

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

Pearson Edexcel International Advanced Level

Tuesday 17 October 2023

Morning (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 ►

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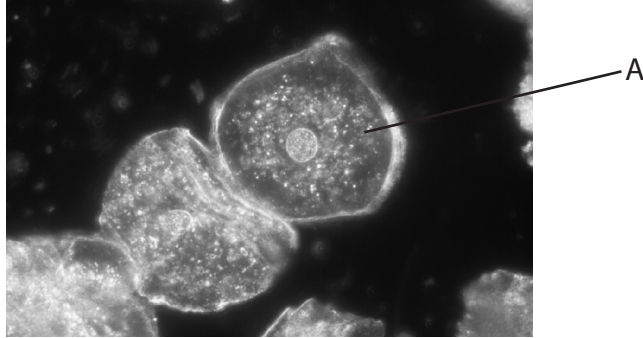


Pearson

Answer ALL questions.

Write your answers in the spaces provided.

- 1 The photograph shows two human cheek cells on a microscope slide. The mean diameter of human cheek cells is $60\ \mu\text{m}$.



(Source: © BIOPHOTO ASSOCIATES/SCIENCE PHOTO LIBRARY)

- (a) (i) Describe a procedure for the accurate determination of the diameter of cell A.

(5)

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(ii) Draw cell A and label the parts of the cell.
Include a scale by your drawing.

(4)

(iii) An onion cell is 0.2 mm in length.

Calculate the ratio of the length of an onion cell to the diameter of a cheek cell.

(2)

Answer

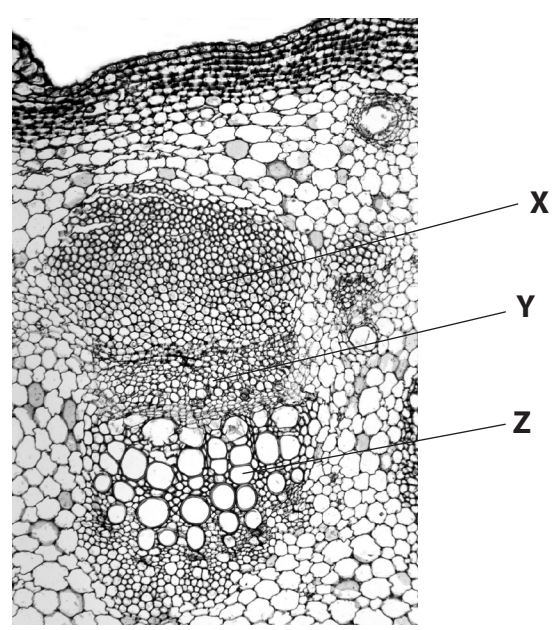
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(b) The photograph below shows part of a transverse section of a plant stem.
 Three types of cell are labelled **X**, **Y** and **Z**.



(Source: DR KEITH WHEELER / SCIENCE PHOTO LIBRARY)

(i) Identify the cell types labelled X, Y and Z. (2)

X

Y

Z

(ii) The photograph shows a longitudinal section of where two plant cells meet.



(Source: DR KEITH WHEELER / SCIENCE PHOTO LIBRARY)

State which of the cells labelled X, Y or Z is shown in this longitudinal section. (1)

Cell

(Total for Question 1 = 14 marks)



2 A simple test can be used to assess the quantity of sugar in liquids, such as food extracts and urine.

(a) (i) Describe how a urine sample can be tested for glucose.

(2)

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(ii) Complete the table of results from tests on standard glucose solutions.

(2)

Appearance	Glucose concentration / g dm ⁻³	Glucose quantity
Blue	0.0	None
Green with no visible precipitate	0.1 to 0.4	Trace
Green with precipitate	0.5 to 10.0	Very low
Yellow with precipitate		Low
Orange with precipitate	15.1 to 20.0	Moderate
	>20.0	High



(b) People with type 2 diabetes can have a raised blood glucose concentration.

The concentration of glucose in the urine can be used to identify people with raised blood glucose levels.

Blood glucose concentrations can be estimated using test strips.

A study measured the urine glucose concentrations and the blood glucose concentrations of a group of people with type 2 diabetes.

The table shows the results of this study.

