



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2023

Centre Number

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Candidate Number

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Biology

Assessment Unit AS 3

assessing

Practical Skills in AS Biology



[SBY31]

SBY31

WEDNESDAY 31 MAY, MORNING

TIME

1 hour.

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 outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all seven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 50.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You are reminded of the need for good English and clear presentation in your answers.

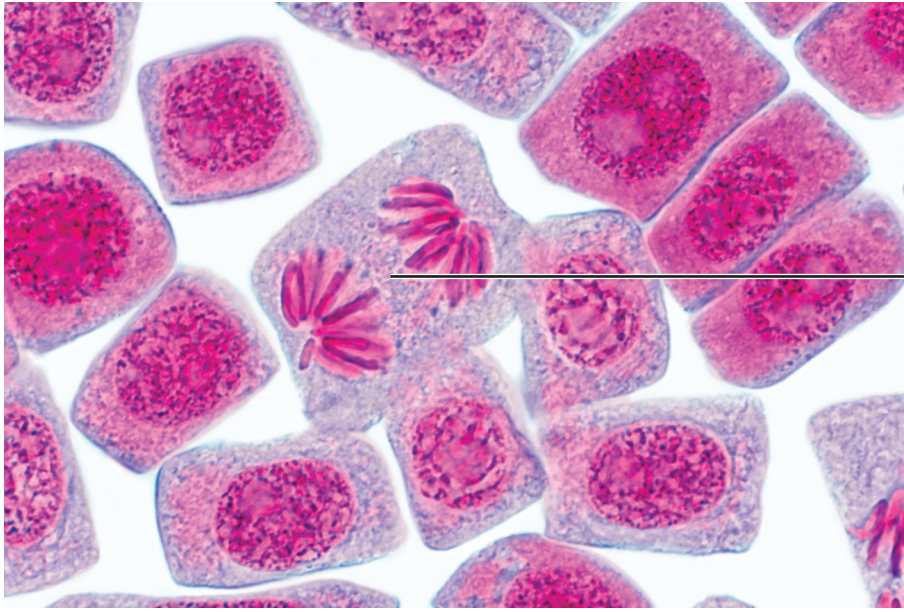
Use accurate scientific terminology in all answers.

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1 The photomicrograph below shows garlic cells during mitosis.



Source: © Herve Conge, ISM / Science Photo Library

(a) (i) State which region of a garlic root is used to observe cells during mitosis.

[1]

(ii) Name a suitable stain to observe chromosomes during mitosis.

[1]



Tissue used in this practical is usually heated in a water bath, before being 'squashed' on a slide.

(iii) Explain the purpose of each of these steps.

Heating

Squashing

[2]

(b) Identify the stage of mitosis shown in cell X.

[1]



2 Some practical investigations require relatively pure samples of cell organelles. Liver tissue is a good source of many cell organelles. In order to obtain organelle samples, the following steps can be used.

Step 1 – The tissue is broken up and mixed to form a uniform suspension.

Step 2 – This suspension is then spun at different speeds to separate the organelles.

(a) (i) Name the technique described in **step 1**.

[1]

(ii) Suggest suitable apparatus which could be used to carry out this step.

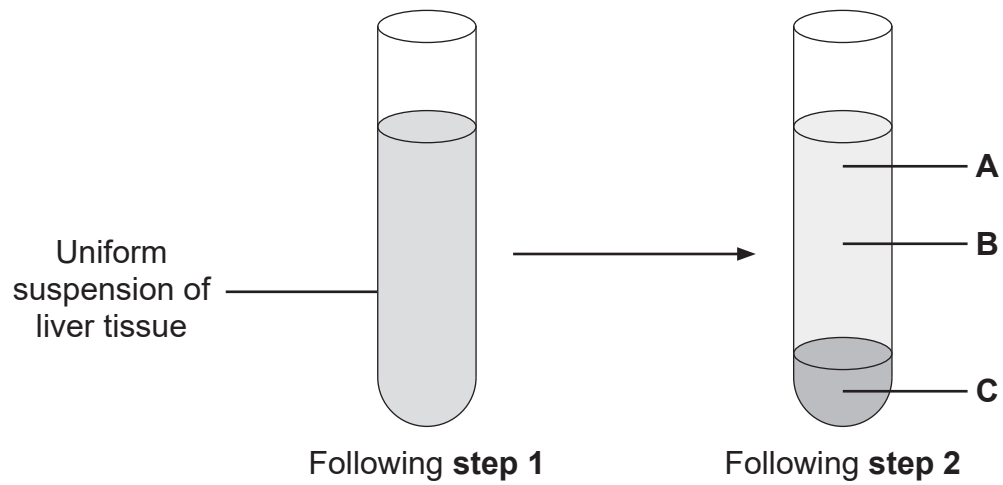
[1]

