Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/62**

Paper 6 Alternative to Practical **March 2017**

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.

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This document consists of **7** printed pages.

Question	Answer	Marks
1(a)	<table><tr><td>reagent</td><td>Benedict's</td><td>biuret</td><td>iodine solution</td></tr><tr><td>nutrient tested for</td><td>**reducing sugar ;**</td><td>**protein ;**</td><td>**starch ;**</td></tr></table>	**3**
1(b)	<table><tr><td>reagent</td><td>Benedict's</td><td>biuret</td><td>iodine solution</td></tr><tr><td>solution **A**</td><td>**yellow / green / orange / red**</td><td>**blue**</td><td>**blue-black**</td></tr><tr><td>solution **B**</td><td>**blue ;**</td><td>**lilac ;**</td><td>**blue-black ;**</td></tr></table> (mark vertically i.e. colours correct for both)	**max 3**
1(c)	wore goggles / tied back hair / used tongs **and** chemical tests or hot water ;	**max 1**
1(d)	(dissolve in) ethanol **and** water added ; no naked flames (ignore other safety precautions) ; cloudy / emulsion ;	**3**
10	**Total:**	**10**

Question	Answer	Marks
2(a)	add water and stir ; filter mixture ; diagram with at least two labels ;	**3**
2(b)(i)	no bubbles / no effervescence ;	**1**
2(b)(ii)	chloride ;	**1**
2(b)(iii)	<table><tr><td>test</td><td>observations</td><td>conclusion about cation</td></tr><tr><td>1 (add sodium hydroxide solution)</td><td>**no ppt. ;**</td><td>(not Cu^{2+}, Fe^{2+}, Fe^{3+}, Zn^{2+})</td></tr><tr><td>2 (heat the mixture from test 1 and test any gases with damp litmus papers)</td><td>**red to blue ;**</td><td>**ammonium / NH_4^+ ;**</td></tr></table>	**3**
2(c)(i)	reacts quicker ;	**1**
2(c)(ii)	dark blue (solution) ;	**1**
	Total:	**10**

Question	Answer	Marks
3(a)	1.2 (V) ; 0.18 (A) ;	**2**
3(b)(i)	5.2 / 5.24 **and** 6.7 / 6.67 ; both R values consistent to 2 / 3 significant figures ;	**2**
3(b)(ii)	11.9 (Ω) ; ecf **(i)**	**1**
3(c)(i)	correct series connection ; voltmeter position unchanged ;	**2**
3(c)(ii)	8.1(3) c.a.o. ;	**1**
3(d)	(statement matching results – expect NO) results used for justification with reference to the idea of experimental accuracy ;	**1**
3(e)	resistance changes / wires get hot / bulbs get hot / battery runs down ;	**max 1**
10	**Total:**	**10**

Question	Answer	Marks
4(a)	time **and** minutes ; pulse rate / beats **and** 15 seconds ;	**2**
4(b)(i)	41 **and** 44 ;	**1**
4(b)(ii)	148 **and** 164 ;	**1**
4(c)	axes labelled with units ; suitable linear scale using at least half the grid ; at least 4 points plotted correctly ; best-fit curve ;	**4**
4(d)	increases ;	**1**
4(e)	correct reading from graph as marked ;	**1**
10	**Total:**	**10**

Question	Answer	Marks
5(a)	*any 3 from:* copper doesn't react with acid ; delivery tube is under level of liquid in conical flask / cannot gather gas ; no bung in conical flask / gas escapes out of top of conical flask ; measuring cylinder should be underwater / should contain water / cannot collect gas ;	max 3
5(b)(i)	4 ; slower reaction / takes more time ;	2
5(b)(ii)	1 ; twice as much gas ;	2
5(c)	same / 30 cm^3 **and** same amount of metal / metal in excess ;	1
5(d)	heat **or** evaporating dish / beaker and burner ;	max 1
5(e)	lighted splint **and** pop ;	1
10	Total:	10

Question	Answer	Marks
6(a)(i)	15.4 (cm) ;	**1**
6(a)(ii)	15.4 ÷ 10 = 1.54 ;	**1**
6(a)(iii)	$\dfrac{\pi(1.54)^2}{4}$ = 1.86 (cm^2) ;	**1**
6(b)(i)	3.1 (cm) ;	**1**
6(b)(ii)	5.8 / 5.77 (cm^3) ;	**1**
6(c)	55.<u>0</u> (g) ;	**1**
6(d)	55.0/5.77 = 9.5(3) (g / cm^3) ;	**1**
6(e)	idea that it allows more accurate measurement as uncertainty is a smaller percentage / fraction of measurement ;	**1**
6(f)	the volume calculated will be too large ; so this will make the value of the density too small ;	**2**
6		Total: **10**