Mean urine glucose concentration / a.u.	Mean blood glucose concentration / a.u.	Standard deviation of blood glucose concentration / a.u.
0	150	± 140
2	225	± 170
4	280	± 170
6	315	± 185
8	370	± 140
10	415	± 165

(i) Describe how the measurements for blood glucose concentration taken in this study were processed to give the data in the table.

(2)

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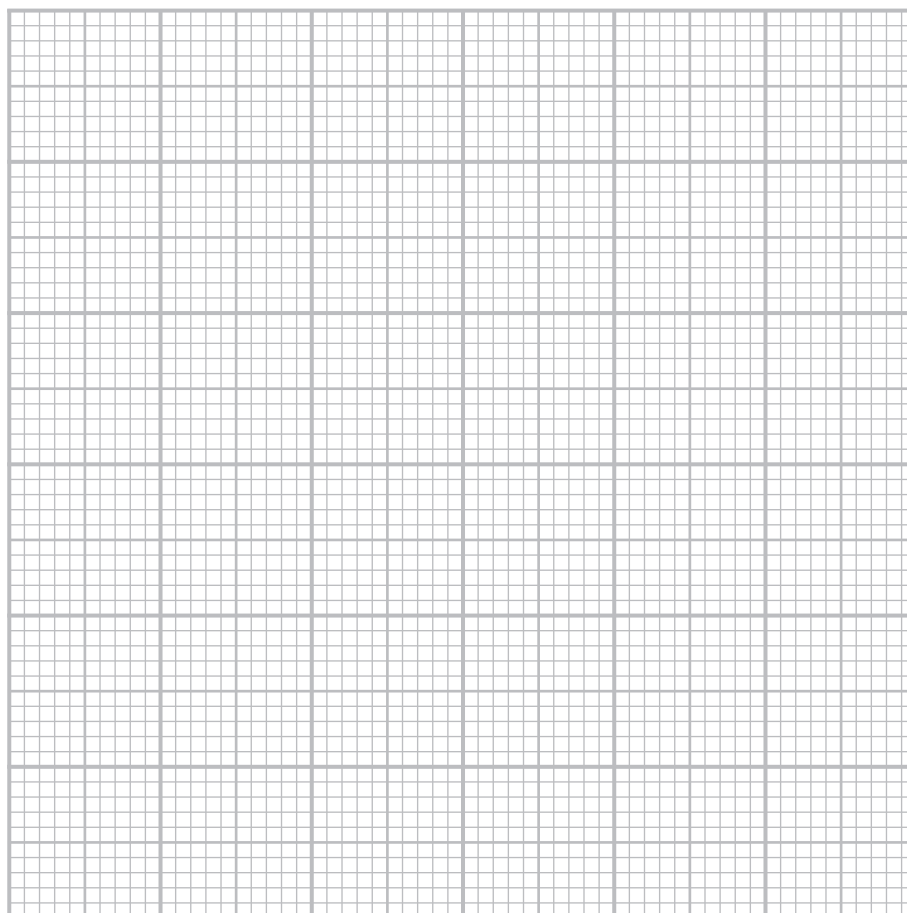


- (ii) Plot a suitable graph to show the relationship between mean urine glucose concentration and mean blood glucose concentration.

Plot the standard deviation for the mean blood glucose concentration at the mean urine glucose concentration of 2 a.u.

Draw a line of best fit.

(5)



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(iii) Comment on the conclusion that urine glucose concentration is a good indicator of the blood glucose level.

Use the information in the table and in your graph to support your answer.

(3)

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(iv) Calculate the blood glucose concentration at a urine glucose concentration of 12 a.u.

The equation for the line of best fit is $y = 29.3x + 154.1$.

Give your answer to 3 significant figures.

(3)

Answer a.u.

(Total for Question 2 = 17 marks)



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3 Mitosis and cell division are involved in growth and repair in plants and animals.

(a) (i) Name the stages of mitosis when chromosomes line up across the centre of the cell and when chromosomes separate.

(1)

Chromosomes line up

Chromosomes separate

(ii) Cell division takes place after mitosis.

Compare and contrast cell division in animal and plant cells.

