GradeMax

Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/23**

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

* 3 5 9 1 9 6 8 1 9 2 *

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.

IB22 11_0610_23/4RP
© UCLES 2022

[Turn over

GradeMax

1 Which process provides an organism with the raw materials needed for tissue repair?

A excretion

B growth

C nutrition

D respiration

2 Which name is given to a group of individuals that can reproduce to produce fertile offspring?

A a genus

B a kingdom

C a species

D an organ system

3 Root hair cells are found on plant roots.

Which feature is present in a root hair cell but **not** in a sperm cell?

A cell membrane

B cell wall

C chloroplasts

D cytoplasm

4 What is an example of a tissue?

A a chloroplast

B the palisade mesophyll

C a neurone

D the pancreas

5 Some examples of substances moving across membranes are listed.

1 glucose molecules into the epithelium that lines the small intestine

2 nitrate ions from a dilute solution in soil into a more concentrated solution in root hair cells

3 water molecules from mesophyll cells into the air spaces of a leaf

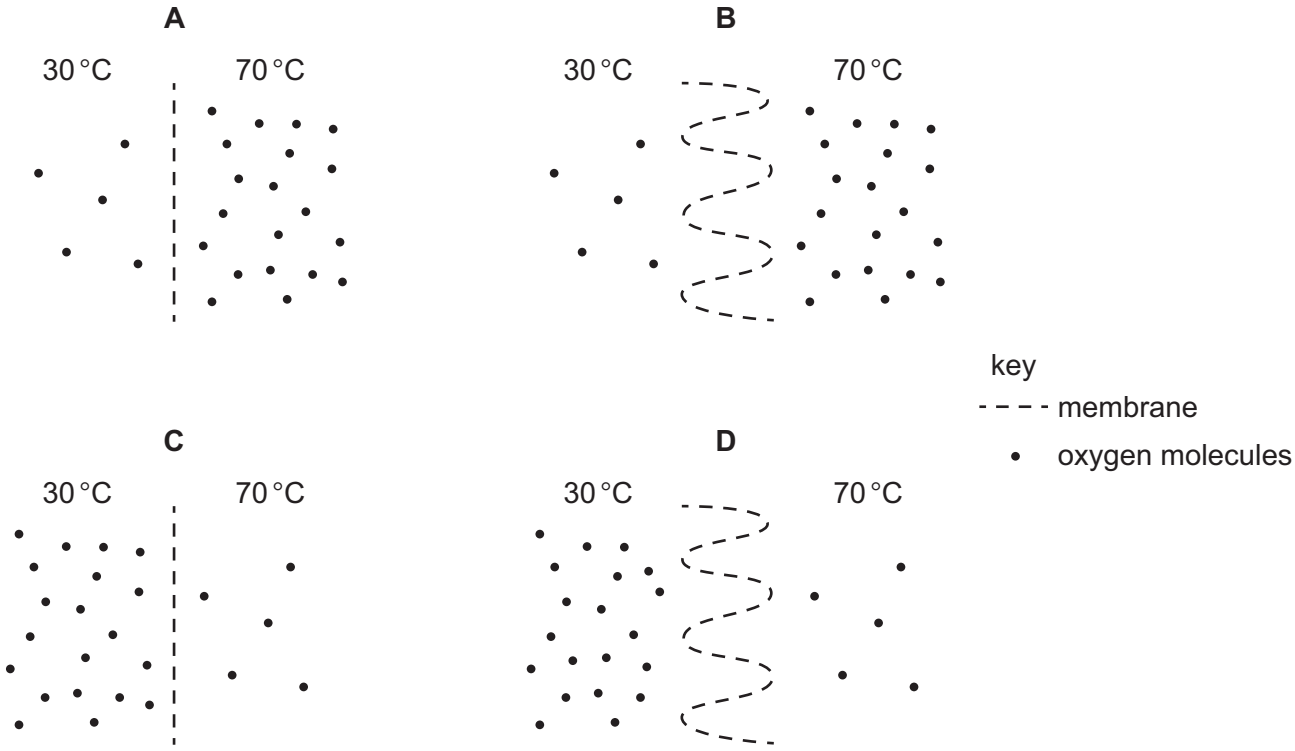
For which examples must oxygen be present?

