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International Education

Cambridge International AS & A Level

BIOLOGY **9700/31**

Paper 3 Advanced Practical Skills 1 **October/November 2025**

MARK SCHEME

Maximum Mark: 40

Published

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	correct awarding one mark from marking point or marking group 1. similar numbered ticks are used for marking point or marking groups 2, 3, 4 etc.
	incorrect point or mark not awarded
	information missing or insufficient for credit
	allow or accept
	incorrect or insufficient point ignored while marking the rest of the response
	contradiction in response, mark not awarded
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	error carried forward applied
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max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
AVP	alternative valid point

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Question	Answer	Marks
1(a)(i)	1 states 1%, 0.5%, 0.25% and 0.125% under the appropriate beaker ; 2 shows transfer of 10cm^3 to each beaker from the previous beaker ; 3 shows 10 cm^3 of **W** added to each beaker ;	**3**
1(a)(ii)	1 (heading for independent variable) concentration of H_2O_2 and % and to the left of the dependent variable ; 2 (heading for dependent variable) time / seconds ; 3 result for each concentration ; 4 expected pattern of results (the highest concentration has the shortest time) ; 5 results recorded to the nearest whole second ;	**5**
1(a)(iii)	the times for **U1**, **U2** and **U3** recorded and seconds ;	**1**
1(a)(iv)	shows the three times added and divided by 3 ;	**1**
1(a)(v)	estimates the concentration of hydrogen peroxide in sample **U** according to results ;	**1**
1(a)(vi)	shows that there are no anomalies ;	**1**
1(a)(vii)	states that using smaller intervals between concentrations of hydrogen peroxide around the estimate would allow a more accurate estimate ;	**1**
1(b)(i)	1 *x*-axis: time / hours and *y*-axis: percentage of bacterial cells able to produce hydrogen peroxide ; 2 scale on *x*-axis: 40 to 2 cm, labelled at least every 2 cm and *y*-axis: 4 to 2 cm, labelled at least every 2 cm ; 3 correct plotting of points using small dots in circles or crosses ; 4 plots joined with thin line passing through all points ;	**4**
1(b)(ii)	1 percentage increases as time progresses (for both temperatures) ; 2 greater increase at lower temperature ;	**2**

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Question	Answer	Marks
1(b)(iii)	1 value estimated from graph ; 2 suitable line shown on the graph ;	**2**
1(b)(iv)	states one of these variables – species of bacteria / pH / nutrient status / oxygen ;	**1**

Question	Answer	Marks
2(a)(i)	1 uses most of the available space and the correct number of tissues ; 2 draws whole stem and no cells ; 3 draws the vascular tissue correctly ; 4 draws details of the tissue layers ; 5 label line to identify the xylem and the label xylem ;	**5**
2(a)(ii)	1 drawing of a minimum size and lines continuous, thin and sharp and no shading ; 2 draws only four cells and each cell touching at least one other cell ; 3 cell wall drawn as two lines ; 4 correct shapes of the cells ; 5 label line to identify the waxy cuticle and the label waxy cuticle ;	**5**
2(a)(iii)	(differences) 1, 2 and 3 ; ; ; *Any **three** from* : **feature** / **J1** / **Fig. 2.1** cuticle / thicker / thinner ; presence of trichomes / absent / present ; size of cortex cells / smaller / larger ; central tissue / larger / smaller ;	**3**

Question	Answer	Marks
2(b)(i)	states number of whole vascular bundles in sector **P ;**	**1**
2(b)(ii)	1 shows 360 divided by 15 **;** 2 correct calculation of 24 multiplied by value from **Q2(b)(i) ;**	**2**
2(b)(iii)	1 shows value from **Q2(b)(ii)** divided by 44 **;** 2 correct answer given to two significant figures **;**	**2**

