



General Certificate of Secondary Education  
2023

Centre Number

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Candidate Number

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## Biology

Unit 1  
Foundation Tier

<b>MV24</b>
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[GBL11]

TUESDAY 16 MAY, MORNING

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### Time

1 hour 15 minutes, plus your additional time allowance.

### Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write on blank pages.**

Complete in black ink only.

Answer **all ten** questions.

## Information for Candidates

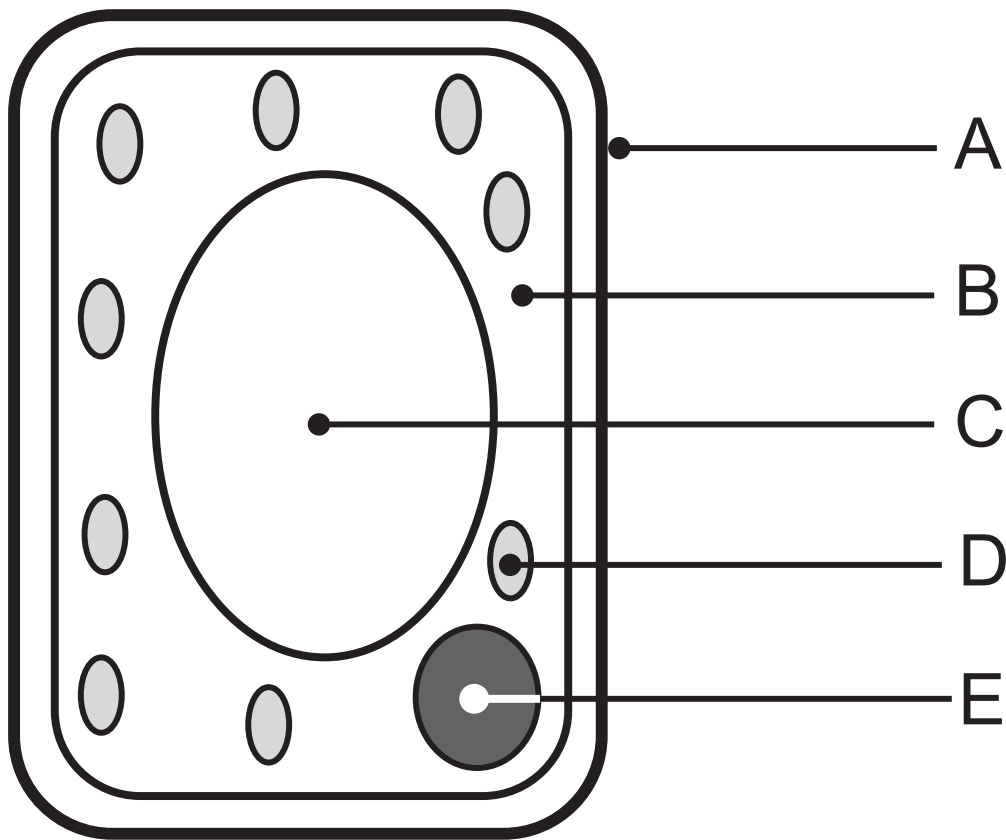
The total mark for this paper is **75**.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **7(b)**.

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**(Questions start overleaf)**

1 The diagram shows some structures found in a plant cell.



Look at the diagram.

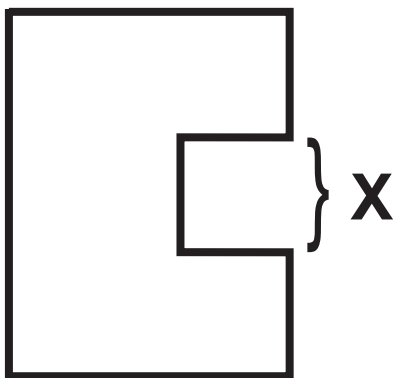
(a) Complete the table to give the name or function of the structures labelled **A** to **E**.  
[5 marks]

Structure	Name	Function
<b>A</b>		provides support
<b>B</b>	cytoplasm	
<b>C</b>		contains cell sap
<b>D</b>	chloroplast	
<b>E</b>	nucleus	

(b) Give the letters of **two** structures in the diagram which are also found in animal cells. [1 mark]

\_\_\_\_\_ and \_\_\_\_\_

2 (a) The diagram shows an enzyme.