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

© UCLES 2022

GradeMax

6 In which diagram would most oxygen molecules diffuse across the membrane per minute?



7 The list shows some statements about enzymes.

1 They all contain the element nitrogen.

2 They are proteins.

3 They can be denatured by cold temperatures.

4 Their specificity is due to the complementary shapes of the active site and the substrate.

Which statements are correct?

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

8 Which statement about the structure of DNA is correct?

A DNA contains six types of base.

B DNA contains three strands coiled to form a helix.

C DNA is made of a chain of amino acids.

D DNA has two strands with cross-links between pairs of bases.

© UCLES 2022

[Turn over

GradeMax

9 A doctor tested the urine of four patients for both glucose and protein. The colours of the urine samples after testing are shown in the table.

Which patient's urine contained both protein and glucose?

	colour after testing with biuret solution	colour after testing with Benedict's solution
A	blue	brick red
B	blue	blue
C	purple	brick red
D	purple	blue

10 The equation shows the digestion of protein to amino acids.

$$\text{protein} \xrightarrow{\text{protease}} \text{amino acids}$$

In the equation, what is protease?

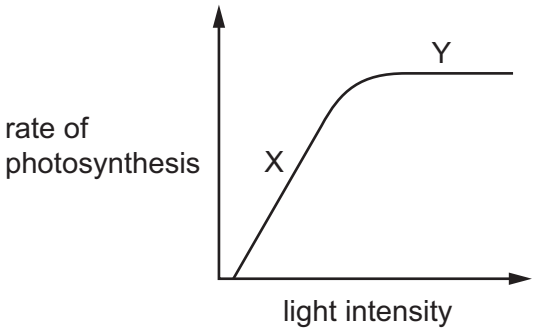
A a catalyst

B a product

C a solvent

D a substrate

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



What are the limiting factors at X and Y?

	X	Y
A	carbon dioxide concentration	carbon dioxide concentration
B	carbon dioxide concentration	light intensity
C	light intensity	carbon dioxide concentration
D	light intensity	light intensity

© UCLES 2022

GradeMax

12 The substances listed are found in the leaf of a plant.

Which substance is obtained from the soil?

A carbon dioxide

B chlorophyll

C glucose

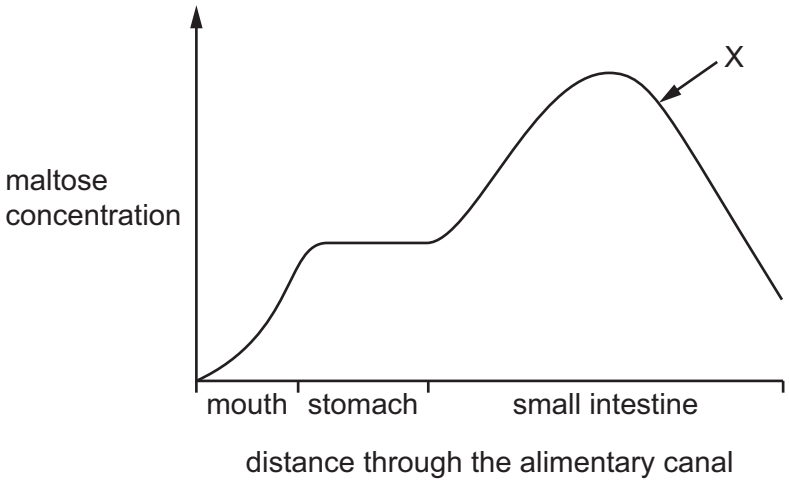
D mineral ions

13 The cholera bacterium produces toxins that cause chloride ions to be secreted into the small intestine.

What is the immediate effect of this on the water potential of blood in the intestinal capillaries, and on the water potential of the contents of the small intestine?

	water potential	
	blood in capillaries	contents of small intestine
A	lowered	lowered
B	lowered	raised
C	raised	lowered
D	raised	raised

14 The graph shows the concentration of maltose in different parts of the alimentary canal.



What causes the change in concentration at X?

