2025.M44

2025L025A1EL

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2025

Biology

Sections A and B and Answerbook

Higher Level

Tuesday 10 June Afternoon 2:00 - 5:00

400 marks

Examination Number

Date of Birth

For example, 3rd February 2005 is entered as 03 02 05

Centre Stamp

Instructions

Write your Examination Number and your Date of Birth in the boxes on the front cover.

Write your answers to all parts of the examination into this answerbook. This answerbook will be scanned and your work will be presented to an examiner on screen. Anything that you write outside of the answer areas may not be seen by the examiner.

Write your answers in blue or black pen. You may use pencil for sketches, graphs and diagrams only.

There are three sections in this examination. Questions for Section **C** are supplied separately but your answers must be written in this answerbook.

It is recommended that you spend not more than 30 minutes on Section **A** and 30 minutes on Section **B**, leaving 120 minutes for Section **C**.

Section **A**	Answer any **five** questions from this section. Each question carries 20 marks.
Section **B**	Answer any **two** questions from this section. Each question carries 30 marks.
Section **C**	Answer any **four** questions from this section. Each question carries 60 marks.

Section A

Answer any five questions.
Write your answers in the spaces provided.

1. Answer any **five** of the following parts (a) to (f):

(a) Write the general formula for carbohydrates.

(b) Give the **four** chemical elements found in **all** proteins.

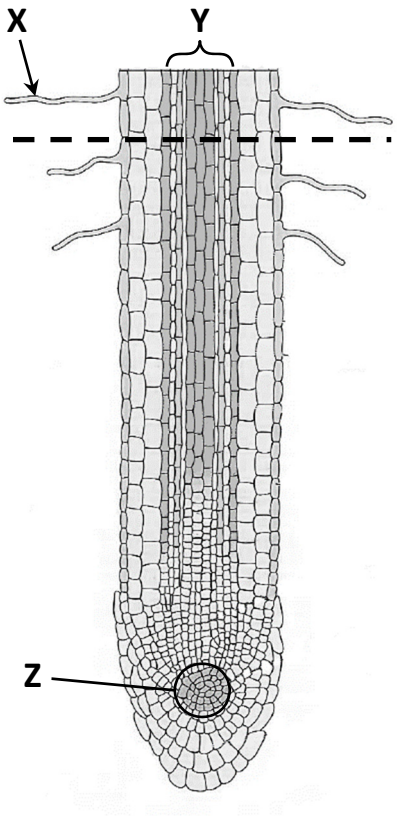
(c) State **one** structural role of proteins in the body.

(d) Name the small subunits that make protein.

(e) Name **one** water-soluble vitamin.

(f) Give **one** example of a trace element found in food.

2. The diagram shows a longitudinal section through the root of a plant.



(a) Name the structure indicated by the letter **X and** give its function.

Name:
Function:

(b) Name the tissue type indicated by the letter **Y and** give its function.

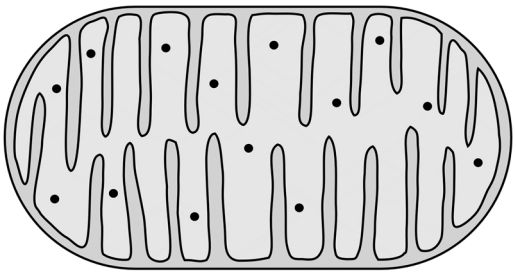
Name:
Function:

(c) Name the tissue indicated by the letter **Z** where rapid mitosis is occurring.

(d) In the space below, draw **and** label a transverse section of the root as it would appear if it was cut at the position of the dashed line (-------) in the diagram above.

Labelled diagram:

3. Aerobic respiration is a two-stage process.
Stage 2 occurs in the cell organelle shown.



(a) Name the cell organelle shown.

(b) Name the cycle of reactions that occurs in stage 2 of aerobic respiration.

(c) ATP is produced in large quantities by aerobic respiration.
What does ATP stand for?

(d) NAD^+ is an important molecule in respiration.
Give the function of NAD^+.

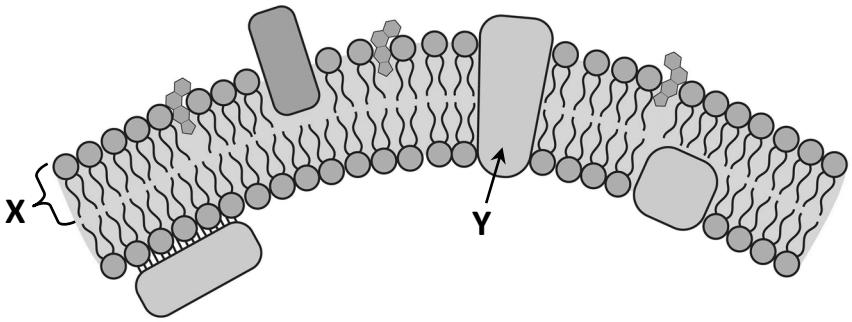
Anaerobic respiration may occur under certain conditions.