(iii) Name the technique described in **step 2**.

[1]



The diagram below represents the results of carrying out these steps using liver tissue.

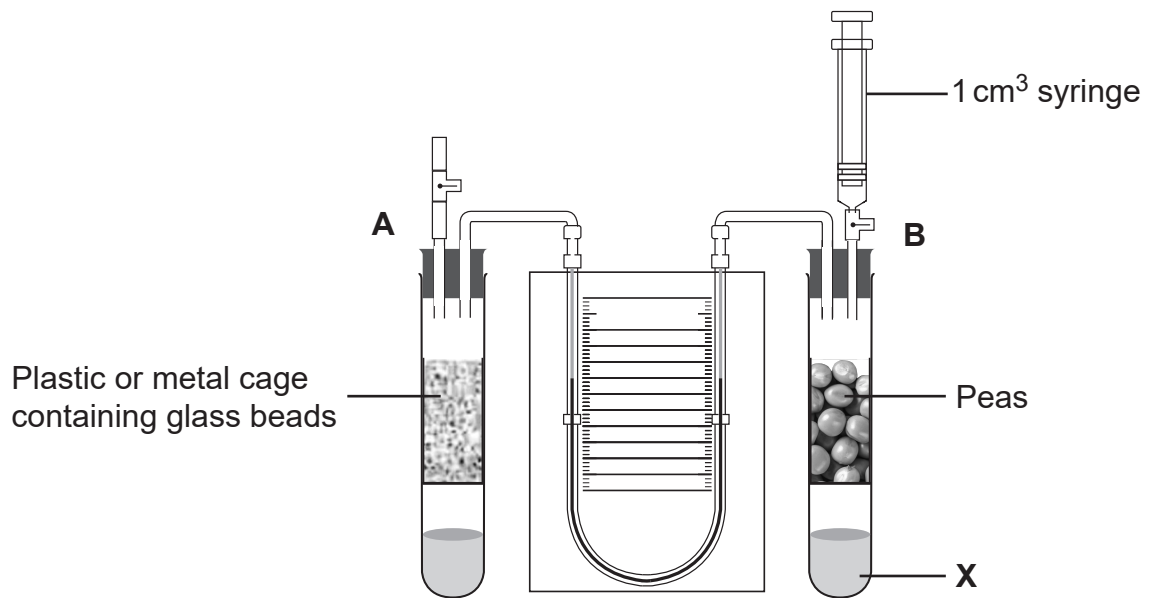


(b) At which position, **A**, **B** or **C**, would nuclei be found? Explain your answer.

[2]



- 3 The apparatus shown below can be used to measure oxygen uptake in living organisms.