A absorption of maltose

B action of amylase

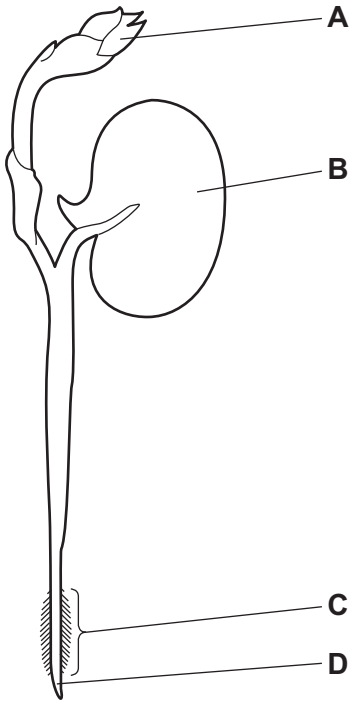
C action of maltase

D assimilation of maltose

GradeMax

15 The diagram shows a bean seedling soon after it has germinated.

Where is most water absorbed?



© UCLES 2022

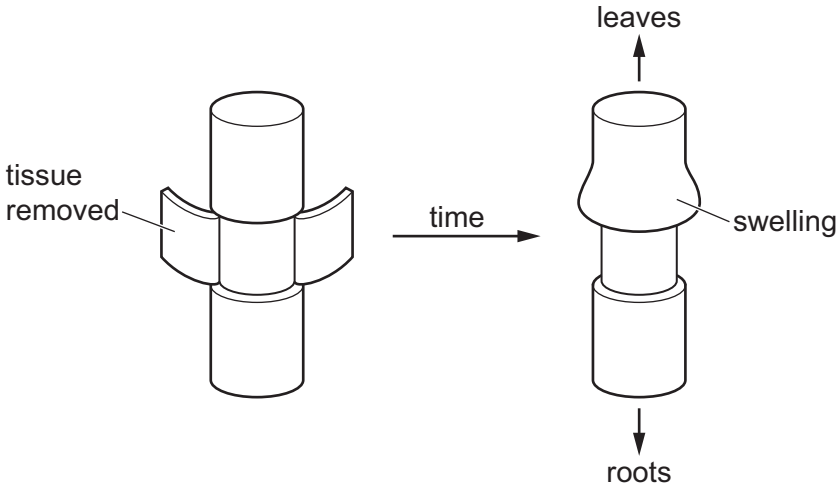
GradeMax

16 Scientists investigate the movement of substances in a plant.

They cut a ring of tissue from the stem.

Removing the tissue removes some of the transport vessels found around the edge of the stem.

A few days later they notice swelling above the area where the tissue has been removed.



What causes the swelling?

A Phloem vessels have been removed and sucrose cannot move to the sink.

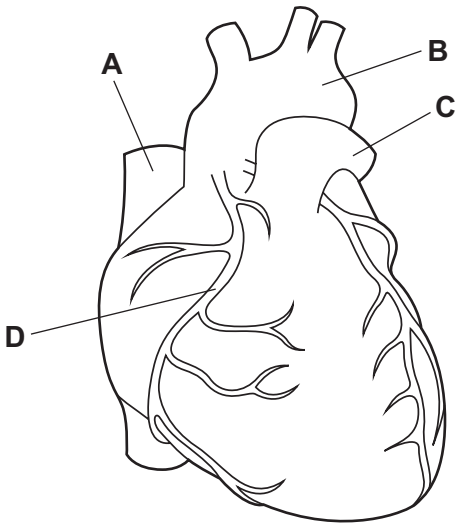
B Phloem vessels have been removed and sucrose cannot move to the source.

C Xylem vessels have been removed and minerals cannot move to the sink.

D Xylem vessels have been removed and minerals cannot move to the source.

17 The diagram shows the outside of a human heart.

Which structure is a coronary artery?



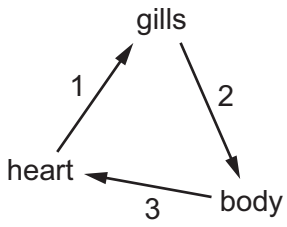
© UCLES 2022

[Turn over

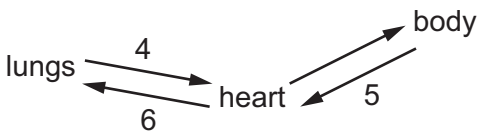
GradeMax

18 The diagrams represent blood flow in the circulatory systems of fish and humans.

fish circulation



human circulation



In the fish circulation and the human circulation, where is the oxygen concentration highest?

	fish circulation	human circulation
A	1	4
B	1	5
C	2	4
D	3	6

19 *Campylobacter* is a bacterium that can cause food poisoning.

Which word describes *Campylobacter*?

