



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education

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

Assessment

TIME

1 hour.

Assessment Level of Control:

Tick the relevant box (✓)

Controlled Conditions	
Other	

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 Complete the table by identifying an appropriate chemical or solution for each use described.

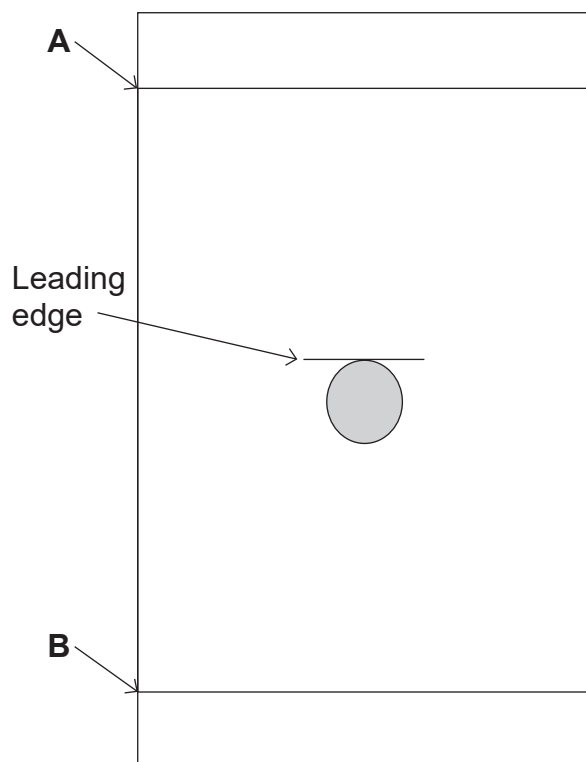
Chemical/solution	Use
	Increasing visibility of cell structures in onion epidermis when viewing under a microscope
	Maintaining pH during an enzyme experiment
	Staining chromosomes to observe mitosis in a root tip squash
	Absorbing carbon dioxide in a respirometer

[4]

[Turn over



- 2 The diagram below represents a developed amino acid chromatogram. A table of R_f values for some amino acids in the solvent used (phenol) is also shown.



Amino acid	R_f
Serine	0.36
Lysine	0.48
Alanine	0.55
Valine	0.77
Methionine	0.80

- (a) (i) Identify lines **A** and **B**.

A _____

B _____

[2]

- (ii) State **two** precautions necessary when drawing line **B** to ensure valid results.

1. _____

2. _____

[2]



(b) Using the leading edge of the spot shown, calculate the R_f value for the amino acid.

(Show your working.)

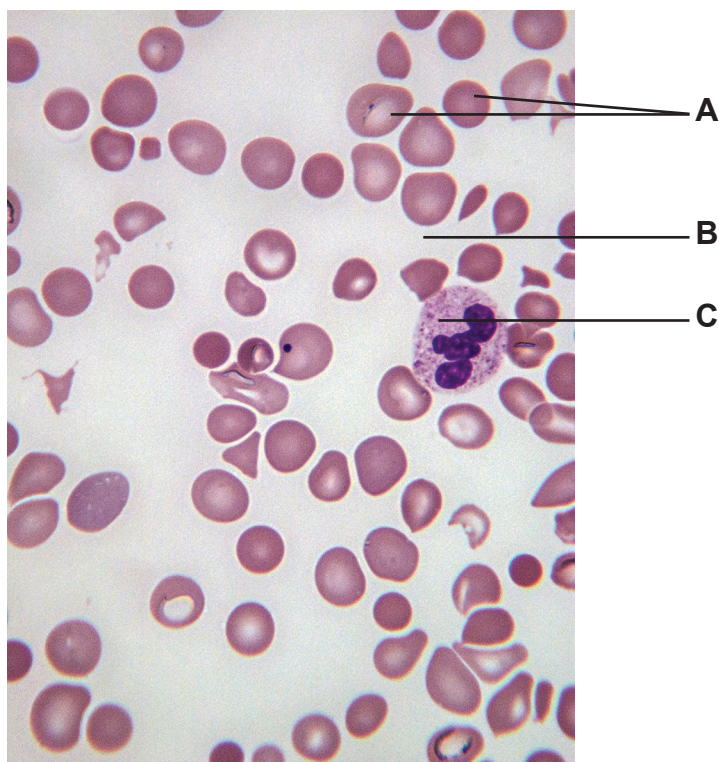
_____ [2]

(c) Identify this amino acid using the information provided.

