Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/63**

Paper 6 Alternative to Practical **October/November 2016**

MARK SCHEME

Maximum Mark: 60

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 will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

<table>
<tr><th>Question</th><th>Answers</th><th>Marks</th></tr>
<tr><td>1(a)</td><td>
<table>
<tr><td>Nutrient tested for</td><td>Testing solution</td><td>Heat needed? (Yes / no)</td></tr>
<tr><td>Protein</td><td>Biuret</td><td>no</td></tr>
<tr><td>Reducing sugar</td><td>Benedict’s</td><td>yes</td></tr>
<tr><td>Starch</td><td>Iodine</td><td>no</td></tr>
</table>
3 correct reagents = 2, 1 correct = 1;;

1 mark for heat for reducing sugar only ;
</td><td>3</td></tr>
<tr><td>1(b)</td><td>
<table>
<tr><td>Testing solution used</td><td>Initial colour</td><td>Colour after test</td></tr>
<tr><td>Benedict’s solution</td><td>Blue</td><td>blue</td></tr>
<tr><td>biuret solution</td><td>Blue</td><td>purple/lilac</td></tr>
<tr><td>iodine</td><td>brown</td><td>brown</td></tr>
</table>
purple / lilac for protein ;
negative colours brown and blue ;
</td><td>2</td></tr>
<tr><td>1(c)</td><td>Benedict's: yellow / green / orange / red ;

iodine: blue-black ;</td><td>2</td></tr>
<tr><td>1(d)</td><td>same volume of juice and lemonade ;
same volume of Benedict’s solution ;
yellow / green for small amount of reducing sugar OR orange / red for high(er) amount of reducing sugar ;</td><td>3</td></tr>
<tr><td></td><td>Total:</td><td>10</td></tr>
</table>

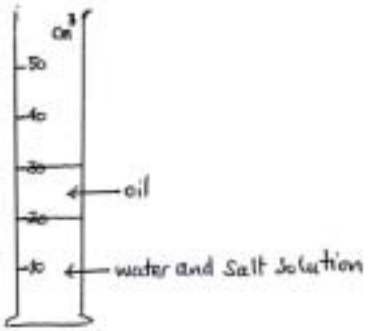
Question	Answers	Marks
2(a)	30 ; 32 ;	**2**
2(b)(i)	31 ;	**1**
2(b)(ii)	0.032 0.019 / 0.018, 0.012 / 0.011 ;	**1**
2(c)(i)	linear scale for vertical axis using at least half of the grid ; all three points plotted correctly to within half a small square ; best appropriate straight line or curve through the origin ;	**3**
2(c)(ii)	as concentration increases speed increases ;	**1**
2(d)	0.75 and difference between them is much greater than difference between other pairs / % difference greater than other pairs / % difference greater than 10% ;	**1**
2(e)	(reacted chips have) smaller surface area / (already reacted chips will) react slower ;	**1**
	Total:	**10**

Question	Answers	Marks
3(a)(i)	correct symbol for voltmeter ; correct parallel (voltmeter) connection between X and Y ;	**2**
3(a)(ii)	1.9 (V) ;	**1**
3(a)(iii)	0.24 (A) ;	**1**
3(a)(iv)	7.9 ; Unit Ω / ohm ;	**2**
3(b)	15 (Ω) ;	**1**
3(c)	YES (no mark) **and** values of R_T and $0.5\,R_S$ are close enough / difference can be attributed to experimental error ;	**1**
3(d)	resistors become hot / temperature affects resistance ;	**1**
3(e)	increases ;	**1**
	Total:	**10**

<table>
<tr><th>Question</th><th>Answers</th><th>Marks</th></tr>
<tr><td>4(a)</td><td>
<table>
<tr><th>Test-tube</th><th>Initial colour</th><th>Final Colour</th><th>Change in CO2 concentration (increase / decrease / no change)</th></tr>
<tr><td>A</td><td>red</td><td>purple</td><td>decrease</td></tr>
<tr><td>B</td><td>red</td><td>yellow</td><td>increase</td></tr>
<tr><td>C</td><td>red</td><td>red</td><td>(no change)</td></tr>
<tr><td>D</td><td>red</td><td>red</td><td>no change</td></tr>
</table>
changes for A and B correct ;
anything other than no change for D = no marks
</td><td>1</td></tr>
<tr><td>4(b)(i)</td><td>photosynthesis (removes CO_2) ;</td><td>1</td></tr>
<tr><td>4(b)(ii)</td><td>respiration (produces CO_2) ;</td><td>1</td></tr>
<tr><td>4(b)(iii)</td><td>rate of photosynthesis and respiration is matched ;</td><td>1</td></tr>
<tr><td>4(c)</td><td>control / to show no change without organisms ;</td><td>1</td></tr>
<tr><td>4(d)(i)</td><td>water bath ;
between 10–40 °C ;</td><td>2</td></tr>
<tr><td>4(d)(ii)</td><td>volume of water ;
number / size of tadpoles ;
size of pondweed ;
amount of indicator ;
light intensity ;
type of water ;
type of pondweed ;</td><td>max 3</td></tr>
<tr><td></td><td>Total:</td><td>10</td></tr>
</table>

Question	Answers	Marks
5(a)(i)	symbol for cell / DC power supply ; symbol for ammeter or lamp ;	2
5(a)(ii)	copper oxide / CuO ;	1
5(b)(i)	thermometer and stopper ; thermometer bulb opposite to the side-arm ;	2
5(b)(ii)	99.5 (°C) ;	1
5(b)(iii)	(0.5 less than 100) within experimental error / inaccuracy of thermometer / height above sea level ;	1
5(c)	carbon dioxide / CO_2 ;	1
5(d)	sodium hydroxide solution / add ammonia solution ; colour of ppt. / specific example, e.g. blue ppt. = Cu^{2+} ;	2
	Total:	10

Question	Answers	Marks
6(a)(i)	29.0 ; 41.0 ;	2
6(a)(ii)	eye level / bottom of meniscus ;	1
6(b)	1.2 (1.193103448275862) ; 0.8 (0.8390243902439024463) ;	2
6(c)(i)	(teat / dropping) pipette ;	1
6(c)(ii)	formula takes it into account ;	1

Question	Answers	Marks
6(c)(iii)	find the average / mean (of the three results for each liquid) ;	1
6(d)(i)	**S and** because it is less dense than water / liquid T ;	1
6(d)(ii)	oil / S on top (ecf) with **one** line at 20 ;  (water and salt solution or water and solution **R**)	1
	Total:	10