A antibody

B disease

C pathogen

D symptom

20 What is the approximate percentage of oxygen in expired air?

A 0.04% **B** 4% **C** 16% **D** 21%

© UCLES 2022

GradeMax

21 Which actions use energy released from respiration?

1 muscle contraction

2 protein synthesis

3 cell division

4 transmitting nerve impulses

A 1, 2, 3 and 4

B 1, 2 and 4 only

C 2 and 3 only

D 3 and 4 only

22 What is the word equation for anaerobic respiration in muscle cells?

A glucose + oxygen → lactic acid

B glucose → carbon dioxide

C glucose + carbon dioxide → alcohol

D glucose → lactic acid

23 Which statement about the formation of urea is correct?

A Urea is formed in the kidneys from excess amino acids.

B Urea is formed in the liver from excess amino acids.

C Urea is formed in the kidneys from excess fatty acids.

D Urea is formed in the liver from excess fatty acids.

24 What is a response to a low concentration of glucose in the blood?

A Glucagon will cause the body to convert glucose into glycogen.

B Glucagon will cause the body to convert glycogen into glucose.

C Insulin will cause the body to convert glucose into glycogen.

D Insulin will cause the body to convert glycogen into glucose.

25 Which endocrine gland secretes insulin?

A adrenal

B ovary

C pancreas

D testis

© UCLES 2022

[Turn over

GradeMax

26 Which factors affect the growth of plants?

A gravity and light only

B gravity, light and temperature

C gravity and temperature only

D light and temperature only

27 The table shows the recommended daily amounts (RDA) of some nutrients for a person with special dietary requirements, and their actual intake of those nutrients.

dietary component	RDA for this person	actual intake
carbohydrate / g	260	265
protein / g	44	41
fat / g	33	32
vitamin C / mg	60	5
vitamin D / μg	10	11
fibre / g	26	27
iron / mg	15	15
calcium / mg	700	710

What would the person be at risk of developing if they continued with the same daily intake of these nutrients?

A constipation

B coronary heart disease

C obesity

D scurvy

28 What are advantages of using sexual reproduction to produce crop plants?

1 It produces genetic variation to help breed new varieties of crop plant.

2 It ensures that crops have the identical characteristics.

3 It quickly produces many identical copies of a plant.

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

© UCLES 2022

GradeMax

29 Where is the hormone progesterone produced?

1 ovaries

2 placenta

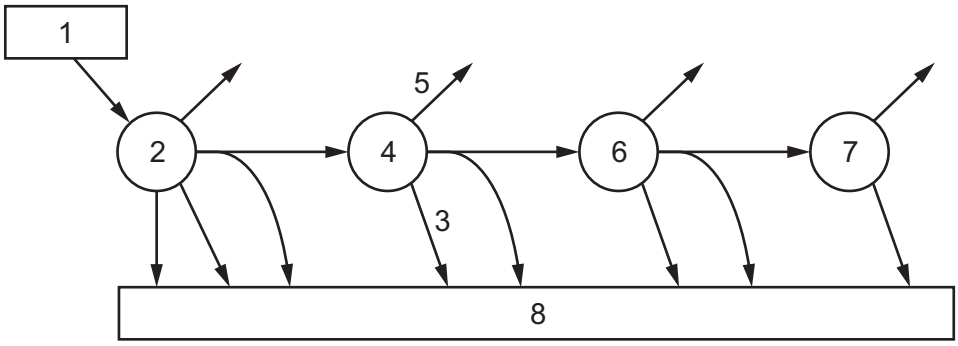
3 uterus

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

30 Which row correctly describes mitosis?

	new cells are genetically identical to the parent cell	duplication of chromosomes occurs	number of chromosomes in a daughter cell compared to the parent cell
A	no	before mitosis	same
B	no	during mitosis	halved
C	yes	before mitosis	same
D	yes	during mitosis	halved

31 The diagram shows the flow of energy through a food chain.



Which row correctly labels this energy flow diagram?

