GradeMax

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel International Advanced Level

Thursday 16 October 2025

Afternoon (Time: 1 hour 20 minutes)

Paper reference **WBI13/01**

Biology

International Advanced Subsidiary/Advanced Level
UNIT 3: Practical Skills in Biology I

You must have:
Scientific calculator, ruler, HB pencil

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P78823A

©2025 Pearson Education Ltd.
M:1/1/1/

P 7 8 8 2 3 A 0 1 1 6

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

1 The high water content of fruits and vegetables increases the chances of them being damaged during storage.

Fruit can be preserved by removing water from the fruit. Water can be removed by submerging the fruit in a sugar solution.

(a) (i) Explain how submerging fruit in a sugar solution removes water from the fruit.

(2)

(ii) Another method of removing water involves heating the fruit.

Give **one** advantage of submerging fruit in a sugar solution rather than heating the fruit to remove water.

(1)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(b) The effect of the concentration of sucrose solution on water loss in pumpkin fruits was investigated.

The photograph shows a pumpkin fruit cut in half.



(Source: © Leonid Nyshko /Alamy Stock Photo)

(i) State the **independent** variable in this investigation.

(1)

.....

.....

(ii) Explain why the temperature should be kept constant in this investigation.

(2)

.....

.....

.....

.....

.....

.....

(c) The table shows some results from this investigation.

Concentration of sucrose solution / mol dm^{-3}	Water loss / g per 100 g of pumpkin	
	Mean	Standard deviation
1.0	62.7	2.8
1.4	67.9	3.7
1.8	72.4	2.7
2.3	77.2	0.9
2.8	82.3	1.7

(i) Describe how the results shown in the table could have been obtained.

Assume that a sucrose solution and distilled water were provided.

(5)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

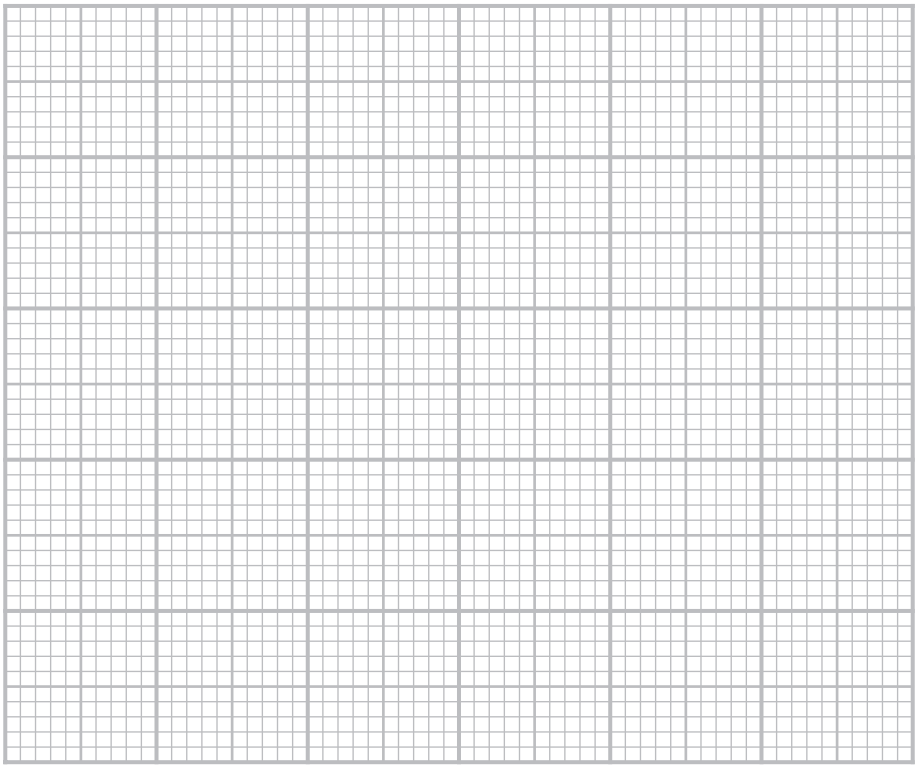
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(ii) Plot a suitable graph of all the mean water loss results.

Include the standard deviations for 1.4, 1.8 and 2.3 mol dm^{-3} **only**.

Join the points you have plotted with straight lines.

(5)



(iii) It was stated that "the water loss at each concentration of sucrose solution is significantly different from all the others".

Evaluate this statement.

Use the results to support your answer.

(2)

.....

.....

.....

.....

.....

.....

(iv) Calculate the gradient of your graph between 1.8 and 2.3 mol dm^{-3} of sucrose solution.

Give your answer as a whole number.

(2)

Answer .....

(Total for Question 1 = 20 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

2 Vitamin C is an antioxidant.

(a) Explain the importance of antioxidants, such as vitamin C.

