

**MARK SCHEME for the October/November 2010 question paper
for the guidance of teachers**

9700 BIOLOGY

9700/34

Paper 32 (Advanced Practical Skills 2),
maximum raw mark 40

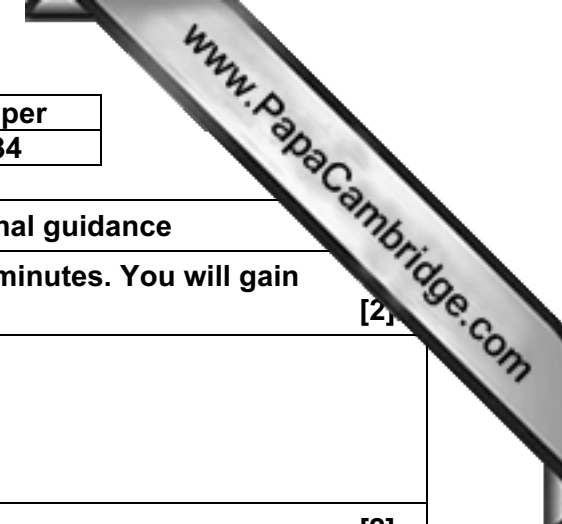
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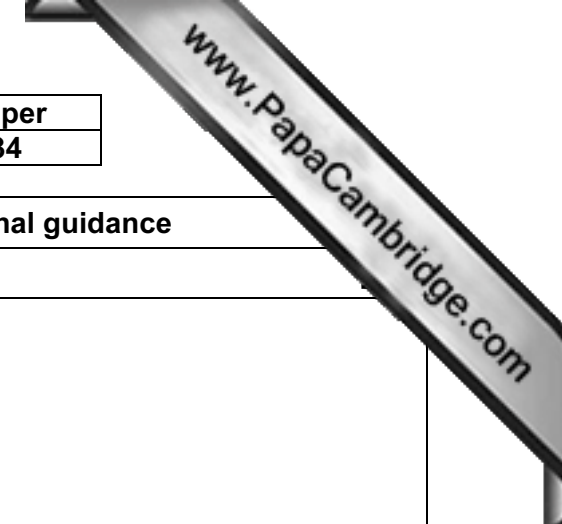
CIE is publishing the mark schemes for the October/November 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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Question	Expected Answers	Additional guidance
1 (a) (i)	Show clearly on Fig.1.1 what you would expect the contents of the test-tube to look like after 10 minutes. You will gain marks for clear labels.	[2]
ACE conclusions 2	[1] line drawn level with half way mark	AND more yeast drawn towards bottom of tube or another line to show a separate region;
	[1] one label or description;	
(ii) State the time intervals you will use and what you will use the graph paper scale to measure.		[2]
MMO decisions 2	[1] uses 10 minutes	AND at least three times (including 10) even time intervals between consecutive three; Or one/two/two and a half minutes or two mins 30s intervals; Reject if does not divide into 10 e.g. 3 minutes
	[1] measures or describes measuring e.g. (use graph paper) to find distance/length	
(iii) ...decide on the volume of Y and the volume of each buffer solution to use. Describe all the steps you used to work out the volume. State the volume of Y and the volume of each buffer solution to use.		[1] [1]
MMO decisions 2	[1] describes all following steps <ul style="list-style-type: none"> • takes into account to (half-way) line • takes into account 1 cm³ calcium chloride/C • divides by half; 	Allow <ul style="list-style-type: none"> • to 0.1 cm³
	[1] volume of Y <u>equal</u> to volume of buffer AND cm ³ / ml on both;	

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(iv) Prepare the space below and record your observations.		
PDO recording 2	[1] table with all cells drawn AND heading (top or left) pH;	
	[1] Reject <ul style="list-style-type: none"> if units anywhere else except headings t or T 	
	(headings) time min(utes) AND length/depth/height/AW with mm or cm;	
MMO collection 2	[1] different results/observations for different pH minimum 2 pH;	Reject if no units/if mixed units Allow as error carried forward whole or 0.5 units on graph paper
	[1] recorded to 1 mm or 0.1 cm only;	
MMO decision 1	[1] repeats recorded;	
(v) Use your results to state the effect of pH on the yeast suspension. [1]		
ACE conclusion 1	[1] (yeast settles) <u>more / higher rate of</u> <ul style="list-style-type: none"> at some pH or correct example of pH with results; 	Reject activity

Question	Expected Answers	Additional guidance
(vi) Identify <i>one</i> significant source of error in this experiment.		
ACE interpretation max 1	[1] cause of error	error
	[1] (dependent variable) boundary/ top of layers or bubbles on surface	idea of finding measuring seeing determining judging;
	[1] or graph paper and test-tube	lining up;
	[1] (standardised variables) test-tubes sizes/ mixing/adding/readings	not constant not same/different/vary cannot be done at same time;
		max 1
(vi) State the degree of uncertainty of using the graph paper scale as a measure. [1]		
ACE interpretation 1	[1] +/- 2 mm;	Reject % error Allow +/- 0.2 cm or +/- whole or 1 graph paper unit