(e) Suggest a condition under which anaerobic respiration might occur.

(f) State where anaerobic respiration occurs in a cell.

(g) Name **one main** product of anaerobic respiration.

4. The diagram below shows part of the ultrastructure of a cell membrane.



(a) Name the parts labelled **X** and **Y**.

X:
Y:

(b) Give a function of the cell membrane.

(c) **(i)** What term describes cells **without** membrane-bound organelles?

(ii) What term describes cells **with** membrane-bound organelles?

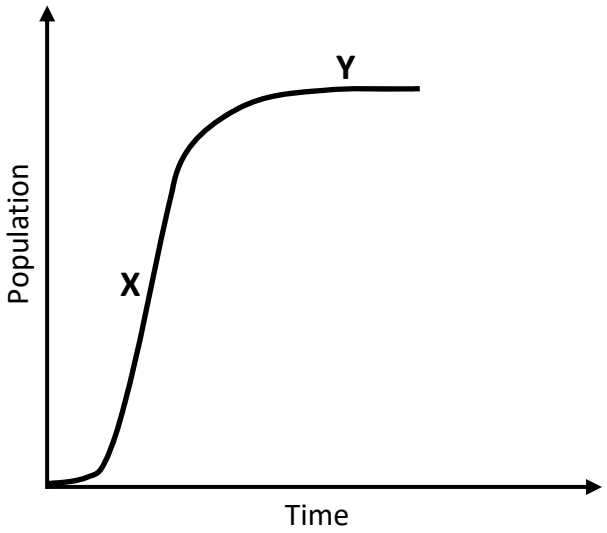
(d) Plant cells have a cell wall in addition to a cell membrane.

(i) Sketch the basic structure of a plant cell clearly labelling the cell membrane **and** the cell wall.

Sketch:

(ii) Give **one** function of a plant cell wall.

5. The image shows a piece of equipment that may be used in food processing.
Food processing is a type of bioprocessing involving enzymes and/or microorganisms.
The graph shows the population growth curve of a species of bacteria in the piece of equipment shown.



(a) What is the common name given to this piece of equipment?

(b) Name **two** factors controlled by the piece of equipment shown that could affect the growth of bacteria, other than nutrient availability.

1.
2.

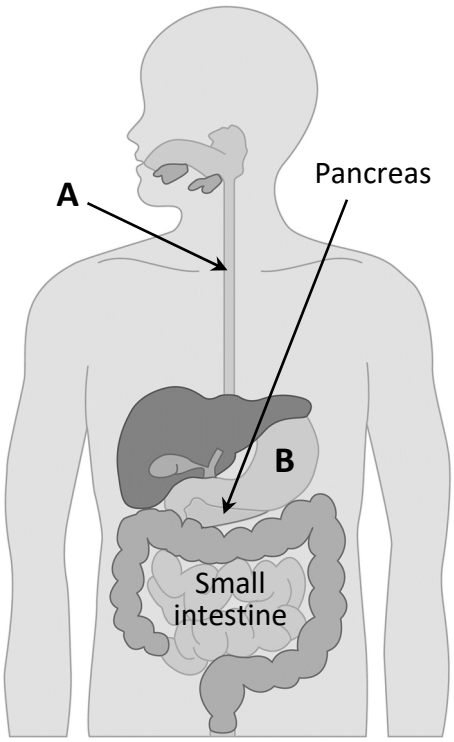
(c) Name the **two** stages **X** and **Y** on the population growth curve.

X:
Y:

(d) The piece of equipment is keeping the population of bacteria steady in growth phase **Y**.
Which type of food processing technique is represented by the growth curve shown?

(e) If the population of bacteria in the piece of equipment above were to run out of nutrients, draw **on the graph above** to show how the line would continue.

6. The diagram shows the human digestive system.



(a) Name the parts labelled **A** and **B**.

A:
B:

(b) Name **and** describe briefly the method by which food travels through structure **A**.

Name:
Describe:

(c) How does the pH of the food material change as it travels from **A** to **B**?

(d) Name the enzyme produced in the pancreas which digests lipids.