_____ [1]



- 3 The circulatory system of a mammal consists of a heart, blood vessels and blood. Below is a photomicrograph of a blood smear showing several blood components.



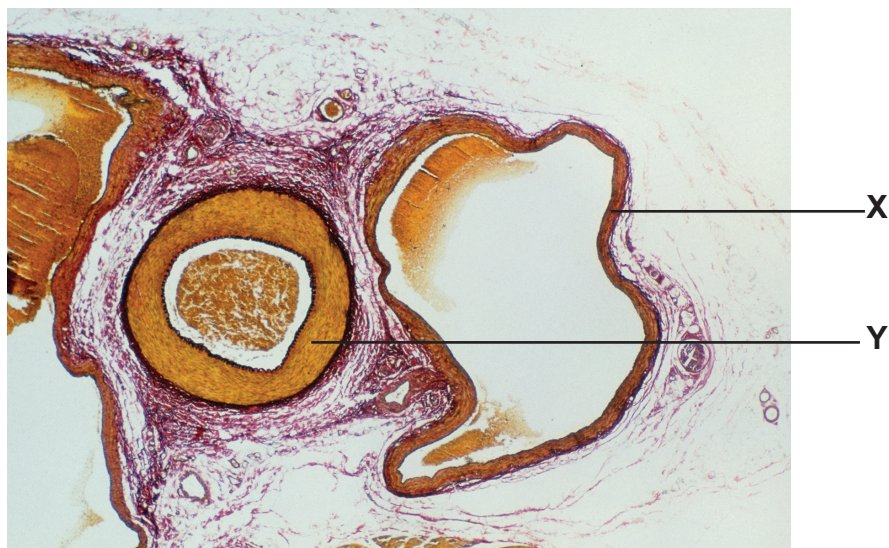
Source: © Nature's Faces / Science Source / Science Photo Library

(a) State precisely the **function** of components **A–C**.

- A _____
- B _____
- C _____ [3]



The photomicrograph below shows a transverse section through mammalian blood vessels.



Source: © Biophoto Associates / Science Photo Library

- (b) Identify which of the blood vessels (X or Y) is an artery. Justify your answer using evidence from the photomicrograph.

[3]

[Turn over]



The heart is a muscular organ which pumps blood around the body.

- (c) Describe how you would dissect a mammalian heart to examine the internal features of one side.

[3]





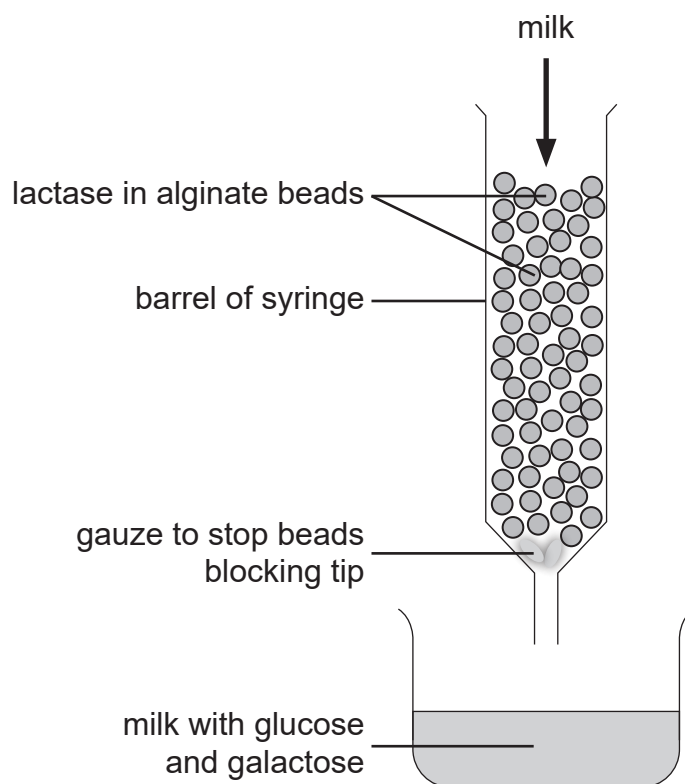
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(Questions continue overleaf)