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Question	Answer	Marks
1(a)(i)	states 19 cm^3 as the volume of distilled water, **W** to use **;**	**1**
1(a)(ii)	1 shows transfer of 10cm^3 to each beaker from the previous beaker **;** 2 shows 10 cm^3 of **W** added to each beaker **;**	**2**
1(a)(iii)	states the volume of Benedict's to add as 2 cm^3 or a volume greater than 2 cm^3 and explains that this is because equal or excess volume of Benedict's solution is needed **;**	**1**
1(a)(iv)	results show the correct trend for times of known concentrations, the higher the percentage concentration of glucose the shorter the time to first colour change **;**	**1**
1(a)(v)	1 (heading for independent variable) sample time and minutes and to the left of the dependent variable ; 2 (heading for dependent variable) time to first appearance of a colour change and s and no units in the body of the table **;** 3 results for each sampling time **;** 4 results recorded to nearest whole second **;**	**4**
1(a)(vi)	states source of error as the time to first colour change is subjective **;**	**1**
1(a)(vii)	results used correctly to estimate the concentration of glucose in the samples taken at 5, 10 and 15 minutes **;**	**1**
1(a)(viii)	(concentration higher at 15 minutes) glucose had more time to diffuse out of the dialysis tubing into the water **;**	**1**
1(b)(i)	1 *x*-axis: time sample was taken from the blood / min and *y*-axis: concentration in the blood / arbitrary units **;** 2 scale on *x*-axis: 5 to 2 cm, labelled at least every 2 cm and *y*-axis: 50 to 2 cm, labelled at least every 2 cm **;** 3 correct plotting of points using small dots in circles or crosses ; 4 plots joined with thin line passing through all points **;**	**4**

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Question	Answer	Marks
1(b)(ii)	1 shows (280 – 75) / 280 × 100 ; 2 correct answer to 2 significant figures ;	**2**
1(b)(iii)	1 (0 to 10 minutes) reference to a steep concentration gradient (between the blood and dialysate) ; 2 (10 to 20 minutes) reference to a less steep concentration gradient (between the blood and dialysate) ;	**2**

Question	Answer	Marks
2(a)(i)	1 uses most of the available space and the correct number of tissues ; 2 draws half the root <u>and</u> no cells ; 3 draws the outer region of the vascular tissue as 2 lines drawn close together ; 4 draws the correct proportion of the vascular tissue ; 5 label line to the tissue involved in transport of substances throughout the plant <u>and</u> the label **T** ;	**5**
2(a)(ii)	1 lines continuous, thin and sharp <u>and</u> no shading ; 2 draws only four cells <u>and</u> each cell touching at least one of the other cells ; 3 cell wall drawn as two lines ; 4 correct shapes of the cells ;	**4**
2(b)(i)	1 states only observable differences ; (differences) 2, 3 and 4 ; *Any **three** from* :	**4**

feature	Fig. 2.2	K1
area of vascular tissue	larger	smaller ;
presence of trichomes	absent	present ;
number of xylem vessels	more	less ;
presence of endodermis	absent	present ;

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Question	Answer	Marks
2(c)(i)	1 records a value for the length of the line **A – B ;** 2 shows the length of line **A – B** divided by 35 to calculate actual length of line **A – B ;** 3 shows ½ actual length of line **A – B** squared and multiplied by π ; 4 correct answer **;**	**4**
2(c)(ii)	1 take sections of the root from plants at different ages **;** 2 keep the species of the plants the same **;** 3 keep the variables for growing the plants the same **;**	**3**

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Question	Answer	Marks
1(a)(i)	1 Benedict's and at least 80 °C ;	**1**
1(a)(ii)	1 add acid and heat ; 2 add, sodium hydrogen carbonate / alkali ;	**2**
1(a)(iii)	1 heading for independent variable: sample / solution (before heading for dependent variable) ; 2 heading for dependent variable: colour / observation and reducing sugar, non-reducing sugar and starch ; 3 records correct observations for reducing sugar tests ; 4 records correct observations for non-reducing sugar tests ; 5 records correct observations for starch tests ;	**5**
1(a)(iv)	According to candidate's results: 1 two correct answers ; 2 four correct answers ;	**2**
1(a)(v)	1 biuret ; 2 purple ;	**2**
1(b)(i)	1 *x*-axis: time / hours and *y*-axis: concentration of sugars / μmol and lines labelled leaves and phloem sieve tubes ; 2 *x*-axis: 5 h to 2 cm and labelled at least every 2 cm and scale on *y*-axis: 0.1 μmol to 2 cm and labelled at least every 2 cm ; 3 correct plotting of points ; 4 plots joined with a thin line passing through all points ;	**4**
1(b)(ii)	*Any **one** of:* 1 concentration of sugars decreases for 8 hours and then increases ; 2 concentration of sugars in leaves is higher than in phloem over 24 hours ;	**1**