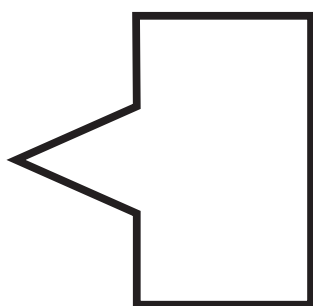


Look at the diagram.

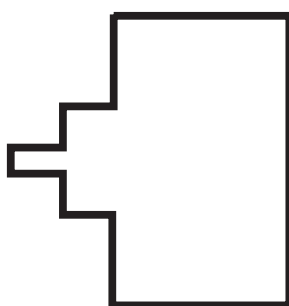
(i) Name the part of the enzyme labelled **X**. [1 mark]

\_\_\_\_\_

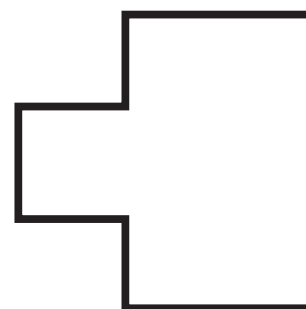
(ii) Which of the following substrates, **A**, **B** or **C**, would this enzyme break down? [1 mark]



**A**



**B**



**C**

Substrate \_\_\_\_\_

**(iii)** Name this model of enzyme action.  
[1 mark]

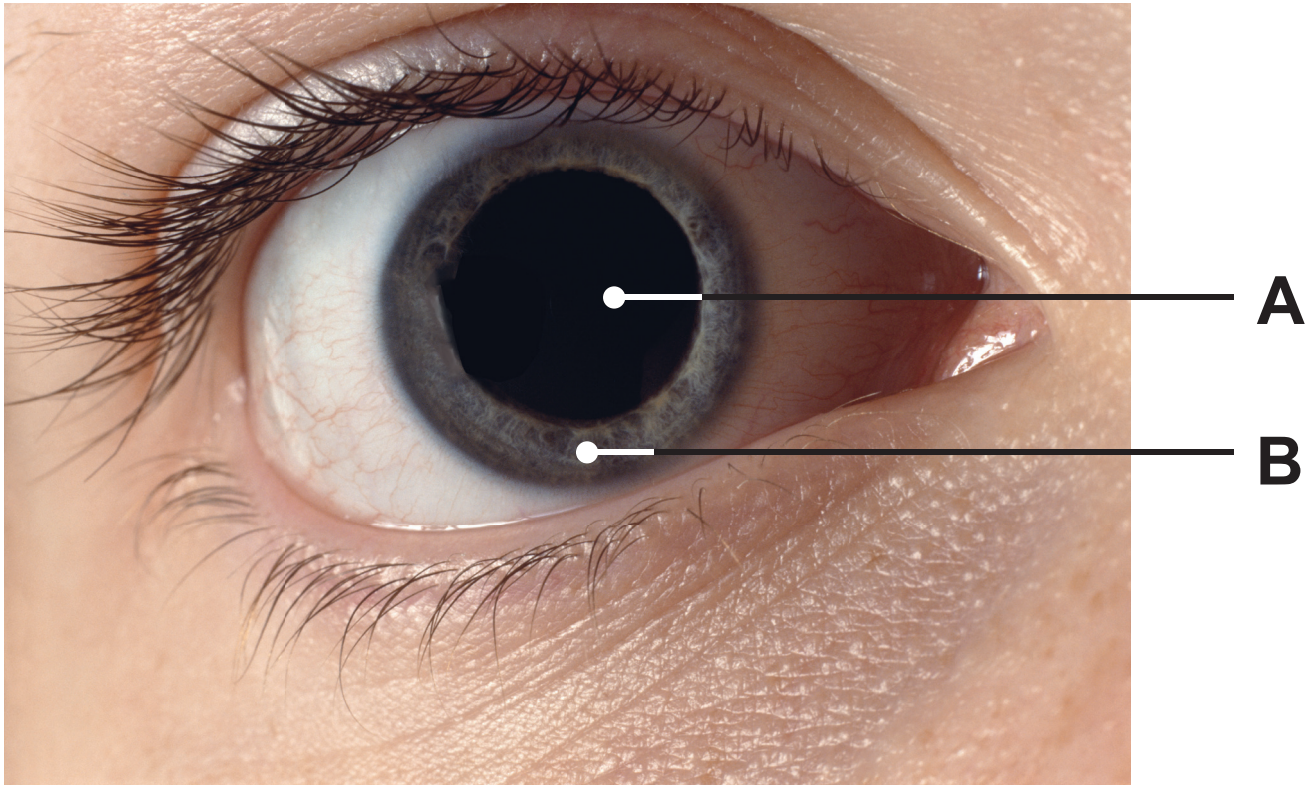
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**(b)** Name the type of enzyme which breaks  
down [2 marks]

