



**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**BIOLOGY**

**0610/62**

Paper 6 Alternative to Practical

**May/June 2016**

**MARK SCHEME**

Maximum Mark: 40

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**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.

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This document consists of **8** printed pages.

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### Abbreviations used in the Mark Scheme

- ; separates marking points
- / separates alternatives within a marking point
- **R** reject
- **ignore** ignore (mark as if this material was not present)
- **A** accept (a less than ideal answer which should be marked correct)
- **AW** alternative wording (accept other ways of expressing the same idea)
- underline words underlined (or grammatical variants of them) must be present
- **max** indicates the maximum number of marks that can be awarded
- **mark independently** the second mark may be given even if the first mark is wrong
- **ecf** error carried forward (credit a correct statement that follows a previous wrong response)
- ( ) the word / phrase in brackets is not required, but sets the context
- **ora** or reverse argument
- **AVP** any valid point

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<b>Question</b>	<b>Mark scheme</b>	<b>Mark</b>	<b>Guidance</b>												
<b>1 (a) (i)</b>	Biuret ;	[1]													
<b>(ii)</b>	<table border="1"> <thead> <tr> <th>food supplement</th> <th>colour at start</th> <th>colour at end</th> </tr> </thead> <tbody> <tr> <td><b>P</b></td> <td>blue</td> <td>lilac</td> </tr> <tr> <td><b>Q</b></td> <td>blue</td> <td>blue ;</td> </tr> <tr> <td><b>R</b></td> <td>blue</td> <td>lilac ;</td> </tr> </tbody> </table>	food supplement	colour at start	colour at end	<b>P</b>	blue	lilac	<b>Q</b>	blue	blue ;	<b>R</b>	blue	lilac ;	[1]	rows P and R correct – 1 mark row Q correct – 1 mark
food supplement	colour at start	colour at end													
<b>P</b>	blue	lilac													
<b>Q</b>	blue	blue ;													
<b>R</b>	blue	lilac ;													
<b>(b)</b>	<table border="1"> <thead> <tr> <th>food supplement</th> <th>number of drops of iodine solution added</th> <th>vitamin C content</th> </tr> </thead> <tbody> <tr> <td><b>P</b></td> <td>12</td> <td>high</td> </tr> <tr> <td><b>Q</b></td> <td>1</td> <td>none</td> </tr> <tr> <td><b>R</b></td> <td>5 ;</td> <td>high ;</td> </tr> </tbody> </table>	food supplement	number of drops of iodine solution added	vitamin C content	<b>P</b>	12	high	<b>Q</b>	1	none	<b>R</b>	5 ;	high ;	[2]	mark each column
food supplement	number of drops of iodine solution added	vitamin C content													
<b>P</b>	12	high													
<b>Q</b>	1	none													
<b>R</b>	5 ;	high ;													
<b>(c) (i)</b>	Benedict's (solution / reagent) ;	[1]													
<b>(ii)</b>	idea of eye protection / safety when using heat qualified ;	[1]													

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<b>Question</b>	<b>Mark scheme</b>	<b>Mark</b>	<b>Guidance</b>								
<b>(d)</b>	<table border="1"> <tr> <td>test-tube</td> <td>time for brick red colour to appear/s</td> </tr> <tr> <td><b>P2</b></td> <td>75;</td> </tr> <tr> <td><b>Q2</b></td> <td>more than 180</td> </tr> <tr> <td><b>R2</b></td> <td>25;</td> </tr> </table>	test-tube	time for brick red colour to appear/s	<b>P2</b>	75;	<b>Q2</b>	more than 180	<b>R2</b>	25;	[2]	P2 = 1mark  <u>both</u> Q2 and R2 = 1mark
test-tube	time for brick red colour to appear/s										
<b>P2</b>	75;										
<b>Q2</b>	more than 180										
<b>R2</b>	25;										
<b>(e) (i)</b>	volume of food supplement may not be the same ;	[1]									
<b>(ii)</b>	syringe / burette / <u>graduated</u> pipette / measuring cylinder / balance / scales ;	[1]									
<b>(f)</b>	<table border="1"> <thead> <tr> <th><i>Source of error</i></th> <th><i>Improvement</i></th> </tr> </thead> <tbody> <tr> <td>idea of difficult to be sure of end point / difficult to see when the colour changes ;</td> <td>white or black background / compare with standard / control / use a colorimeter;</td> </tr> <tr> <td>cannot add tubes to hot water / monitor colour change, in three tubes simultaneously ;</td> <td>do tubes separately / other people to do other tubes ;</td> </tr> </tbody> </table>	<i>Source of error</i>	<i>Improvement</i>	idea of difficult to be sure of end point / difficult to see when the colour changes ;	white or black background / compare with standard / control / use a colorimeter;	cannot add tubes to hot water / monitor colour change, in three tubes simultaneously ;	do tubes separately / other people to do other tubes ;	[max 2]	one error and one matching improvement  I reference to repetition		
<i>Source of error</i>	<i>Improvement</i>										
idea of difficult to be sure of end point / difficult to see when the colour changes ;	white or black background / compare with standard / control / use a colorimeter;										
cannot add tubes to hot water / monitor colour change, in three tubes simultaneously ;	do tubes separately / other people to do other tubes ;										