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Question	Answer	Marks
1(b)(iii)	*dark:* 1 sugars not made in the leaves so less sugar transported by, the phloem sieve tubes / translocation ; *light:* 2 sugars made in the leaves and, loaded into phloem sieve tubes / sugars move from leaves to phloem / sugars move by translocation ;	**2**
1(b)(iv)	1 uses 0.24 and percentage concentration of sugars at 20 hours ; 2 shows percentage concentration of sugars at 20 hours minus 0.24 divided by 0.24 and multiplied by 100 ;	**2**

Question	Answer	Marks
2(a)(i)	1 appropriate size and no shading ; 2 draws correct section of the organ ; 3 draws the correct pattern of vascular bundles and the correct proportions of large vascular bundles and no cells drawn ; 4 draws two lines for the epidermis and trichomes ; *5* label line and label to vascular bundle ;	**5**
2(a)(ii)	1 appropriate size and lines are sharp and continuous ; 2 draws only four xylem vessel elements and each xylem vessel element touches at least one other xylem vessel element ; 3 two lines around each xylem vessel element and three lines where xylem vessel elements touch ; 4 draws correct shape of xylem vessel elements ; *5* label line and label to the wall of one xylem vessel element ;	**5**
2(a)(iii)	1 stem and reason ;	**1**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(b)</td><td>1 collects differences using only observable differences ;

2, 3 two observable differences ;;

any two (correct differences) from:

<table>
<tr><th>feature</th><th>M1</th><th>Fig. 2.2</th></tr>
<tr><td>shape</td><td>square</td><td>circular ;</td></tr>
<tr><td>vascular bundles</td><td>at corners and between bulges</td><td>in a ring ;</td></tr>
<tr><td>vascular bundles</td><td>large and small</td><td>same size ;</td></tr>
<tr><td>central tissue</td><td>cells</td><td>no cells ;</td></tr>
</table>
</td><td>3</td></tr>
<tr><td>2(c)(i)</td><td>1 correct number of eyepiece graticule units ;
2 shows division of eyepiece graticule units by one <u>and</u> multiplies by 1000 ;</td><td>2</td></tr>
<tr><td>2(c)(ii)</td><td>1 correct measurement using eyepiece graticule units ;
2 shows the answer from 2(c)(i) multiplied by the number of eyepiece graticule units ;</td><td>2</td></tr>
<tr><td>2(c)(iii)</td><td>1 3 measurements <u>and</u> calculate the mean ;</td><td>1</td></tr>
</table>

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International Education

Cambridge International AS & A Level

BIOLOGY **9700/35**

Paper 3 Advanced Practical Skills 1 **October/November 2025**

MARK SCHEME

Maximum Mark: 40

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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PUBLISHED

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- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
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Annotation	Meaning
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I	ignore
( )	the word / phrase in brackets is not required, but sets the context
AW	alternative wording (where responses vary more than usual)
underline	actual word given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
AVP	alternative valid point

