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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

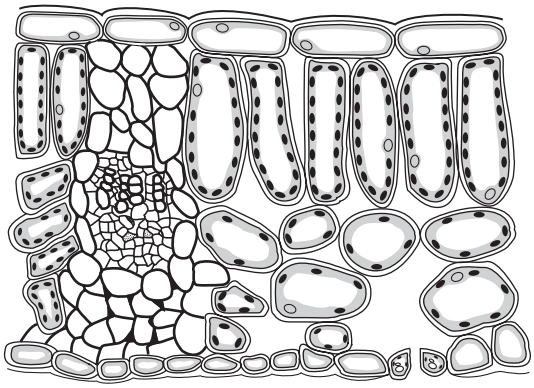
C cytoplasm and chloroplasts

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

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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

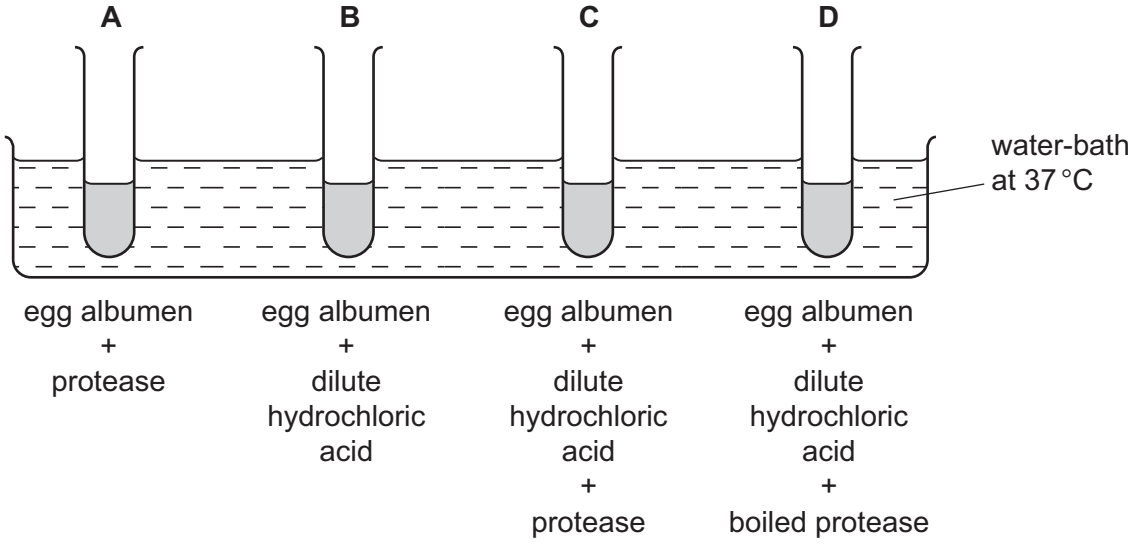
C iodine solution

D Benedict's solution

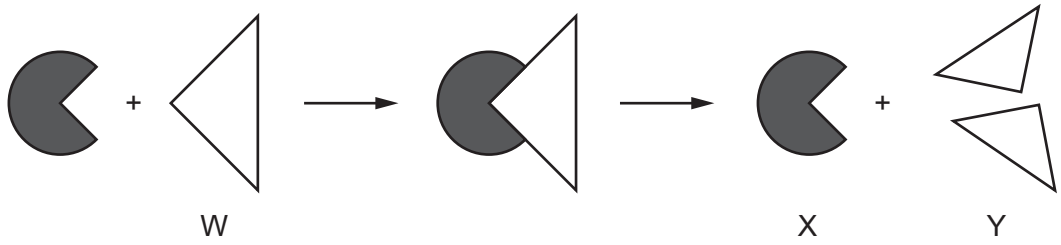
10 The diagram shows an experiment on the digestion of the protein in egg albumen by protease.