(2)

(b) The concentration of vitamin C in a variety of locally sourced and imported fruits was measured.

Describe how vitamin C content in an extract of a fruit can be measured.

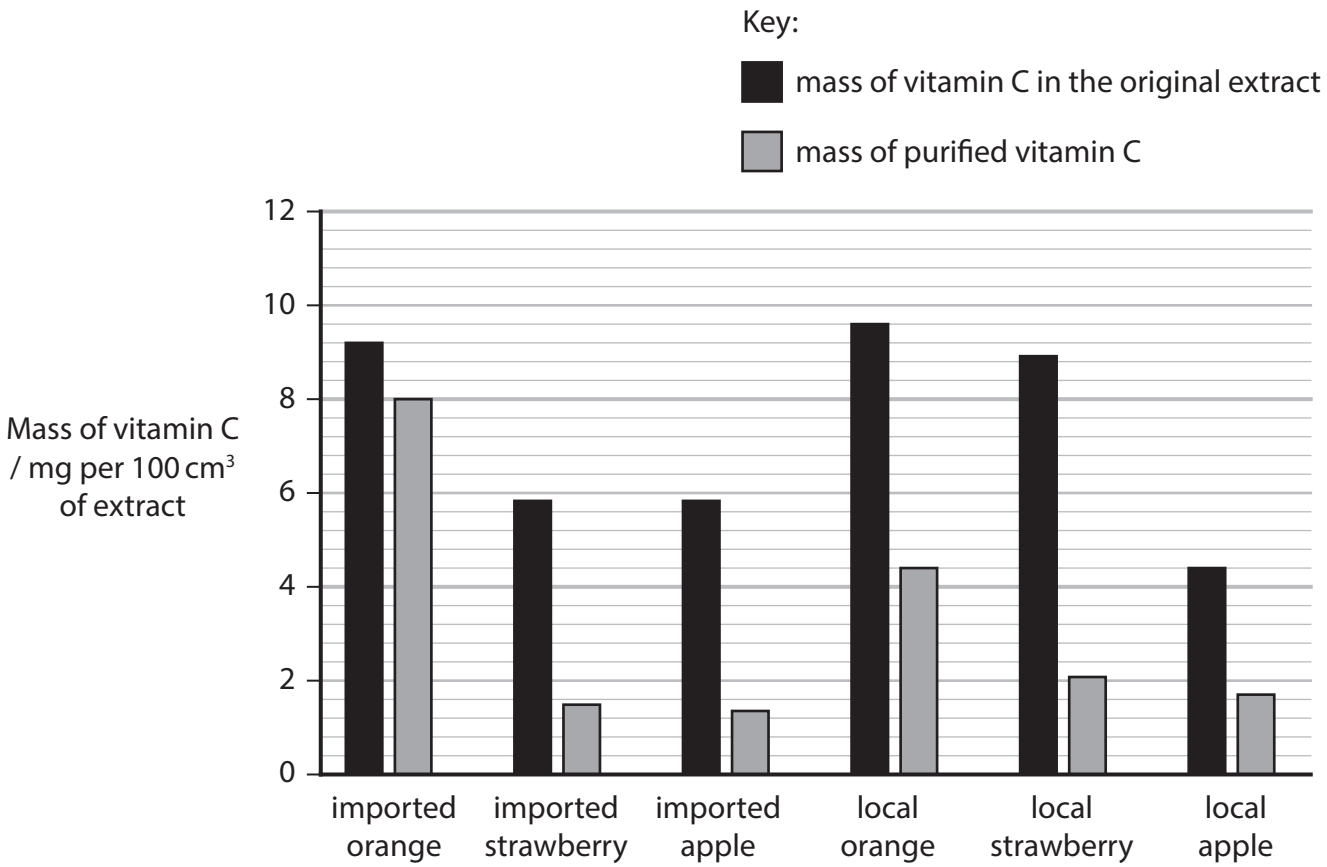
(4)

(c) In an investigation, vitamin C was purified from fruit extracts.

The mass of vitamin C purified from the extracts was compared with the mass of vitamin C present in the original extracts.

The fruits studied were oranges, apples and strawberries, both imported and locally sourced.

The bar chart shows the results of this investigation.



(i) Suggest **two** reasons why the mass of purified vitamin C is less than the mass of vitamin C in the original extract.

(2)

1 .....

.....

.....

2 .....

.....

.....

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(ii) Draw a table to show a comparison of the vitamin C content in the original extract of both imported and locally sourced fruits.

(3)

(iii) The mean of the vitamin C content in the original extracts of all imported fruit is 6.93 mg per 100 cm^3.

Calculate the mean vitamin C content in the original extracts for all locally sourced fruit.

Give your answer to three significant figures.