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Question	Answer	Marks
1(a)(i)	1 correct concentrations (0.5, 0.25, 0.125, 0.0625) and % at least once ; 2 shows transfer of 10 (cm^3) to each beaker from the previous beaker ; 3 shows 10 (cm^3) of water added to each beaker ;	**3**
1(a)(ii)	1 heading for independent variable: percentage concentration of glucose (before heading for dependent variable) and no units in body of table ; 2 heading for dependent variable: time / seconds and no units in body of table ; 3 records a time for each concentration ; 4 time for highest concentration of glucose is shorter than for the lowest concentration of glucose ; 5 records time in whole seconds ;	**5**
1(a)(iii)	records a time for **R1** and **S1** ;	**1**
1(a)(iv)	correct estimate for **R1** and **S1** based on candidate's results ;	**1**
1(a)(v)	1 **R1** has, more glucose molecules / a steeper concentration gradient, than **S1** ; 2 faster rate of diffusion ;	**2**
1(a)(vi)	calculates average rate of diffusion for **R** to two significant figures ;	**1**
1(a)(vii)	1 use standard glucose concentrations with narrower intervals ; 2 stated concentrations each side of the estimate for **R1** ;	**2**
1(a)(viii)	systematic and no effect ;	**1**
1(b)(i)	1 *x*-axis: type of sugar and apple and pineapple and bars labelled glucose, fructose, sucrose and *y*-axis: mass of sugar / g per 100 g fruit ; 2 scale on *x*-axis: even width of six bars and scale on *y*-axis: 2 g per 100 g to 2 cm and labelled at least every 2 cm ; 3 correct plotting of all six bars ; 4 horizontal and vertical lines joined precisely ;	**4**
1(b)(ii)	shows 5.2 minus 1.9 divided by 5.2 and multiplied by 100 **or** 1.9 minus 5.2 divided by 1.9 and multiplied by 100 ;	**1**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)(i)</td><td>1 appropriate size and no shading ;
2 draws correct section of the stem ;
3 draws at least three vascular bundles and the correct proportion of vascular bundles to the cortex and no cells drawn ;
4 draws correct shape of outline and continuous vascular tissue ;
5 label line and label to xylem ;</td><td>5</td></tr>
<tr><td>2(a)(ii)</td><td>1 appropriate size and lines are sharp and continuous ;
2 draws only four xylem vessel elements and each xylem vessel element touches at least one other xylem vessel element ;
3 two lines around each xylem vessel element and three lines where xylem vessel elements touch ;
4 draws correct shape of xylem vessel elements ;
5 label line and label to the wall of one xylem vessel element ;</td><td>5</td></tr>
<tr><td>2(b)</td><td>1 draws a table and includes a heading for M1 and Fig. 2.2 ;
2, 3, 4 three observable differences ;;;

any three (correct differences) from:

<table><tr><th>Feature</th><th>M1</th><th>Fig. 2.2</th></tr><tr><td>Shape</td><td>circular</td><td>5 sides ;</td></tr><tr><td>vascular bundles</td><td>one ring</td><td>two rings ;</td></tr><tr><td>vascular tissue</td><td>continuous</td><td>separate ;</td></tr><tr><td>central tissue</td><td>cells</td><td>no cells ;</td></tr></table></td><td>4</td></tr>
<tr><td>2(c)(i)</td><td>1 correct number of eyepiece graticule units ;
2 shows division of eyepiece graticule units by one and multiplies by 1000 ;
3 answer to three significant figures ;</td><td>3</td></tr>
<tr><td>2(c)(ii)</td><td>1 correct number of eyepiece graticule units ;
2 shows the answer from 2(c)(i) multiplied by the number of eyepiece graticule units ;</td><td>2</td></tr>
</table>