protein. \_\_\_\_\_

fat. \_\_\_\_\_

**3** The photograph shows the front of a human eye in dim light.



Look at the photograph.

**(a)** Name parts **A** and **B**. [2 marks]

**A** \_\_\_\_\_

**B** \_\_\_\_\_

**(b) (i)** Describe the change to part **A** when a bright light is switched on. [1 mark]

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**(ii)** Suggest why this change is necessary to protect the eye. [2 marks]

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Light entering the eye is refracted (bent) on to the retina.

**(c)** Name **two** parts of the eye which refract (bend) light. [2 marks]

1. \_\_\_\_\_

2. \_\_\_\_\_

4 (a) Complete the word equation for photosynthesis. [3 marks]

glucose

+

light  
↑  
chlorophyll

+

**(b) (i)** Name the **complex carbohydrate** used by plants to store glucose.  
[1 mark]

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**(ii)** Suggest **one other** way a plant uses the glucose produced during photosynthesis. [1 mark]

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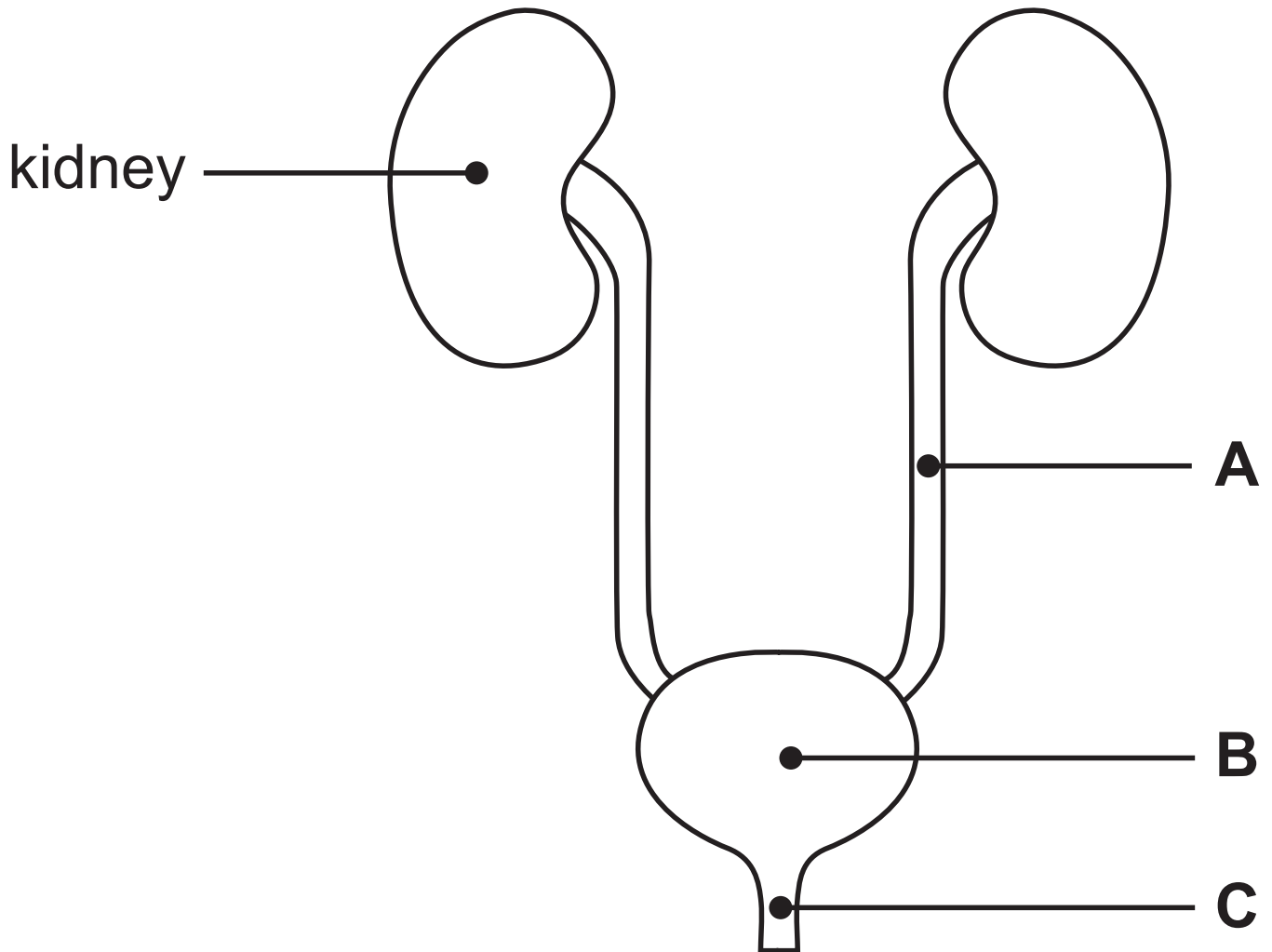
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**(c)** Use the word equation to help you explain why photosynthesis is an **endothermic** process. [1 mark]