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



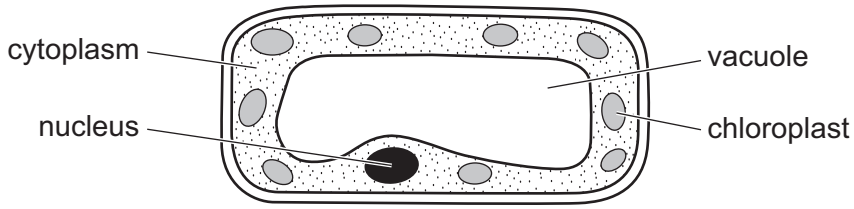
3 + 4 are produced by the leaf

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

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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

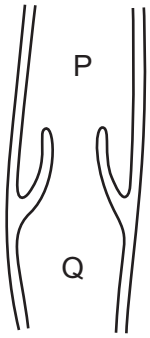
D heart → body → lungs → heart

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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

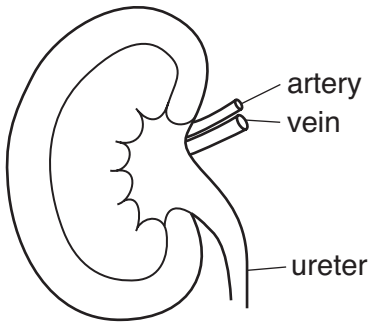
Which changes occur to cause inspiration?

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

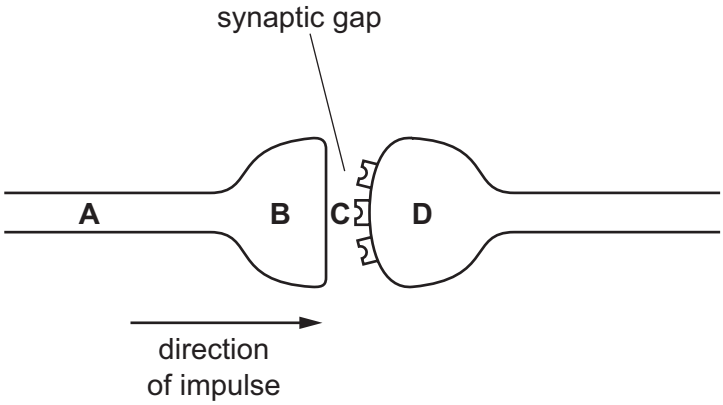
D ureter and vein

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26 The diagram shows a synapse.

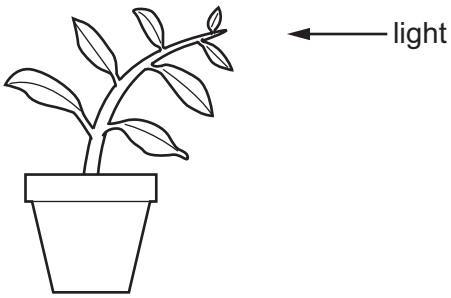
Where are vesicles containing neurotransmitter molecules found?



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.

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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.

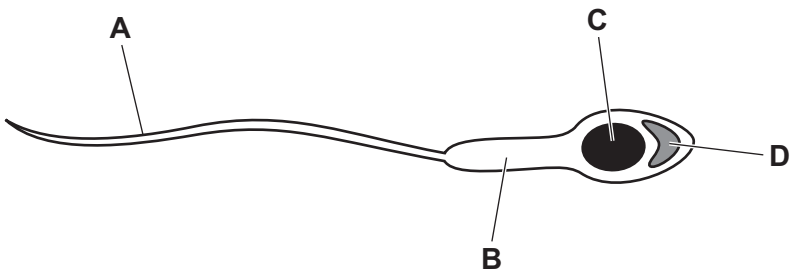
3 Do not use antibiotics to treat viral infections.

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

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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?

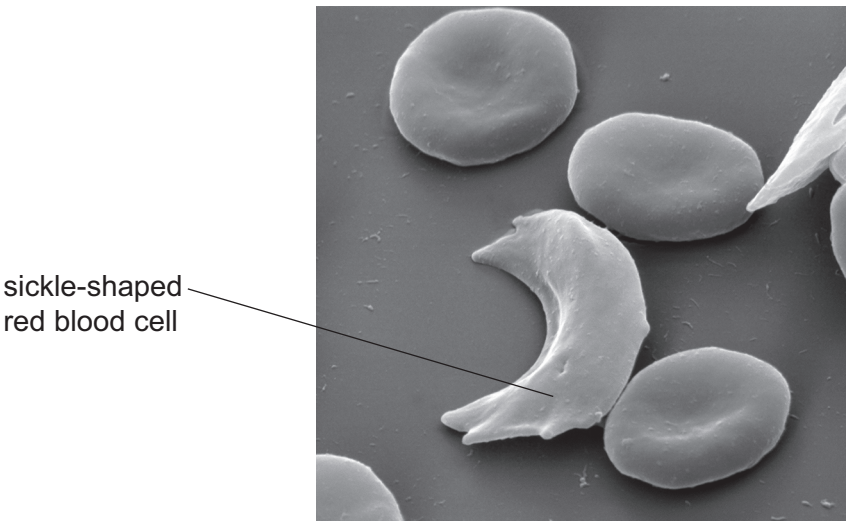
A to create genetically identical daughter cells