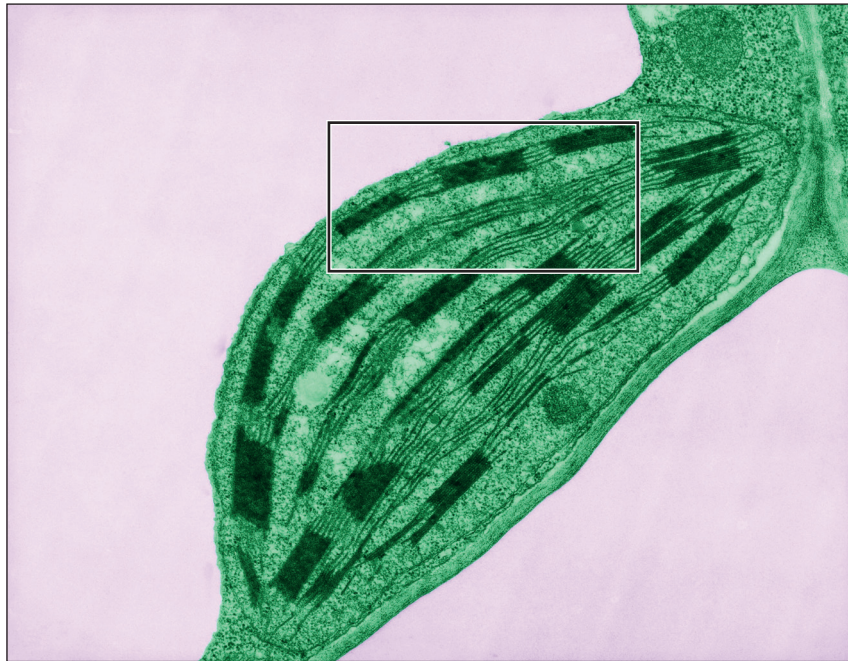
- (a) Name the apparatus shown.

[1]

Source: "CCEA AS/A2 Unit 3 Biology Student Guide: Practical Skills in Biology" by John Campton (ISBN: 9781510419155) 2018
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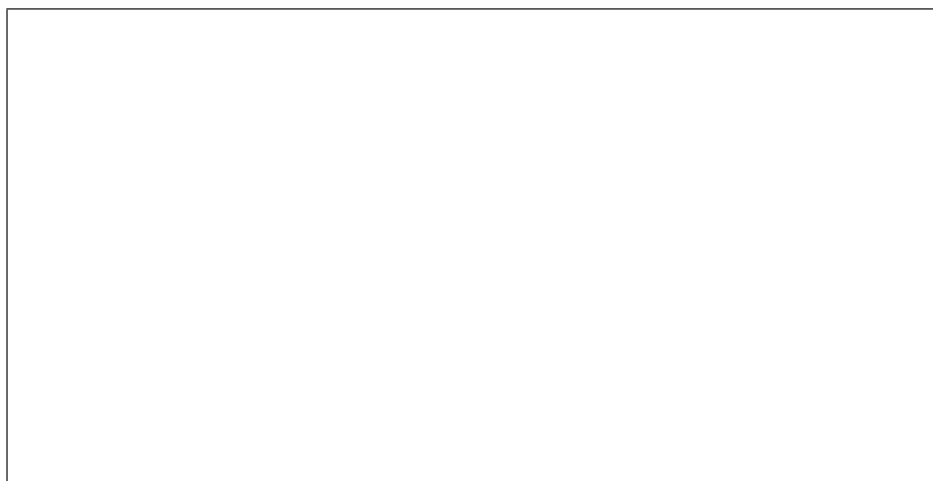
- 4 The electron micrograph below shows a chloroplast in a plant cell. Part of the micrograph is enclosed by a box.



Source: © Dr Jeremy Burgess / Science Photo Library

Draw the part of the chloroplast enclosed by the box in the space below.

Label the stroma and a granum on your drawing.



[5]



- 5 Biochemical tests were carried out on two unknown colourless solutions (**A** and **B**) using three reagents. The end colour of each reagent following testing was recorded in the table below.

Reagent	End colour of reagent	
	Solution A	Solution B
1	yellow-brown	blue-black
2	purple	blue
3	blue	brick red

- (a) Identify reagents 1 to 3.

1 _____

2 _____

3 _____

[2]

- (b) Using the information provided, identify the biochemical(s) present in solutions **A** and **B**.