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**5** The diagram shows part of the excretory system.



Look at the diagram.

**(a)** Name parts **A**, **B** and **C**. [3 marks]

**A** \_\_\_\_\_

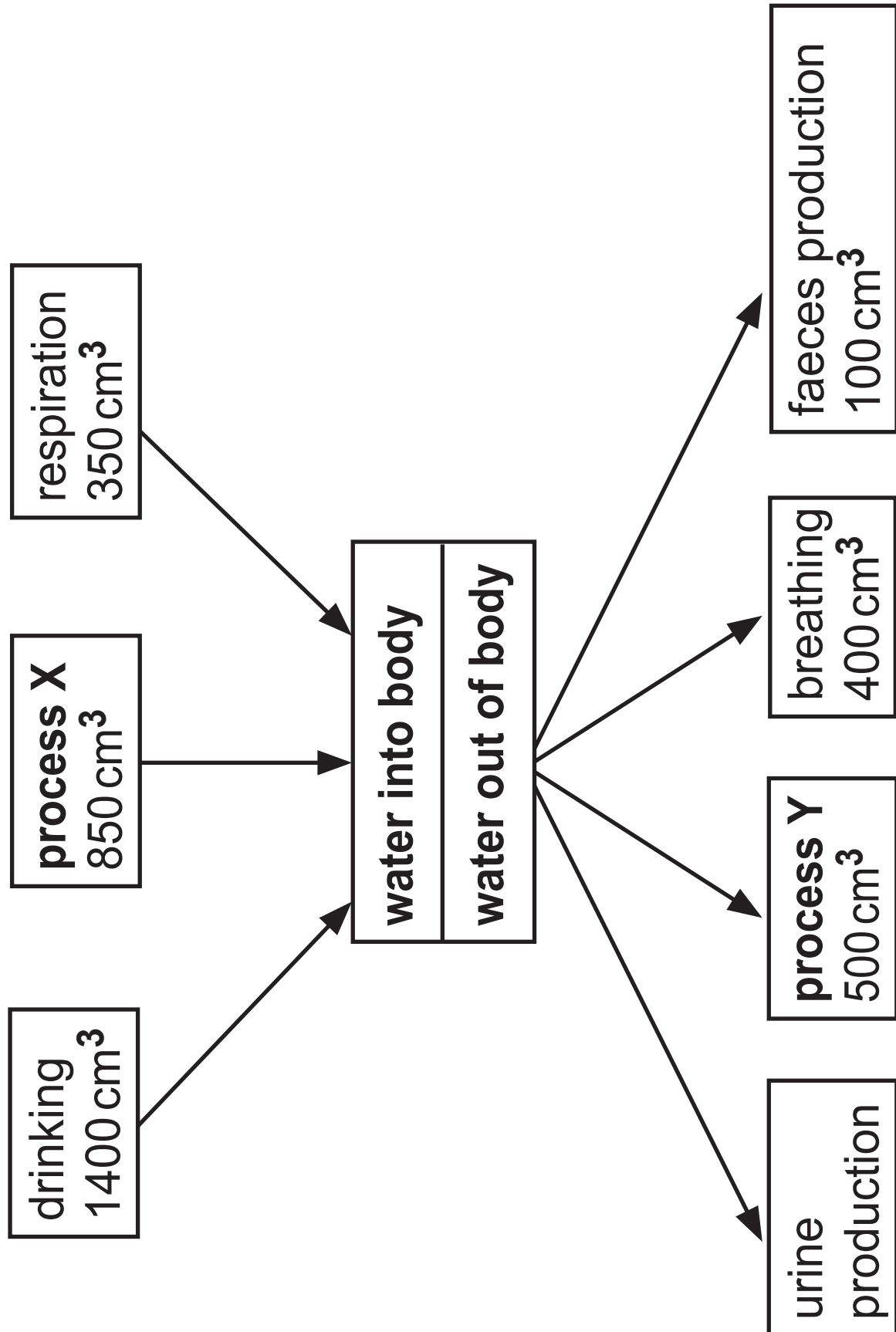
**B** \_\_\_\_\_

**C** \_\_\_\_\_

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**(Questions continue overleaf)**

**(b)** The body has to balance the volume of water it takes in with the volume of water it loses.



The diagram shows the volume of water taken in and lost by different processes over 24 hours.

Look at the diagram.

(i) Name processes **X** and **Y**. [2 marks]

**X** \_\_\_\_\_

**Y** \_\_\_\_\_

(ii) Calculate the volume of water lost in urine. [3 marks]

Show your working.

Volume of urine \_\_\_\_\_ cm<sup>3</sup>

(iii) Suggest why the volume of water lost by process **Y** is lower in winter.  
[1 mark]

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**(Questions continue overleaf)**

**6** The photographs show three stages in the life cycle of a sustainable forest.

## **Stage A**



## **Stage B**



## **Stage C**



Look at the photographs.

Stage C shows recently planted trees.

**(a)** Name the process of planting new trees.  
[1 mark]

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**(b)** Suggest how spreading out the trees when planting helps them grow better.  
[2 marks]

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**(c)** Describe how planting more sustainable forests affects the level of oxygen and carbon dioxide in the atmosphere.  
[2 marks]

oxygen \_\_\_\_\_

carbon dioxide \_\_\_\_\_

Many forests have a variety of species of trees planted.

