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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

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(a)</td><td>
<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>
</td><td>3</td></tr>
<tr><td>1(b)</td><td>
<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)
</td><td>max 3</td></tr>
<tr><td>1(c)</td><td>wore goggles / tied back hair / used tongs and chemical tests or hot water ;</td><td>max 1</td></tr>
<tr><td>1(d)</td><td>(dissolve in) ethanol and water added ;
no naked flames (ignore other safety precautions) ;
cloudy / emulsion ;</td><td>3</td></tr>
<tr><td></td><td>Total:</td><td>10</td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)</td><td>add water and stir ;
filter mixture ;
diagram with at least two labels ;</td><td>3</td></tr>
<tr><td>2(b)(i)</td><td>no bubbles / no effervescence ;</td><td>1</td></tr>
<tr><td>2(b)(ii)</td><td>chloride ;</td><td>1</td></tr>
<tr><td>2(b)(iii)</td><td>
<table>
<tr><th>test</th><th>observations</th><th>conclusion about cation</th></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>
</td><td>3</td></tr>
<tr><td>2(c)(i)</td><td>reacts quicker ;</td><td>1</td></tr>
<tr><td>2(c)(ii)</td><td>dark blue (solution) ;</td><td>1</td></tr>
<tr><td></td><td>Total:</td><td>10</td></tr>
</table>

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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**
	Total:	**10**

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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**
	Total:	**10**

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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**
	Total:	**10**

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Question	Answer	Marks
6(a)(i)	15.4 (cm) ;	**1**
6(a)(ii)	15.4 ÷ 10 = 1.54 ;	**1**
6(a)(iii)	$\frac{\pi(1.54)^2}{4}$ = 1.86 (cm^2) ;	**1**
6(b)(i)	3.1 (cm) ;	**1**
6(b)(ii)	5.8 / 5.77 (cm^3) ;	**1**
6(c)	55.0 (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**
	Total:	**10**

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