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International Education

Cambridge International AS & A Level

BIOLOGY **9700/36**

Paper 3 Advanced Practical Skills 2 **October/November 2025**

MARK SCHEME

Maximum Mark: 40

Published

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mp	marking point (with relevant number)
ecf	error carried forward
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Question	Answer	Marks
1(a)(i)	1 (heading for independent variable) (yeast) beads / **B** and free (yeast) to the left of the dependent variable ; 2 (heading for dependent variable) time to the first appearance of a colour change and s and no units in body of table ; 3 5 results for immobilised yeast cells and 5 results for 'free' yeast cells ; 4 correct trend for immobilised beads and 'free' yeast cells ; 5 results recorded to the nearest whole second ;	**5**
1(a)(ii)	*Any **two** from 1, 2 and 3*: 1 (for beads) as time increases, the time to first colour change decreases ; 2 (for 'free yeast') as time increases, the time to first colour change decreases ; 3 correct comparison between the results for beads and for 'free yeast' / **F** ; 4 data quote to support 1, 2 or 3 ;	**3**
1(a)(iii)	boiled enzyme / yeast / use water instead of yeast ;	**1**
1(a)(iv)	'free' yeast cells remain in the sample and continues to catalyse the reaction ;	**1**
1(a)(v)	*Any **two** from:* 1 even concentration of yeast cells between **B** and **F** ; 2 even mixing in the substrate (sucrose) ; 3 even distribution of reducing sugars ;	**2**
1(a)(vi)	1 judging the time to first colour change while timing taking the sample in the sucrose / **S** ; 2 do each time in separate beakers one after each other / stop enzyme after taking each sample ;	**2**

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Question	Answer	Marks
1(b)(i)	1 *x*-axis: pH and *y*-axis: activity of catalase / arbitrary units (au) and lines correctly labelled (immobilised / free) ; 2 scale on *x*-axis: 1.0 to 2 cm, labelled at least every 2 cm and *y*-axis: 20 to 2 cm, labelled at least every 2 cm ; 3 correct plotting of points using small dots in circles or crosses ; 4 plots joined with thin line passing through all points ;	**4**
1(b)(ii)	1 both have same optimum of pH7 ; 2 immobilised catalase has a higher activity over a wider range of pH ;	**2**

Question	Answer	Marks
2(a)(i)	1 uses most of the available space and the correct number of tissues ; 2 draws the whole section and no cells ; 3 draws the epidermis as 2 lines close together ; 4 draws the correct number of vascular bundles ; 5 label line to phloem and label phloem ;	**5**
2(a)(ii)	1 lines continuous, thin and sharp and no shading ; 2 draws only four cells and each cell touches at least two other cells ; 3 cell wall drawn as two lines close together ; 4 correct shapes of the cells ; 5 label line and label to cell wall ;	**5**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(b)</td><td>1 records only observable differences ;

2, 3, and 4 (differences) ; ; ;

Any three from :
<table>
<tr><th>feature</th><th>N1</th><th>Fig. 2.1</th></tr>
<tr><td>arrangement of vascular tissue</td><td>in a ring, near the epidermis</td><td>scattered ;</td></tr>
<tr><td>number of vascular bundles</td><td>fewer</td><td>more ;</td></tr>
<tr><td>size of vascular bundles</td><td>same size</td><td>different sizes ;</td></tr>
<tr><td>epidermis width</td><td>thinner</td><td>wider ;</td></tr>
</table></td><td>4</td></tr>
<tr><td>2(c)(i)</td><td>1 decides to measure at least 3 diameters ;
2 measurement of diameter lines within range <u>and</u> units ;</td><td>2</td></tr>
<tr><td>2(c)(ii)</td><td>1 correct measurement of scale bar <u>and</u> units ;
2 shows measurement of mean diameter divided by measurement of scale bar multiplied by 310 μm ;</td><td>2</td></tr>
<tr><td>2(c)(iii)</td><td>1 shows mean measured diameter divided by answer to (c)(ii) ;
2 correct answer to the nearest whole number ;</td><td>2</td></tr>
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CAMBRIDGE
International Education

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BIOLOGY **9700/37**

Paper 3 Advanced Practical Skills 1 **October/November 2025**

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Annotations

Annotation	Meaning
	correct point or mark awarded
	correct awarding one mark from marking point or marking group 1. similar numbered ticks are used for marking point or marking groups 2, 3, 4 etc.
	incorrect point or mark not awarded
	information missing or insufficient for credit
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	incorrect or insufficient point ignored while marking the rest of the response
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Annotation	Meaning
SEEN	point has been noted, but no credit has been given or blank page seen

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Mark scheme abbreviations

;	separates marking points
/	alternative answers for the same point
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( )	the word / phrase in brackets is not required, but sets the context
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max	indicates the maximum number of marks that can be given
ora	or reverse argument
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ecf	error carried forward
AVP	alternative valid point