**(d)** Suggest **two** ways this increases biodiversity. [2 marks]

1. \_\_\_\_\_

2. \_\_\_\_\_

**7 (a)** A hormone is a chemical messenger which is released by a gland and transported to a target organ.

**(i)** Name the hormone which controls blood glucose concentration.  
[1 mark]

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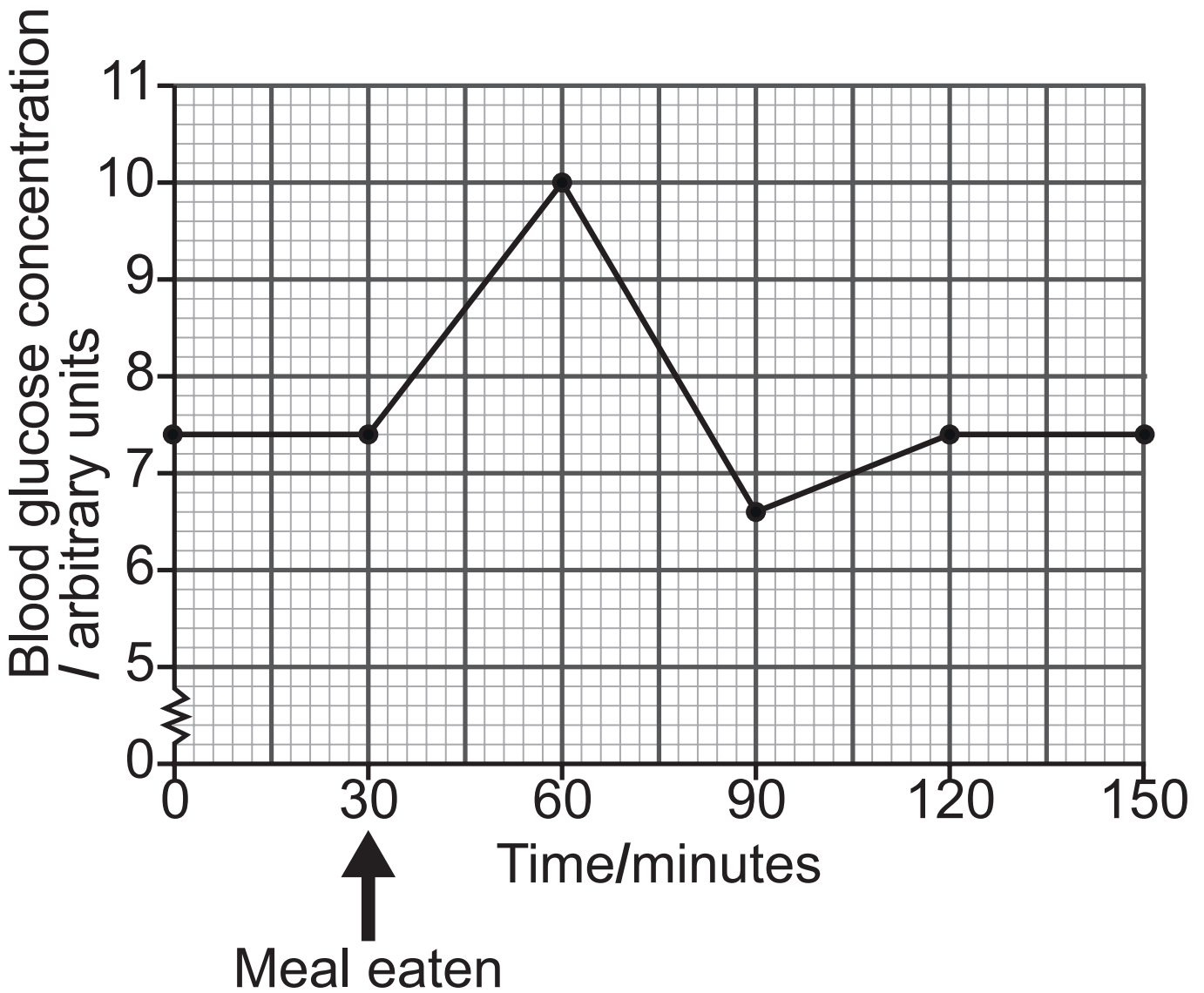
**(ii)** Name the gland which produces this hormone. [1 mark]

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**(iii)** Name the target organ for this hormone. [1 mark]

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The graph shows the effect of eating a meal on the blood glucose concentration of a healthy student.



Look at the graph.

- (b)** • Describe how blood glucose concentration changes during the first 60 minutes **after** eating a meal.

Use **data** from the graph to support your answer.

- Give the time taken for blood glucose concentration to return to normal **after** eating a meal.
- Explain how the hormone returns blood glucose concentration to normal.

**In this question you will be assessed on your written communication skills, including the use of specialist scientific terms. [6 marks]**



**8 (a)** The diagram shows a food chain from a vegetable garden.

**lettuce → snail → thrush (bird)**

Look at the diagram.

**(i)** Describe the role of the lettuce in this food chain. [2 marks]

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**(ii)** Name the secondary consumer in this food chain. [1 mark]

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**(iii)** What do the arrows represent in a food chain? [1 mark]

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**(b)** A group of students investigated this food chain by:

- estimating the population size of each organism.
- calculating the mean biomass of each organism.
- calculating the biomass of the population of each organism.

The table opposite shows their results.

Look at the table.

**(i)** Complete the table by calculating the mean biomass of **one** lettuce.  
[2 marks]

Show your working.

