
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.

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Page 2	Mark Scheme	Syllabus	Paper
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Question	Answers			Marks												
1(a)	<table border="1"> <thead> <tr> <th>Nutrient tested for</th> <th>Testing solution</th> <th>Heat needed? (Yes/no)</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>3 correct reagents = 2, 1 correct = 1;; 1 mark for heat for reducing sugar only ;</p>	Nutrient tested for	Testing solution	Heat needed? (Yes/no)	Protein	Biuret	no	Reducing sugar	Benedict's	yes	Starch	Iodine	no			3
Nutrient tested for	Testing solution	Heat needed? (Yes/no)														
Protein	Biuret	no														
Reducing sugar	Benedict's	yes														
Starch	Iodine	no														
1(b)	<table border="1"> <thead> <tr> <th>Testing solution used</th> <th>Initial colour</th> <th>Colour after test</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>purple / lilac for protein ; negative colours brown and blue ;</p>	Testing solution used	Initial colour	Colour after test	Benedict's solution	Blue	blue	biuret solution	Blue	purple/lilac	iodine	brown	brown			2
Testing solution used	Initial colour	Colour after test														
Benedict's solution	Blue	blue														
biuret solution	Blue	purple/lilac														
iodine	brown	brown														
1(c)	Benedict's: yellow / green / orange / red ; iodine: blue-black ;			2												
1(d)	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 ;			3												
	Total:			10												

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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 <u>through the origin</u> ;	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

Page 4	Mark Scheme	Syllabus	Paper
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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 $0.5R_S$ 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

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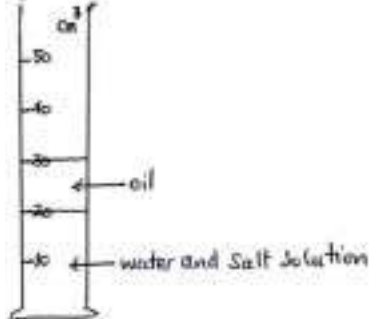
Question	Answers				Marks
4(a)	Test-tube	Initial colour	Final Colour	Change in CO ₂ concentration (increase / decrease / no change)	1
	A	red	purple	decrease	
	B	red	yellow	increase	
	C	red	red	(no change)	
	D	red	red	no change	
	changes for A <u>and</u> B correct ; anything other than no change for D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

Page 6	Mark Scheme	Syllabus	Paper
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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. <u>0</u> ; 41. <u>0</u> ;	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

Page 7	Mark Scheme	Syllabus	Paper
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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 ;  <p>(water and salt solution or water and solution R)</p>	1
	Total:	10