A _____

B _____ [2]

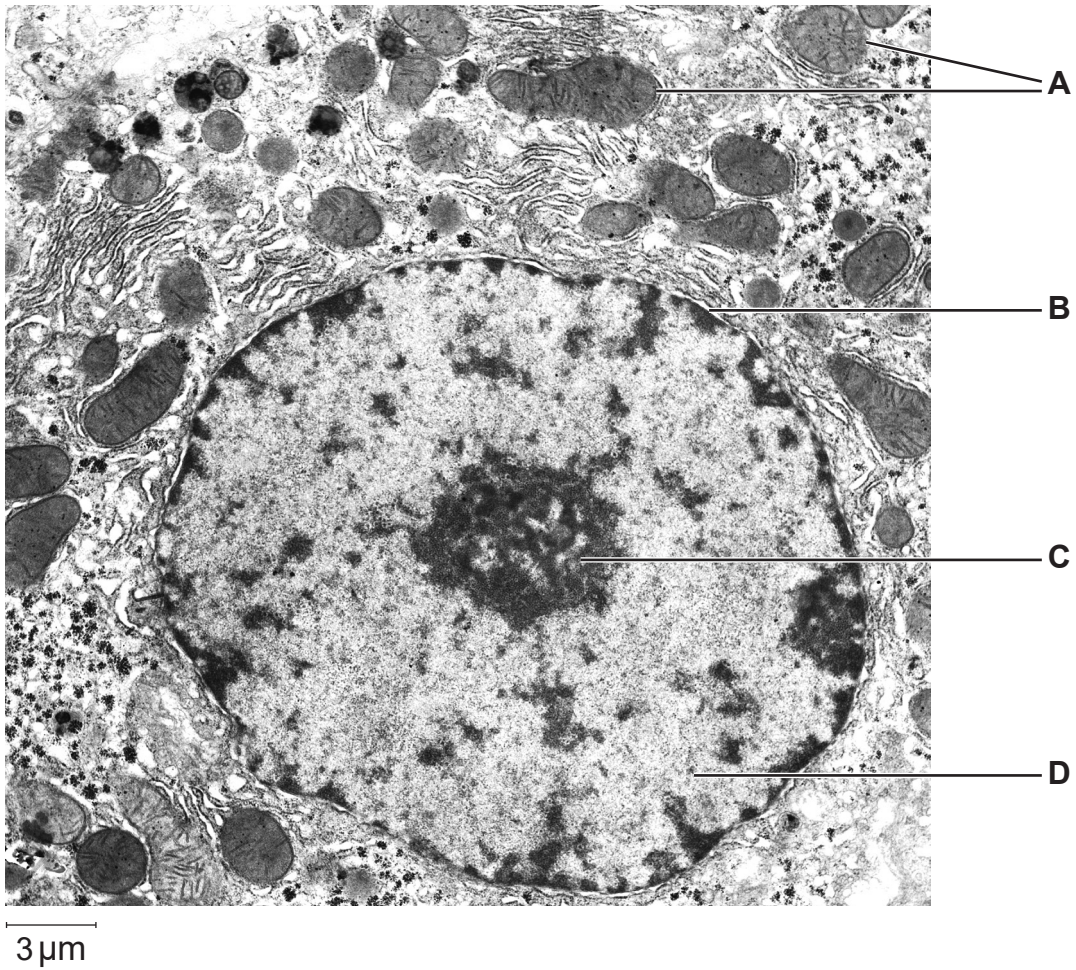
- (c) Further tests confirmed that neither solution contained glucose. Describe a glucose-specific biochemical test.

_____ [2]

[Turn over



6 The electron micrograph below shows a section of a rat liver cell.



Source: © Biophoto Associates / Science Photo Library

- (a) Using the scale bar, calculate the magnification of this electron micrograph.
(Show your working.)

_____ [3]



(b) Identify the structures labelled **A** to **D**.

A _____

B _____

C _____

D _____

[4]

(c) Suggest a reason for the different appearance of the two organelles labelled **A**.

[1]



7 The abundance of grass, daisy, buttercup and clover was investigated in a 400 m² unmanaged meadow. The distribution of each plant type was generally uniform throughout the meadow. The percentage cover of each plant was recorded at 10 sample sites.

(a) Construct a table which could be used to record this data. A caption is not necessary.

[4]



(b) (i) State the most appropriate apparatus which would be used to sample the plants in this investigation.

[1]

(ii) Name the most appropriate type of sampling that should be used in this investigation. Explain your answer fully.

Type _____

Explanation _____

_____ [3]

(iii) Describe how the position of the 10 sites could be selected.

_____ [2]

(c) State how the reliability of this investigation could be improved.