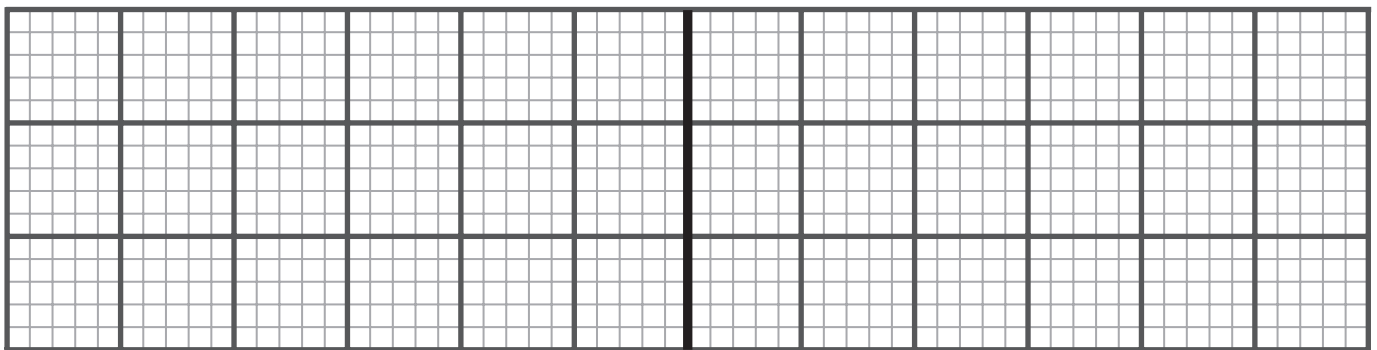
<b>Organism</b>	<b>Population size</b>	<b>Mean biomass of each organism/g</b>	<b>Biomass of population/g</b>
Lettuce	40		6000
Snail	100	16	1600
Thrush	1	100	100

**(ii) Use the information in the table to draw a pyramid of biomass for this food chain. [3 marks]**

Use the scale of 1 small square to represent 100 g.

Use the key shown.