(e) The villus is present in the small intestine.
In the space below, draw **and** label the internal structure of a villus.

Labelled diagram:

7. Answer the following questions in relation to the scientific method.

(a) In the scientific method, a testable statement is known as a _____.
Write the missing word in the box below.

(b) How can this statement be tested?

(c) What is the function of a scientific control?

(d) Give **two** limitations of the scientific method.

1.
2.

(e) Where does a biologist normally publish their results?

(f) What is meant by the term *theory*?

Section B

Answer any two questions.
Write your answers in the spaces provided.
Part (a) carries 6 marks and part (b) carries 24 marks in each question in this section.

8. **(a)** **(i)** What is meant by the term *ecosystem*?

(ii) What could aid ecologists in identifying organisms in a study of an ecosystem?

(b) Answer the following questions based on your study of a sample area of a selected ecosystem.

(i) Describe how you carried out a quantitative study of a **named** *plant* species.

Name of plant species:
Describe:

(ii) Name any **two** abiotic factors you have investigated as part of your study **and** outline how you measured **each** factor.

Name:	Name:
Outline:	Outline:

9. **(a)** Explain the term *osmosis*.

(b) Answer the following questions in relation to a laboratory activity you carried out to demonstrate osmosis.

(i) Name the tissue **or** membrane that you used in the activity.

(ii) Describe how you carried out this activity, including the result.
You may include a labelled diagram if you wish.

Describe:

Labelled diagram:

10. **(a)** **(i)** To which kingdom of living organisms do yeast belong?

(ii) Working with microorganisms often involves sterility. Explain the term *sterility*.

(b) Answer the following questions in relation to an investigation you carried out to grow leaf yeast.

(i) Describe how you set up the investigation. Include **one** safety precaution. You may include a labelled diagram if you wish.

Describe:

Labelled diagram:

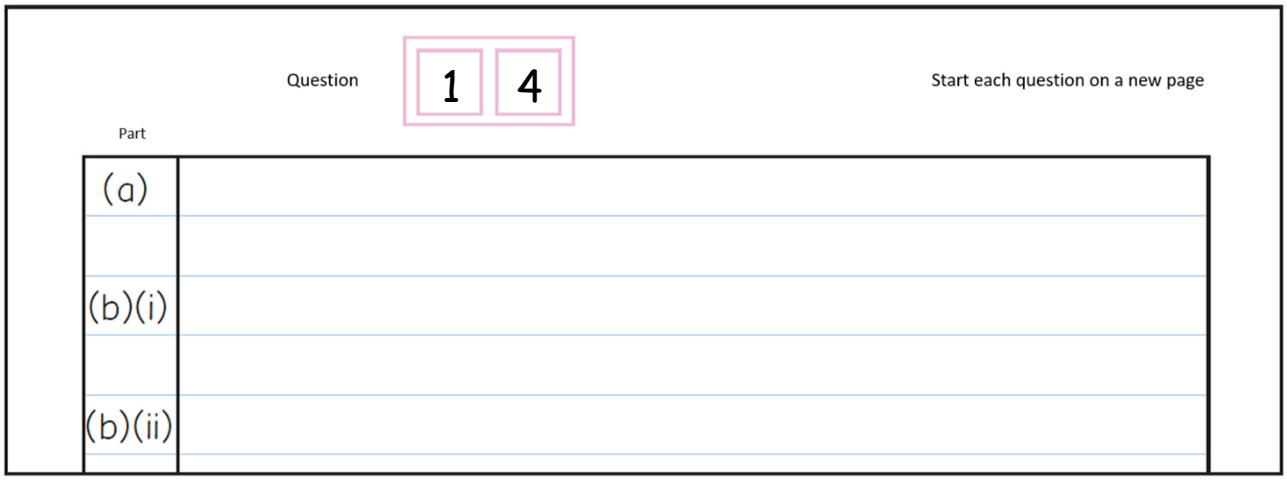
(ii) Describe the result of the investigation, assuming the leaf yeast grew successfully.

Answerbook for Section C

Instructions

Questions for Section **C** are supplied separately.

Start each question on a new page. Write the question number in the box at the top of each page. Use the left-hand column to label each part, as shown below.