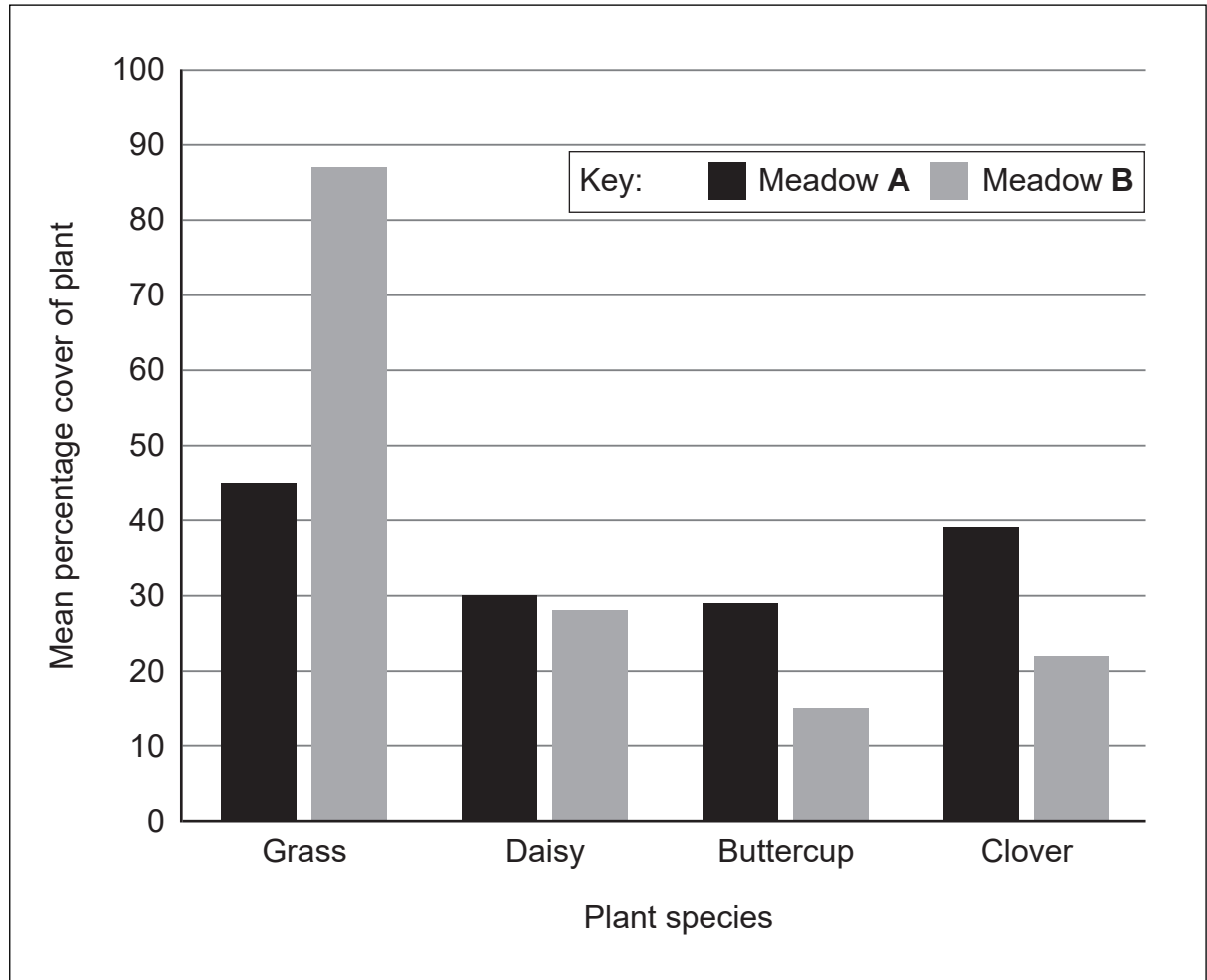
_____ [1]

[Turn over



The meadow described in the previous investigation was referred to as meadow **A**. A second meadow (**B**) of similar size and close to meadow **A** was also sampled in the same way.

The graph below shows the results of these investigations.



Source: All images © CCEA unless otherwise stated.

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	

Total Marks	
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Examiner Number

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