(3)

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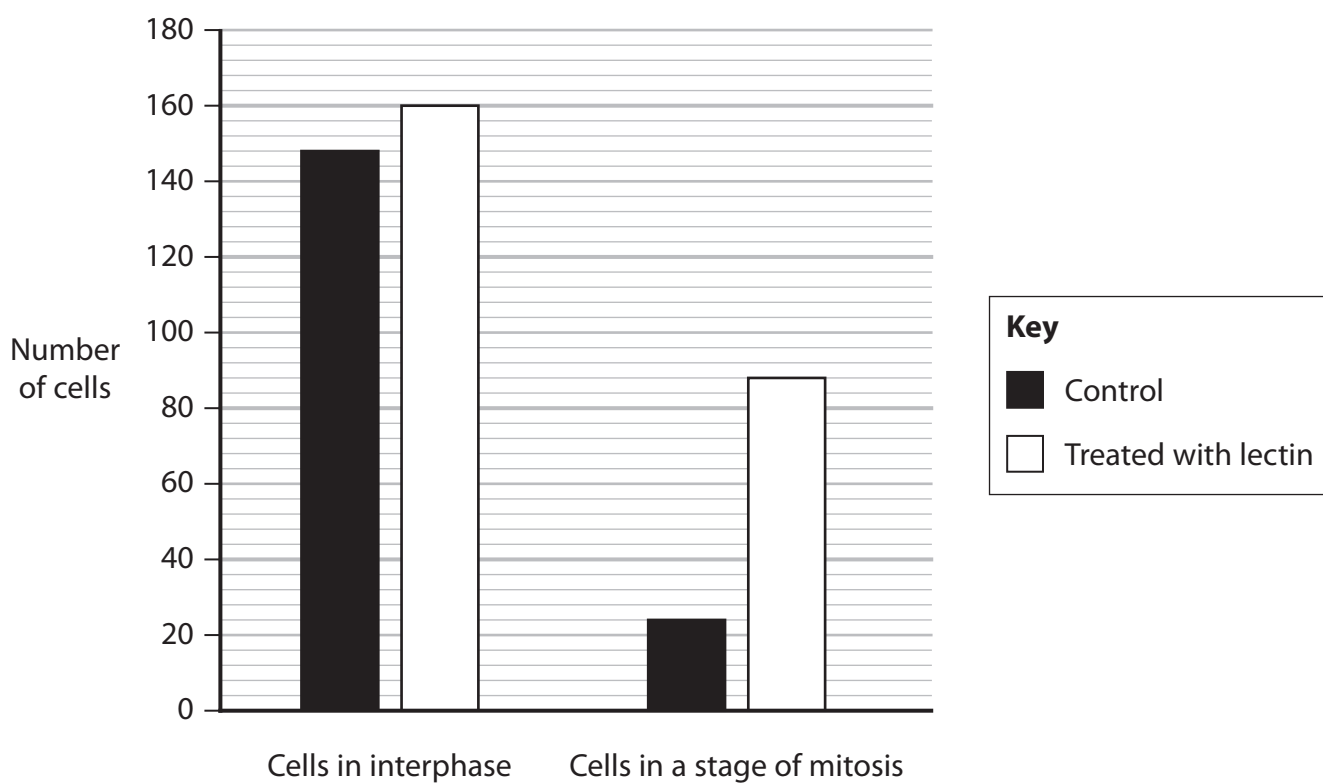
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(b) The hypothesis that the addition of the protein lectin stimulates mitosis in onion cells was investigated. The graph shows the results of this investigation.



(i) State the independent variable in this investigation.

(1)

(ii) Describe a suitable and safe procedure to obtain all the data shown in the graph.

(5)

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(iii) Draw a table to show these results.

(3)



P 7 5 6 1 7 A 0 1 1 1 2

(iv) In control group cells 14.0% are in mitosis. Calculate the percentage of cells in mitosis in those treated with lectin.

(2)

Answer %

(v) Comment on the conclusion that these results show that lectin does stimulate mitosis.

Use the information in the graph and your answer to (b)(iv) to support your answer.

(2)

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(vi) Justify the selection of a named statistical test to be performed on these data.

(2)

Statistical test

Reason

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(Total for Question 3 = 19 marks)

TOTAL FOR PAPER = 50 MARKS

