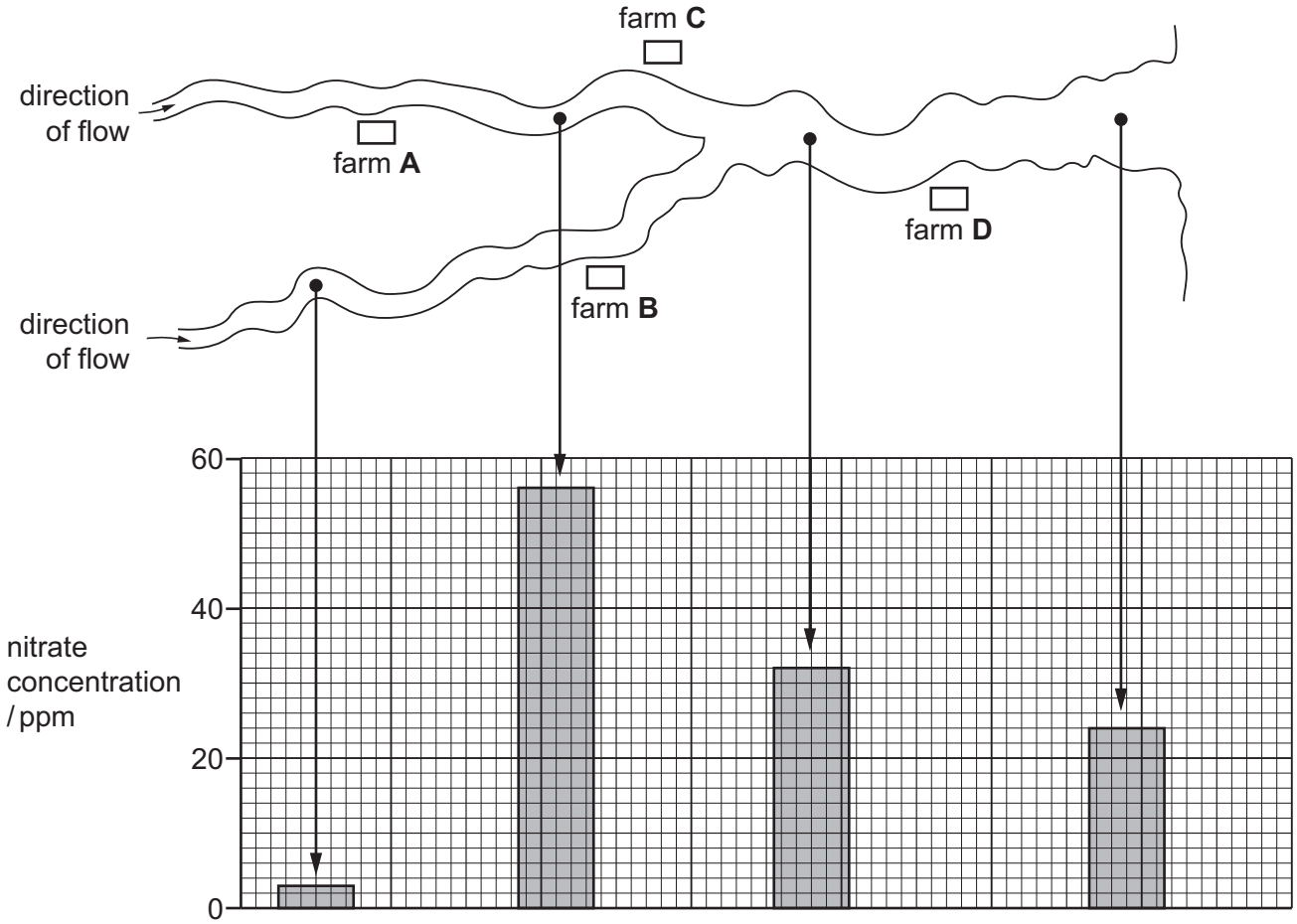
B heating milk to break down lactose

C using lactase to break down lactose

D using lipase to denature lactose

40 The diagram shows the positions of four farms and the concentrations of nitrate at different points in a river.

Which farm is likely to have been using too much fertiliser on its land?



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