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**BIOLOGY****0610/52**

Paper 5 Practical Test

**October/November 2017**

MARK SCHEME

Maximum Mark: 40

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**Published**

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This document consists of **10** printed pages.

**Mark schemes will use these abbreviations**

- ; separates marking points
- / alternatives
- I ignore
- R reject
- A accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording (where responses vary more than usual)
- AVP any valid point
- ecf credit a correct statement / calculation that follows a previous wrong response
- ora or reverse argument
- ( ) the word / phrase in brackets is not required, but sets the context
- underline actual word given must be used by candidate (grammatical variants excepted)
- max indicates the maximum number of marks that can be given

Question	Answer	Marks	Guidance
1(a)(i)	<p>table drawn with minimum two columns and a line between heading and data ;</p> <p>appropriate column / row headings <u>and</u> appropriate units for percentage concentration of amylase time for starch to be digested / minutes ;</p> <p>three correct amylase concentration recorded in any order;</p> <p>table shows 2 columns for each concentration with times recorded;</p> <p>correct trend shown by results ;</p>	<b>5</b>	<p><b>R</b> if units in body of table</p> <p><b>I</b> units in the body of the table</p> <p>(expect 3% faster 2% faster 1%)</p>
1(a)(ii)	idea that iodine remains brown / yellow / orange / no longer changes colour;	<b>1</b>	
1(a)(iii)	<p>(remove a sample from each of the test-tubes and) add (equal volume of) Benedict's solution ;</p> <p>heat (in a water-bath) ;</p>	<b>2</b>	

Question	Answer	Marks	Guidance												
1(b)(i)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><i>variable</i></th> <th style="text-align: left;"><i>controlled by</i></th> </tr> </thead> <tbody> <tr> <td>(volume of) starch (solution)</td> <td>5 cm<sup>3</sup>/ same volume</td> </tr> <tr> <td>(concentration of) starch solution</td> <td>same concentration / used throughout</td> </tr> <tr> <td><u>volume</u> of enzyme / amylase</td> <td>1 cm<sup>3</sup> used</td> </tr> <tr> <td>temperature</td> <td>kept at 55–60 ° C</td> </tr> <tr> <td>time</td> <td>3 minutes for incubation / 5 minutes for testing the enzyme</td> </tr> </tbody> </table> <p style="text-align: center;">; ;</p>	<i>variable</i>	<i>controlled by</i>	(volume of) starch (solution)	5 cm <sup>3</sup> / same volume	(concentration of) starch solution	same concentration / used throughout	<u>volume</u> of enzyme / amylase	1 cm <sup>3</sup> used	temperature	kept at 55–60 ° C	time	3 minutes for incubation / 5 minutes for testing the enzyme	<b>2</b>	<p>one mark for the variable, one mark for method of controlling which must related</p> <p>I amount of enzyme</p> <p>I same temperature</p>
<i>variable</i>	<i>controlled by</i>														
(volume of) starch (solution)	5 cm <sup>3</sup> / same volume														
(concentration of) starch solution	same concentration / used throughout														
<u>volume</u> of enzyme / amylase	1 cm <sup>3</sup> used														
temperature	kept at 55–60 ° C														
time	3 minutes for incubation / 5 minutes for testing the enzyme														
1(b)(ii)	so the contents of all the test-tubes reach the same temperature / AW ;	<b>1</b>													
1(b)(iii)	to show that there is no starch in the enzyme solution / to show enzyme does not react with starch / AW ;	<b>1</b>													

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
1(c)(i)	idea of judging the colour of the endpoint by eye ; idea of doing several procedures at the same time ; idea that only one drop for both spots of iodine (might give different volumes ) ; idea that 1 drop for both spots (could cause contamination); idea of: two samples needed at the same time with the same rod, (then there will be a difference in the actual time) ; idea of: size of drops (from either starch or iodine) added varies ;	<b>2</b>	

Question	Answer	Marks	Guidance																
1(c)(ii)	<table border="1"> <thead> <tr> <th data-bbox="344 248 763 300"><i>e.g. of error</i></th> <th data-bbox="763 248 1176 300"><i>improvement</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="344 300 763 384">judging colour by eye</td> <td data-bbox="763 300 1176 384">have a standard colour for comparison</td> </tr> <tr> <td data-bbox="344 384 763 504">timing and sampling at same time</td> <td data-bbox="763 384 1176 504">start timer then mix and sample and note time when first sample taken</td> </tr> <tr> <td data-bbox="344 504 763 620">one drop for two samples</td> <td data-bbox="763 504 1176 620">use a dropper with enough for both samples / have two glass rods</td> </tr> <tr> <td data-bbox="344 620 763 671">contamination</td> <td data-bbox="763 620 1176 671">use separate glass rods</td> </tr> <tr> <td data-bbox="344 671 763 823">doing two samples at the same time</td> <td data-bbox="763 671 1176 823">take a sample from each tube at the same time with different glass rod / do trials separately</td> </tr> <tr> <td data-bbox="344 823 763 908">size of drop for either</td> <td data-bbox="763 823 1176 908">use a syringe / pipette</td> </tr> <tr> <td data-bbox="344 908 763 992">time not long enough for enzyme to work</td> <td data-bbox="763 908 1176 992">keep going until all starch has gone</td> </tr> </tbody> </table> <p data-bbox="1176 992 1211 1042">;</p>	<i>e.g. of error</i>	<i>improvement</i>	judging colour by eye	have a standard colour for comparison	timing and sampling at same time	start timer then mix and sample and note time when first sample taken	one drop for two samples	use a dropper with enough for both samples / have two glass rods	contamination	use separate glass rods	doing two samples at the same time	take a sample from each tube at the same time with different glass rod / do trials separately	size of drop for either	use a syringe / pipette	time not long enough for enzyme to work	keep going until all starch has gone	1	improvement must match one of the errors from <b>1(c)(i)</b>
<i>e.g. of error</i>	<i>improvement</i>																		
judging colour by eye	have a standard colour for comparison																		
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1(d)(i)	300 (mg) ;;;	3	if answer incorrect one mark for correct unit and one mark for correct working: $(3 \times 2 \times 0.5) \div 3 \text{ cm}^3$ is max 2																
1(d)(ii)	3.4 ;	1	<b>ecf</b> from <b>1(d)(i)</b>																