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Question	Answer	Marks
1(a)(i)	1 correct concentrations (0.5, 0.25, 0.125, 0.0625) and % at least once ; 2 shows transfer of 10 (cm^3) to each beaker from the previous beaker ; 3 shows 10 (cm^3) of water added to each beaker ;	**3**
1(a)(ii)	1 heading for independent variable: percentage concentration of glucose (before heading for dependent variable) and no units in body of table ; 2 heading for dependent variable: time / seconds and no units in body of table ; 3 records a time for each concentration ; 4 time for highest concentration of glucose is shorter than for the lowest concentration of glucose ; 5 records time in whole seconds ;	**5**
1(a)(iii)	records a time for **R1** and **S1** ;	**1**
1(a)(iv)	correct estimate for **R1** and **S1** based on candidate's results ;	**1**
1(a)(v)	1 **R1** has, more glucose molecules / a steeper concentration gradient, than **S1** ; 2 faster rate of diffusion ;	**2**
1(a)(vi)	calculates average rate of diffusion for **R** to two significant figures ;	**1**
1(a)(vii)	1 use standard glucose concentrations with narrower intervals ; 2 stated concentrations each side of the estimate for **R1** ;	**2**
1(a)(viii)	systematic and no effect ;	**1**
1(b)(i)	1 *x*-axis: type of sugar and apple and pineapple and bars labelled glucose, fructose, sucrose and *y*-axis: mass of sugar / g per 100 g fruit ; 2 scale on *x*-axis: even width of six bars and scale on *y*-axis: 2 g per 100 g to 2 cm and labelled at least every 2 cm ; 3 correct plotting of all six bars ; 4 horizontal and vertical lines joined precisely ;	**4**
1(b)(ii)	shows 5.2 minus 1.9 divided by 5.2 and multiplied by 100 **or** 1.9 minus 5.2 divided by 1.9 and multiplied by 100 ;	**1**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)(i)</td><td>1 appropriate size and no shading ;
2 draws correct section of the stem ;
3 draws at least three vascular bundles and the correct proportion of vascular bundles to the cortex and no cells drawn ;
4 draws correct shape of outline and continuous vascular tissue ;
5 label line and label to xylem ;</td><td>5</td></tr>
<tr><td>2(a)(ii)</td><td>1 appropriate size and lines are sharp and continuous ;
2 draws only four xylem vessel elements and each xylem vessel element touches at least one other xylem vessel element ;
3 two lines around each xylem vessel element and three lines where xylem vessel elements touch ;
4 draws correct shape of xylem vessel elements ;
5 label line and label to the wall of one xylem vessel element ;</td><td>5</td></tr>
<tr><td>2(b)</td><td>1 draws a table and includes a heading for M1 and Fig. 2.2 ;
2, 3, 4 three observable differences ;;;

any three (correct differences) from:

<table><tr><th>Feature</th><th>M1</th><th>Fig. 2.2</th></tr><tr><td>Shape</td><td>circular</td><td>5 sides ;</td></tr><tr><td>vascular bundles</td><td>one ring</td><td>two rings ;</td></tr><tr><td>vascular tissue</td><td>continuous</td><td>separate ;</td></tr><tr><td>central tissue</td><td>cells</td><td>no cells ;</td></tr></table></td><td>4</td></tr>
<tr><td>2(c)(i)</td><td>1 correct number of eyepiece graticule units ;
2 shows division of eyepiece graticule units by one and multiplies by 1000 ;
3 answer to three significant figures ;</td><td>3</td></tr>
<tr><td>2(c)(ii)</td><td>1 correct number of eyepiece graticule units ;
2 shows the answer from 2(c)(i) multiplied by the number of eyepiece graticule units ;</td><td>2</td></tr>
</table>

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CAMBRIDGE
International Education