**Key:** Lettuce  Snails  Thrushes 



The students concluded the biomass decreased at each trophic level in the food chain because there was a decrease in energy available.

**(c)** Give **two** reasons why the energy available decreases at each trophic level in **this** food chain. [2 marks]

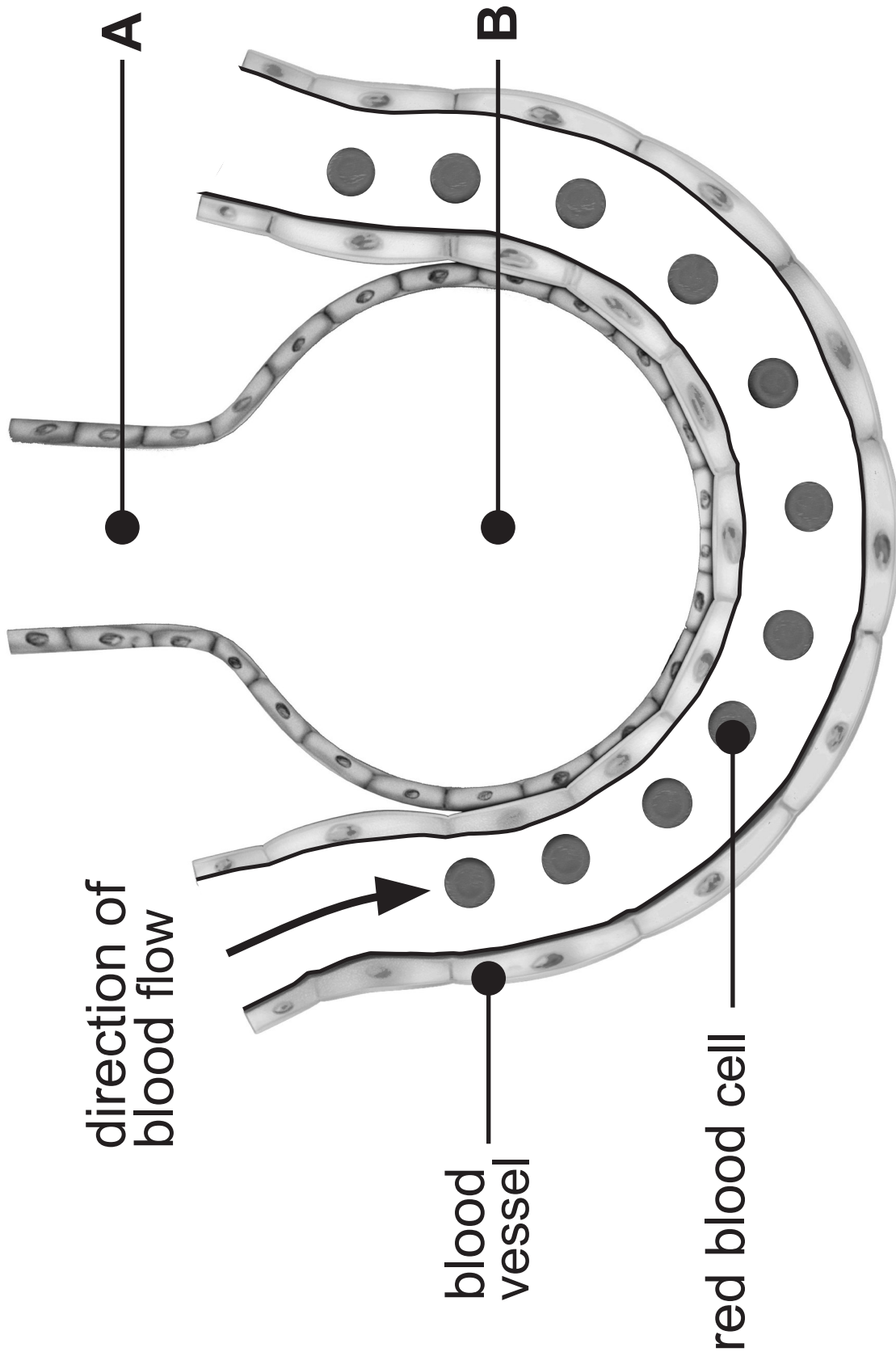
1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