- 4 Enzymes such as lactase can be immobilised in the form of alginate beads. This provides an efficient way to produce lactose-free milk, as shown below.



Source: CCEA Practical Guidance Booklet



[illegible]

[Turn over

- 5 An experiment was carried out to determine the point of incipient plasmolysis of onion epidermal cells.
1. Pieces of onion epidermal tissue were placed in distilled water for 10 minutes.
 2. They were then transferred to beakers, each containing a different concentration of sucrose solution (0.1, 0.2, 0.3, 0.4, 0.5 mol dm⁻³) for 30 minutes.
 3. The onion epidermal tissue was then removed from the solutions and each was mounted on a microscope slide.
 4. The tissue was examined under a microscope and the percentage of cells which were plasmolysed was calculated and recorded.
- (a) Suggest why the pieces of epidermal tissue were placed in distilled water for 10 minutes at the start of the experiment.

[1]



The results recorded by four students are shown in the table below.

(b) Complete the table below by inserting appropriate column headings.

	Student 1	Student 2	Student 3	Student 4	Mean
0.1	0	0	0	0	0.0
0.2	24	35	40	30	32.3
0.3	58	60	59	60	59.3
0.4	85	75	90	80	82.5
0.5	100	100	100	100	100.0

[2]

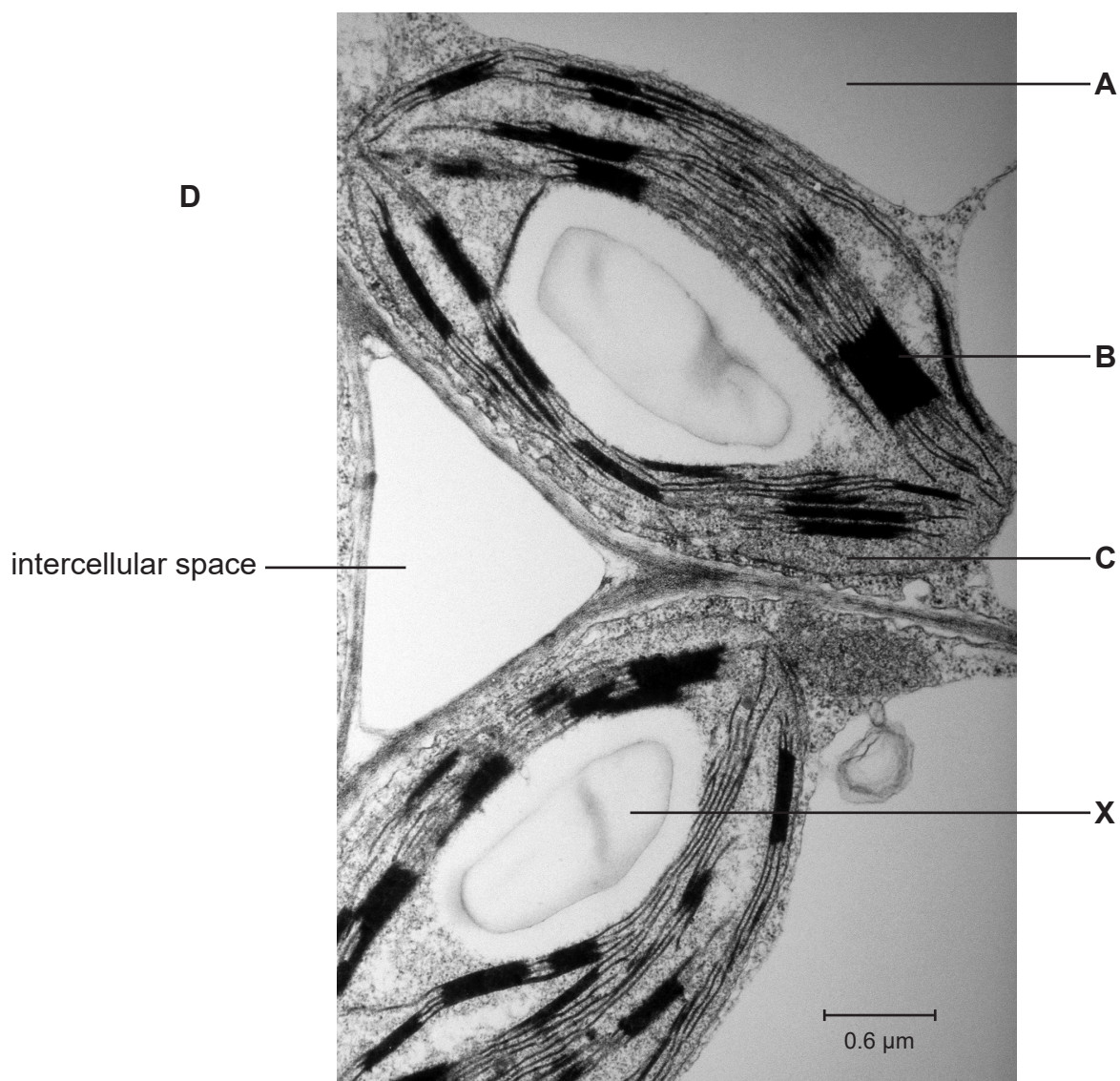
(c) Describe how the students would use the results to determine the point of incipient plasmolysis of the onion epidermal cells.

[3]

[Turn over



6 The image below shows parts of adjacent plant cells.



Source: © Dr Jeremy Burgess / Science Photo Library

(a) (i) Identify A–C.

A _____

B _____

C _____

[3]

(ii) Draw a line from the letter D to a cell wall.

[1]