Cambridge International AS & A Level

BIOLOGY **9700/38**

Paper 3 Advanced Practical Skills 2 **October/November 2025**

MARK SCHEME

Maximum Mark: 40

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

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PUBLISHED

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	<u>'List rule' guidance</u> For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards ***n***. • Incorrect responses should not be awarded credit but will still count towards ***n***. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

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6 Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

7 Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

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Question	Answer	Marks
1(a)(i)	1 (heading for independent variable) (yeast) beads / **B** and free (yeast) to the left of the dependent variable ; 2 (heading for dependent variable) time to the first appearance of a colour change and s and no units in body of table ; 3 5 results for immobilised yeast cells and 5 results for 'free' yeast cells ; 4 correct trend for immobilised beads and 'free' yeast cells ; 5 results recorded to the nearest whole second ;	**5**
1(a)(ii)	*Any **two** from 1, 2 and 3*: 1 (for beads) as time increases, the time to first colour change decreases ; 2 (for 'free yeast') as time increases, the time to first colour change decreases ; 3 correct comparison between the results for beads and for 'free yeast' / **F** ; 4 data quote to support 1, 2 or 3 ;	**3**
1(a)(iii)	boiled enzyme / yeast / use water instead of yeast ;	**1**
1(a)(iv)	'free' yeast cells remain in the sample and continues to catalyse the reaction ;	**1**
1(a)(v)	*Any **two** from:* 1 even concentration of yeast cells between **B** and **F** ; 2 even mixing in the substrate (sucrose) ; 3 even distribution of reducing sugars ;	**2**
1(a)(vi)	1 judging the time to first colour change while timing taking the sample in the sucrose / **S** ; 2 do each time in separate beakers one after each other / stop enzyme after taking each sample ;	**2**

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Question	Answer	Marks
1(b)(i)	1 *x*-axis: pH and *y*-axis: activity of catalase / arbitrary units (au) and lines correctly labelled (immobilised / free) ; 2 scale on *x*-axis: 1.0 to 2 cm, labelled at least every 2 cm and *y*-axis: 20 to 2 cm, labelled at least every 2 cm ; 3 correct plotting of points using small dots in circles or crosses ; 4 plots joined with thin line passing through all points ;	**4**
1(b)(ii)	1 both have same optimum of pH7 ; 2 immobilised catalase has a higher activity over a wider range of pH ;	**2**

Question	Answer	Marks
2(a)(i)	1 uses most of the available space and the correct number of tissues ; 2 draws the whole section and no cells ; 3 draws the epidermis as 2 lines close together ; 4 draws the correct number of vascular bundles ; 5 label line to phloem and label phloem ;	**5**
2(a)(ii)	1 lines continuous, thin and sharp and no shading ; 2 draws only four cells and each cell touches at least two other cells ; 3 cell wall drawn as two lines close together ; 4 correct shapes of the cells ; 5 label line and label to cell wall ;	**5**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(b)</td><td>1 records only observable differences ;

2, 3, and 4 (differences) ; ; ;

Any three from :
<table>
<tr><th>feature</th><th>N1</th><th>Fig. 2.1</th></tr>
<tr><td>arrangement of vascular tissue</td><td>in a ring, near the epidermis</td><td>scattered ;</td></tr>
<tr><td>number of vascular bundles</td><td>fewer</td><td>more ;</td></tr>
<tr><td>size of vascular bundles</td><td>same size</td><td>different sizes ;</td></tr>
<tr><td>epidermis width</td><td>thinner</td><td>wider ;</td></tr>
</table></td><td>4</td></tr>
<tr><td>2(c)(i)</td><td>1 decides to measure at least 3 diameters ;
2 measurement of diameter lines within range <u>and</u> units ;</td><td>2</td></tr>
<tr><td>2(c)(ii)</td><td>1 correct measurement of scale bar <u>and</u> units ;
2 shows measurement of mean diameter divided by measurement of scale bar multiplied by 310 μm ;</td><td>2</td></tr>
<tr><td>2(c)(iii)</td><td>1 shows mean measured diameter divided by answer to (c)(ii) ;
2 correct answer to the nearest whole number ;</td><td>2</td></tr>
</table>

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