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<b>Question</b>	<b>Mark scheme</b>	<b>Mark</b>	<b>Guidance</b>
<b>(g) (i)</b>	<p><b>A</b> – axes labels with units ;</p> <p><b>S</b> – even <u>scale</u> and plots to fill at least <math>\frac{1}{2}</math> of grid both directions ;</p> <p><b>P</b> – plots accurate to <math>\pm \frac{1}{2}</math> square ;</p> <p><b>B</b> – bars of equal width, not touching and with equal space between them ;</p>	[4]	<p>y axis – protein (content of food) g per 100 g</p> <p>x axis – names of foods labelled under each block , or identified with a key</p>
<b>(ii)</b>	177 ;;	[2]	$(20 \div 11.3) \times 100$
		<b>[Total: 19]</b>	

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<b>Question</b>	<b>Mark scheme</b>	<b>Mark</b>	<b>Guidance</b>
<b>2 (a)</b>	measure <b>distance</b> moved by air/water/meniscus ; for a set period of <b>time</b> ;	[2]	
<b>(b)</b>	fan / hairdryer ;	[1]	
<b>(c)</b>	<i>any 2 from:</i> leaf area / size ; type/species of plant / use same leaves; light (intensity) ; temperature ; diameter of capillary tubing ; no <u>additional</u> air movement, e.g. windows open ; humidity ;	[max 2]	

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<b>Question</b>	<b>Mark scheme</b>	<b>Mark</b>	<b>Guidance</b>
<b>(d)</b>	to prevent water leakage / AW ; to stop air getting in ;	[max 1]	e.g. water getting out , water loss
<b>(e)</b>	correct reading from the graph (2.3 and 0.8) ; 2.3 / 0.8 = 3 ;	[2]	
<b>(f)</b>	idea that it actually measures water uptake (not loss);	[1]	
<b>(g)</b>	drawing showing apparatus set up ; description of the treatments ; <i>any 4 of:</i> 1 use of a <u>control</u> with a correct example, 2 weigh (mass of) leaves at beginning with petroleum jelly applied; 3 weigh leaf at end ; 4 for a set period of time ; 5 describe a controlled variable / named environmental factor being kept constant ; 6 repeat experiment / described e.g. two leaves with same treatment ;	2 + 4          [max 6]	<i>allow any of the points shown as annotations on the diagram</i>          e.g. wind (speed) / temperature / light (intensity) / humidity

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<b>Question</b>	<b>Mark scheme</b>	<b>Mark</b>	<b>Guidance</b>
<b>(h) (i)</b>	O – all lines single, clear and unbroken with no shading ; S – drawing occupies at least half the space ; D1 – no cells and only the sector drawn ; D2 – detail ;	[4]	
<b>(ii)</b>	108 ± 1 mm ;	[1]	
<b>(iii)</b>	(x)14 ;	[1]	<b>A</b> 15 if (ii) 109 mm ecf for incorrect measurement in <b>(h) (ii)</b> <b>R</b> if units included with the magnification
		<b>[Total: 21]</b>	