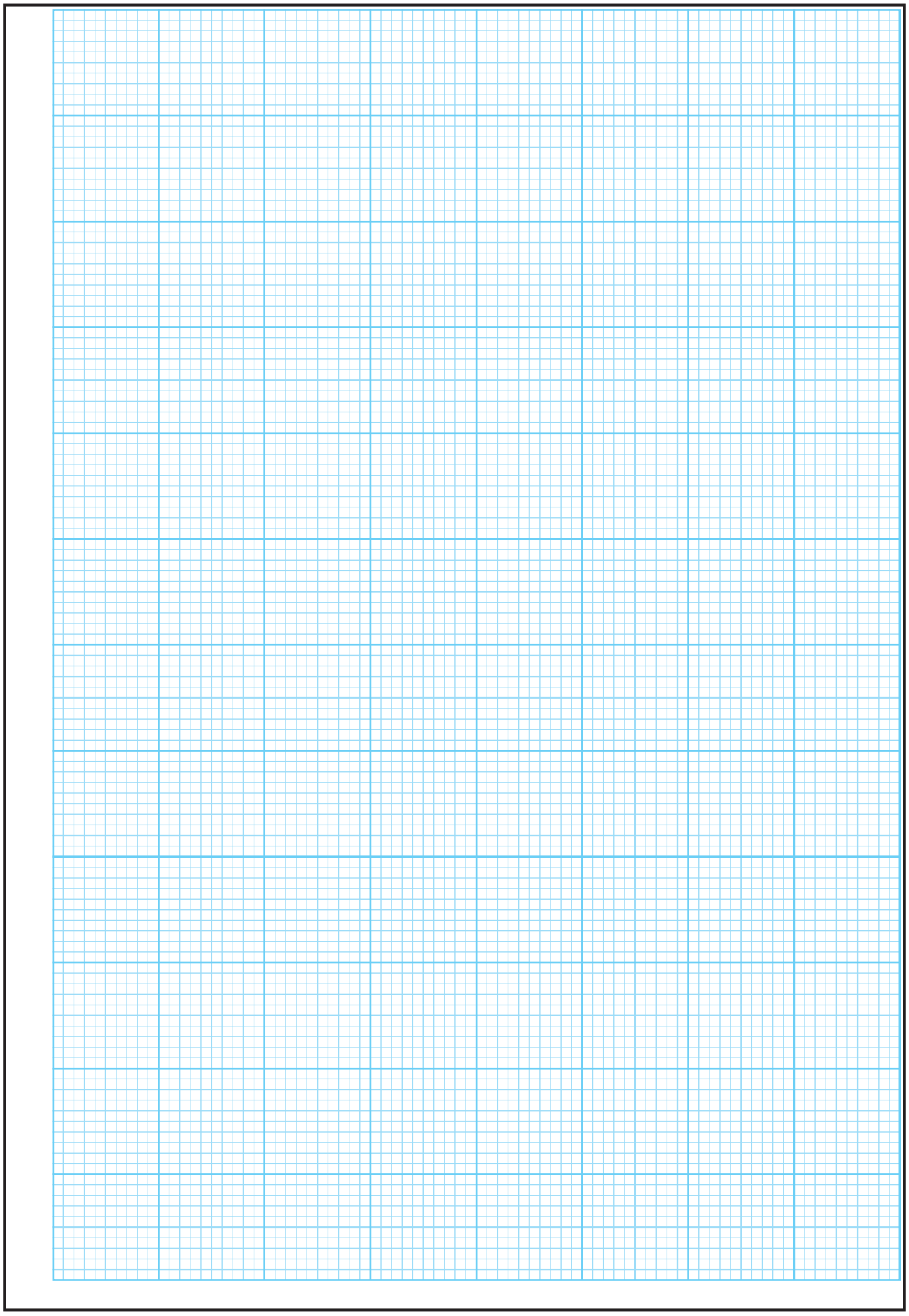


There are two pages of graph paper on the next two pages of this answerbook.
On pages with graph paper, the box for the question number is at the bottom of the page.

You do not need to use all of the pages in this answerbook. If you run out of space in this answerbook, you may ask the superintendent for more paper or graph paper.

Write your answers in blue or black pen. You may use pencil for sketches, graphs and diagrams only.

Question



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Acknowledgments:

Images/graphs/diagrams:

Diagram on page 4:	Adapted from Taiz L, Zeiger E (1998), Plant physiology, 2nd Ed., Sinauer Associates, Sunderland, MA.
Diagram on page 5:	State Examinations Commission
Diagram on page 6:	alamy.com
Image on page 7:	dciinc.com
Graph on page 7:	State Examinations Commission
Diagram on page 8:	shutterstock.com

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Leaving Certificate – Higher Level

Biology Sections A and B and Answerbook

Tuesday 10 June

Afternoon 2:00 - 5:00