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

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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

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

A filtering milk to remove lactose

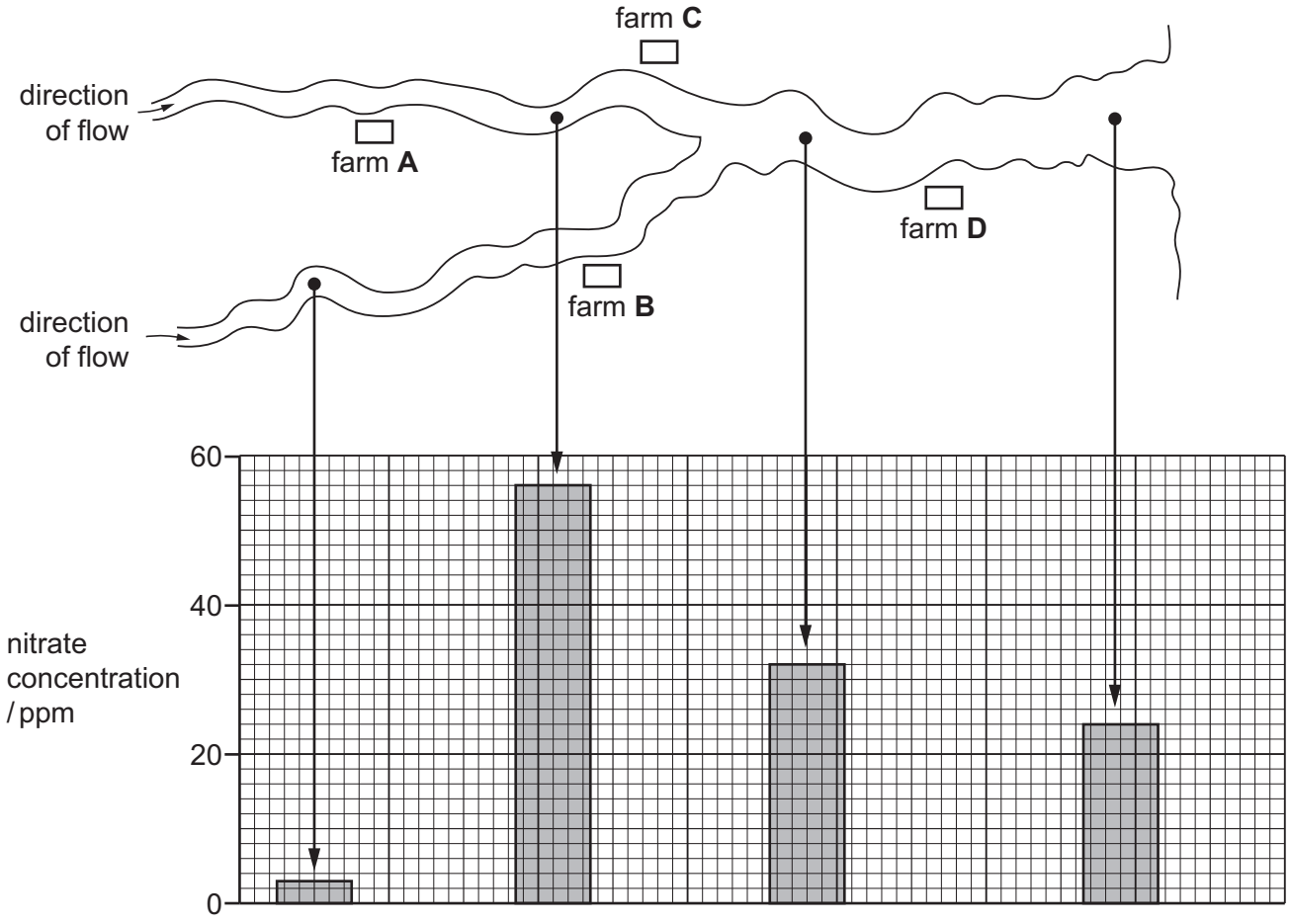
B heating milk to break down lactose

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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