9 The diagram shows part of the respiratory system.



(a) Name parts **A** and **B**. [2 marks]

**A** \_\_\_\_\_

**B** \_\_\_\_\_

(b) On the diagram, draw an arrow to show the movement of oxygen when gas exchange occurs during **breathing in**. [1 mark]

(c) Use the diagram to help describe and explain **two** ways the respiratory system is adapted for gas exchange. [4 marks]

1. Description \_\_\_\_\_

Explanation \_\_\_\_\_

2. Description \_\_\_\_\_

Explanation \_\_\_\_\_

**10 (a)** The photograph shows a Sumatran tiger. It lives in forests on the island of Sumatra in Indonesia.



**Table 1** shows the change in the population of Sumatran tigers on the island over a period of 40 years.

**Table 1**

<b>Year</b>	<b>Number of Sumatran tigers</b>
1980	1000
1990	850
2000	750
2010	625
2020	495

(i) What is meant by the term 'population'? [1 mark]

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Look at **Table 1**.

(ii) Calculate the percentage decrease in the number of Sumatran tigers from **1990** to **2010**. [3 marks]

Show your working.

\_\_\_\_\_ %

**(b) Table 2** shows the area of forest on the island of Sumatra between 1990 and 2010.

**Table 2**

<b>Year</b>	<b>Area of forest/million hectares</b>
1990	21
2000	16
2010	13

**(i)** Use evidence from **Table 1** and **Table 2** to suggest and explain what may have caused the change in the population of Sumatran tigers.  
[2 marks]

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(ii) Suggest **one other** cause of this change in the population of Sumatran tigers. [1 mark]

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(iii) Suggest **one** government initiative which could be introduced to protect the population of Sumatran tigers. [1 mark]

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**This is the end of the question paper**

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## SOURCES

Q1 . . . .Source: © *Principal Examiner*

Q2(a) . . .Source: © *Principal Examiner*

Q3 . . . .Source: © *Adam Hart-Davis / Science Photo Library*

Q5 . . . .Source: © *Getty Images*

Q6 . . . .Source: © *Principal Examiner*

Q9 . . . .Source: © *Getty Images*

Q10(a) . .Source: © *Getty Images*

Q10(a) . .Source: © *Adapted from © Project Ark Foundation*

Q10(b) . .Source: "*Mapping and monitoring deforestation and forest degradation in Sumatra (Indonesia) using Landsat time series data sets from 1990 to 2010*" © *Belinda Arunarwati Margono et al 2012. Environ. Res. Lett. 7 034010 DOI 10.1088/1748-9326/7/3/034010 Published 19 July 2012*

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Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
<b>Total Marks</b>	

Examiner Number

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