- (b) (i) Name precisely the type of microscope that was used to produce this image.

_____ [1]

- (ii) Using the scale bar, calculate the magnification of the image.

(Show your working.)

_____ [2]

- (c) (i) Name the polymer that structure **X** is made from.

_____ [1]

- (ii) Describe the biochemical test for the molecule identified in (c)(i).
Your answer should include the positive colour change.

_____ [1]

[Turn over



- 7 An investigation was carried out to assess the effect of long-term grazing by sheep on plant biodiversity in woodland areas. In total, 98 woodland areas were surveyed (52 grazed and 46 ungrazed).

(a) Name the piece of apparatus most suited to estimate the percentage cover of plant species.

[1]

The table below summarises the data collected.

Factor	Grazed	Ungrazed
Number of plant species	14	11
% cover dead leaves	12.6	26.3
% cover bare ground	10.3	3.1
% cover grasses	33.1	16.8
% cover moss	23.1	28.6
Light intensity/lux	18 000	12 000

(b) (i) Describe the effect of grazing on vegetation cover.

[3]



- (ii) Suggest explanations for the difference in the number of plant species found in grazed and ungrazed woodland areas.

[2]

- (c) Soil samples were taken from grazed and ungrazed areas and analysed for moisture content. Suggest a procedure which would enable values to be obtained for percentage moisture content.

[3]

[Turn over



(d) Using the information provided, explain fully why the investigators considered their results to be reliable.

1. _____

2. _____

_____ [2]

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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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