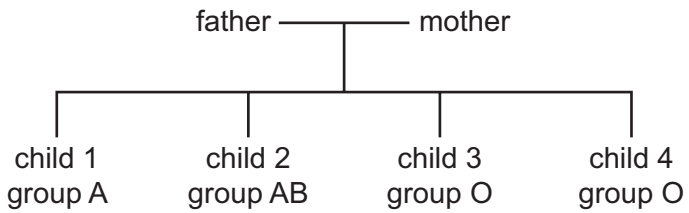
	chemical energy in producers	chemical energy in decomposers	energy loss by respiration	energy loss by excretion	chemical energy in tertiary consumers
A	2	8	5	3	7
B	1	7	5	3	6
C	2	8	3	5	7
D	1	7	3	5	6

© UCLES 2022

[Turn over

GradeMax

32 A man and a woman have four children. The diagram shows the blood groups of the children.



What are the possible genotypes of the father and mother?

A I^AI^A and I^BI^o

B I^AI^B and I^oI^o

C I^AI^o and I^BI^B

D I^AI^o and I^BI^o

33 How do the leaves of hydrophytes differ from those of xerophytes?

A more hairs on the surface of the leaves

B smaller total surface area

C stomata on the undersides of the leaves

D thinner cuticle

34 Broccoli and cauliflower are crop plants that have been produced from a common wild plant.

Which process would be used to produce the broccoli and cauliflower plants from wild plants?

A artificial selection

B competition

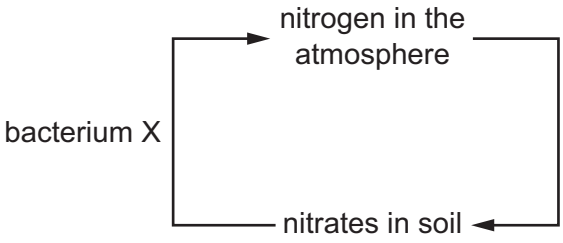
C evolution

D natural selection

© UCLES 2022

GradeMax

35 The diagram shows part of the nitrogen cycle.



Which process in the cycle is performed by bacterium X?

A decomposition

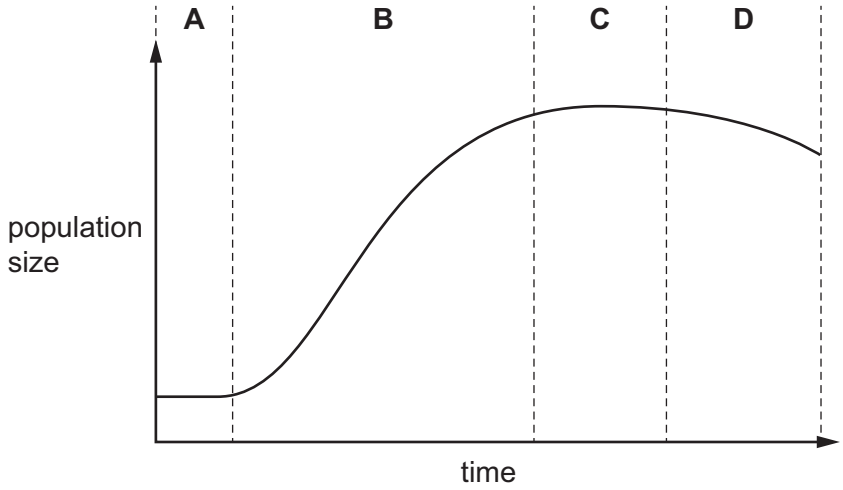
B nitrification

C nitrogen fixation

D denitrification

36 The graph shows changes in the population size of a microorganism growing in a fermenter.

What is the exponential phase?



37 Bacteria are useful in genetic engineering because they possess plasmids.

Which statement describes the importance of a plasmid?

A It is a circle of DNA and human genes can be inserted into it.

B It is the nucleus of the bacterium and human genes can be inserted into it.

C It can be destroyed and replaced with human insulin.

D It is a circle of DNA and human insulin can be inserted into it.

© UCLES 2022

[Turn over

GradeMax

38 Which statement is correct?

A DNA ligase is used to cut DNA.

B DNA ligase is used to make proteins.

C Restriction enzymes are used to cut DNA.

D Restriction enzymes are used to make proteins.

39 What can reduce the occurrence of famine?

A increasing population size

B long periods of drought

C poverty

D equal distribution of food

40 What is a consequence of deforestation?

A flooding due to reduced transpiration by trees

B increased carbon dioxide concentration in the atmosphere due to increased photosynthesis

C reduced carbon dioxide concentration in the atmosphere due to increased decomposition of dead trees

D reduced oxygen concentration in the atmosphere due to reduced respiration of trees

© UCLES 2022

GradeMax

BLANK PAGE

GradeMax

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2022