Question	Answer	Marks	Guidance
1(d)(iii)	<b>A</b> (xes) – labelled with units ; <b>S</b> (cale) – even scale ; <b>P</b> (lot) – all given points plotted accurately $\pm\frac{1}{2}$ square ; <b>L</b> (ines) – each line drawn (with a ruler) point to point / smooth free-hand curve through points ;	<b>4</b>	

Question	Answer	Marks	Guidance																		
2(a)(i)	<table border="1"> <thead> <tr> <th data-bbox="344 248 607 300"><i>feature</i></th> <th data-bbox="607 248 869 300"><i>epidermis cell</i></th> <th data-bbox="869 248 1176 300"><i>guard cell</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="344 300 607 384">shape</td> <td data-bbox="607 300 869 384">wavy outline</td> <td data-bbox="869 300 1176 384">oval / bean, shaped / AW ;</td> </tr> <tr> <td data-bbox="344 384 607 469">chloroplasts / cell inclusions</td> <td data-bbox="607 384 869 469">absent</td> <td data-bbox="869 384 1176 469">present ;</td> </tr> <tr> <td data-bbox="344 469 607 553">cell wall</td> <td data-bbox="607 469 869 553">thin</td> <td data-bbox="869 469 1176 553">thick / thick on inside edge ;</td> </tr> <tr> <td data-bbox="344 553 607 606">cell size</td> <td data-bbox="607 553 869 606">large</td> <td data-bbox="869 553 1176 606">small ;</td> </tr> <tr> <td data-bbox="344 606 607 651">cell arrangement</td> <td data-bbox="607 606 869 651">not paired</td> <td data-bbox="869 606 1176 651">pairs ;</td> </tr> </tbody> </table>	<i>feature</i>	<i>epidermis cell</i>	<i>guard cell</i>	shape	wavy outline	oval / bean, shaped / AW ;	chloroplasts / cell inclusions	absent	present ;	cell wall	thin	thick / thick on inside edge ;	cell size	large	small ;	cell arrangement	not paired	pairs ;	2	one mark per correct row
<i>feature</i>	<i>epidermis cell</i>	<i>guard cell</i>																			
shape	wavy outline	oval / bean, shaped / AW ;																			
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2(a)(ii)	<p>outline single clear continuous lines, no shading, 2 cells drawn ;</p> <p>drawing occupies at least 50 mm along X–Y ;</p> <p>stoma width is about one sixth of total width of XY ;</p> <p>cell walls drawn as double line not too wide ;</p>	4																			
2(b)	<p>(diameter of guard cells and stomata) value within the range of 31 – 34 mm ;</p> <p>line drawn on candidates diagram <b>and</b> measurement <math>\pm 1</math> mm;</p> <p>calculated magnification ;</p>	3																			



Question	Answer	Marks	Guidance
2(c)	<p>absorption (rate) is lower than transpiration 09:00 to 18:00 / during the day / during the light <b>ora</b> ;</p> <p>absorption (rate) is higher than transpiration from 18:00 to 06:00 / at night / in the dark <b>ora</b> ;</p> <p>absorption peaks at 18.00 and transpiration peaks between 14:00 to 16:00 / absorption rate peaks after transpiration rate <b>ora</b> ;</p> <p>transpiration rate increases faster than absorption rate ;</p> <p>comparative data quote for both curves ;</p> <p>rate of absorption and rate transpiration are equal between 08:00 to 09:00 / at 18:00 ;</p>	<b>2</b>	<p><b>A</b> times in am and pm equivalents</p> <p><b>A</b> some variation in the 09:00 time</p>

Question	Answer	Marks	Guidance
2(d)	1 ref. to using at least 3 temperatures / humidity ; 2 ref. to (three) values for temperature / humidity ; 3 ref. to means of obtaining the different temperatures / humidity; 4 ref. to checking that the apparatus does not leak ; 5 ref. to one controlled variable ; 6 ref. to second controlled variable; 7 ref. to measuring distance moved (by the air) along capillary ; 8 ref. to fixed time / timing for a fixed distance ; 9 ref. to refilling capillary between measurements ; 10 ref. to at least two replicates ; 11 use same shoot / same number of leaves / same area of leaves ; 12 AVP ; e.g. detail of apparatus set up e.g. cutting shoot underwater / drying leaves allow apparatus to equilibrate before taking any readings	<b>6</b>	<p><b>A</b> high, medium and low for humidity and temperature</p> <p>e.g. for mp 5 and mp 6: light intensity, light wavelength, wind speed, temperature or humidity</p>