Question	Expected Answers	Additional guidance						
(b) (i) Plot a graph of the data shown in Table 1.1.								
PDO layout 4	O [1]	x-axis calcium chloride/ CaCl_2 conc(entration)(/) <u>m mol</u>	<table border="1"> <tr> <td>Reject t/T</td> <td rowspan="2">Must have units</td> </tr> <tr> <td>AND y-axis time (l) min;</td> </tr> </table>	Reject t/T	Must have units	AND y-axis time (l) min;		
	Reject t/T	Must have units						
	AND y-axis time (l) min;							
	S [1]	<table border="1"> <tr> <td>Reject if awkward scale 0.25 to 2 cm</td> <td rowspan="2">AND 20 to 2 cm;</td> </tr> <tr> <td>scale as 0.2 to 2 cm</td> </tr> </table>	Reject if awkward scale 0.25 to 2 cm	AND 20 to 2 cm;	scale as 0.2 to 2 cm	error carried forward if incorrect O then must use more than half provided grid in x and y		
Reject if awkward scale 0.25 to 2 cm	AND 20 to 2 cm;							
scale as 0.2 to 2 cm								
P [1]	<table border="1"> <tr> <td>Reject</td> <td rowspan="2">intersection of cross must be clear to show plot.</td> </tr> <tr> <td> <ul style="list-style-type: none"> plotting if scale is awkward unless 0.25 if only blobs/dots/blobs in circles. </td> </tr> <tr> <td></td> <td>correct plotting using crosses/dots in circle only;</td> <td></td> </tr> </table>	Reject	intersection of cross must be clear to show plot.	<ul style="list-style-type: none"> plotting if scale is awkward unless 0.25 if only blobs/dots/blobs in circles. 		correct plotting using crosses/dots in circle only;		
Reject	intersection of cross must be clear to show plot.							
<ul style="list-style-type: none"> plotting if scale is awkward unless 0.25 if only blobs/dots/blobs in circles. 								
	correct plotting using crosses/dots in circle only;							
L [1]	straight line through points; error carried forward if scale or plotting incorrect	quality – no thicker than on grid, not feathery for the complete line. joining plots – <ul style="list-style-type: none"> <u>ruled lines plot to plot</u> extrapolation <ul style="list-style-type: none"> not beyond x- or y-axis Ignore if in context of data correct to go to 0,0 must be within 2 mm of 0 if not correct in context of data then no extrapolation at either end of data. 	Reject if any extrapolation beyond 0 or 1.0.					
(ii) State the concentration of calcium chloride required for the yeast to sediment out at 40 minutes. [1]								
MMO collection 1	[1]	correct reading of concentration to no more than 2 significant figures;						

Question	Expected Answers	Additional guidance		
[Total: 22]				
2 (a) (i)	Select a large vascular bundle and draw a large plan diagram of the vascular bundle. Label the xylem tissue.	[5]		
PDO layout 1	[1] Reject if drawn over print of question			
	Reject thick lines • feathery lines • 4 'tails' or overlaps or gaps		AND no shading	AND uses most of the space provided;
	clear, sharp, unbroken lines			
MMO collection 3	[1] no cells drawn	AND draws only one vascular bundle;		
	[1] (vascular bundle) shows an outline which encloses vascular bundle tissues;			
	[1] (in one vascular bundle) wider at one end than the other (tapered) Or at least three regions shown;			
MMO decision 1	[1] Reject • if any label is biologically incorrect e.g. regions belonging to other organs or animals. • label within drawn area			
	correct label with label line xylem to region middle to tapered end;			

Question	Expected Answers	Additional guidance		
(ii) Make a high-power drawing of one trichome, with at least three cells, and one epidermal cell on each side touching the base of the trichome. Label the trichome.				
PDO layout 1	[1] Reject if drawn over print of question			
	Reject <ul style="list-style-type: none"> thick lines – than on grid feathery lines 5 'tails' or overlaps or gaps if double cell walls 		AND no shading	AND uses most of the space provided;
	clear, sharp, unbroken lines in cell outlines			
MMO collection 2	[1] 5, 6 or 7 cells;			
	[1] cells drawn as a touching group		AND cell walls as double lines with middle lamella in 3 adjacent (epidermal) cells;	
MMO decisions 2	[1] (cell or tip of trichome or broken) pointed or rounded Or (in trichome) one larger cell or large base cell;			
	[1] Reject <ul style="list-style-type: none"> if any label is biologically incorrect e.g. labels belonging to other organs or animals. label within drawn area 			
	correct label with label line to trichome;			

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(b) (i) Calculate the ratio of the diameter of the vascular tissue labelled X to the total diameter of the plant organ labelled Y.		
PDO recording 1	[1] (measurements to same degree of precision) whole mm or 0.5 mm;	Allow 0.1 cm or 0.15 cm
PDO display 2	[1] shows larger figure to or: smaller figure or larger figure divided by smaller figure;	
	[1] rounds to correct ratio e.g. 125:69 or leaves as fraction e.g. 125/69;	Reject if include units in answer Reject 1.86:1

Question		Expected Answers			Additional guidance
(ii) Prepare the space below so that it suitable for you to describe the observable differences between M1 and Fig. 2.1.					
PDO recording	[1]	organise as a table or Venn diagram or ruled connected boxes	headed <u>M1</u> and <u>Fig. 2.1</u>	differences opposite each other;	<u>M1</u> <u>Fig. 2.1</u>
	ACE interpretation 4	[1]	Reject tick and cross without a key –		
[1]	feature	M1	Fig. 2.1		
[1]	shape	irregular/wavy/uneven/starshape/swellings	oval/circular; Ignore regular		
[1]	pith/hollow space/empty/lumen/cavity Ignore vacuole	present/yes	absent/no;		
[1]	vascular tissue/bundle/xylem	bundles/around edge/scattered	stele/in centre;		
[1]	number of vascular bundles/tissue/xylem	(vascular bundles) more/(xylem)less	(vascular bundles) less/(xylem)lots/more;		
[1]	thickened layer/stained layer/collenchyma/AW	present	absent;		
[1]	outer epidermis	thick	thin;		
[1]		continuous/smooth	rubbing off/flaky/AW;		
[1]	trichomes/hairs	present/yes/some/more Allow less	absent/no/none/fewer; Allow more		
[1]	trichome shape	hair-like/pointed	irregular;	max 4	
[Total: 18]					