(2)

Answer ..... mg per 100 cm^3

(iv) It has been suggested that it is much better to eat locally sourced fruit rather than imported fruit.

Evaluate this suggestion in terms of vitamin C content in the original fruit extracts.

(4)

(Total for Question 2 = 17 marks)

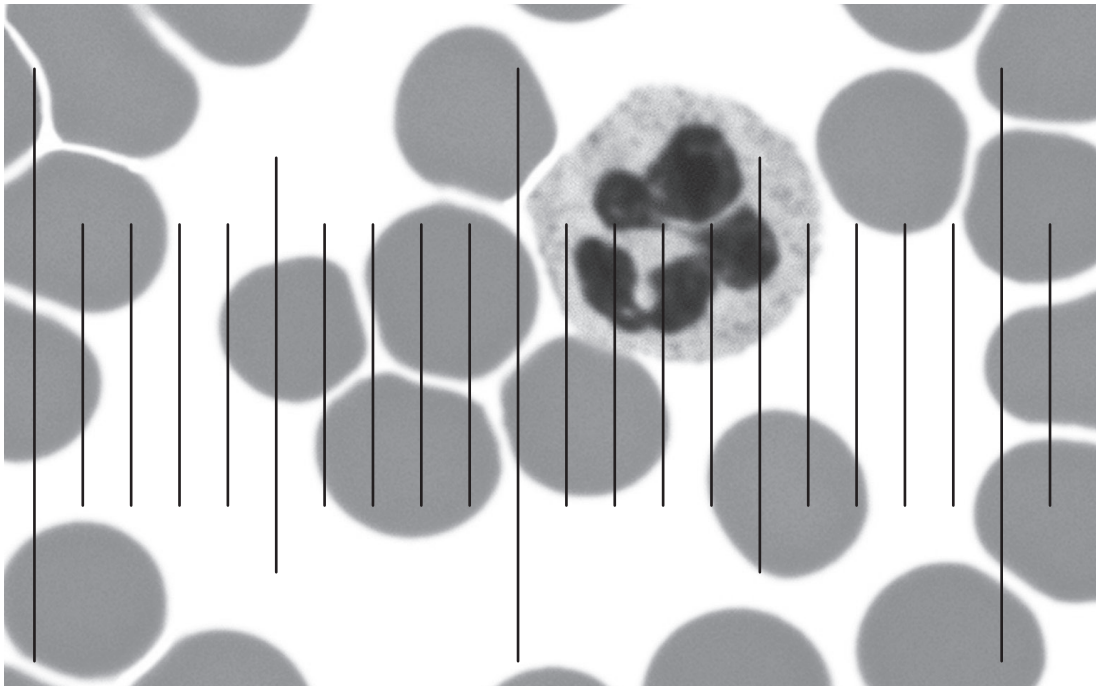
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

BLANK PAGE

3 Microscopes can be used to study structures such as cells and tissues.

(a) The photograph shows some red blood cells and a white blood cell as seen using the microscope and eyepiece graticule.



(Source: © STEVE GSCHMEISSNER / SCIENCE PHOTO LIBRARY)

(i) Describe how an eyepiece graticule can be used to determine the actual diameter of the white blood cell.

Use the information in the photograph to support your answer.

(3)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(ii) Some of the steps used to produce the slide in the photograph are shown in the flow chart.

The blood sample is placed onto a slide → A stain is added → A coverslip is placed onto the slide

Give **one** reason for each of these steps.

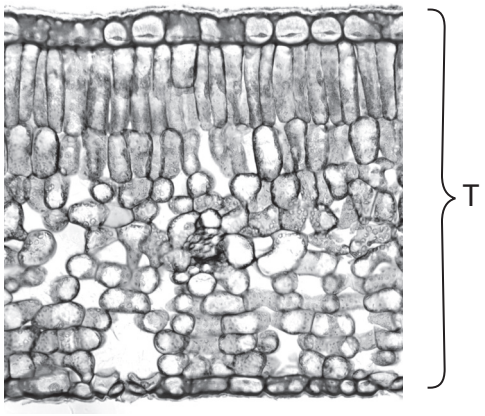
(3)

The blood sample is placed onto a slide

A stain is added

A coverslip is placed onto the slide

(b) The photograph shows a section of part of a leaf from a tea plant.



(Source: © DR KEITH WHEELER / SCIENCE PHOTO LIBRARY)

Magnification ×100

(i) Draw a low power plan diagram of this section of a leaf.

Label **three** tissues shown in your plan diagram.

(4)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(ii) Calculate the thickness (T) of the leaf in the photograph.

Give your answer in micrometres and standard form.

(3)

Answer ..... μm

(Total for Question 3 = 13 marks)

TOTAL FOR PAPER = 50 MARKS

BLANK PAGE

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA