

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0653 COMBINED SCIENCE

0653/51

Paper 5 (Practical Test), maximum raw mark 30

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.

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- 1 (a) (i) (any) blue / no change ; [1]
- (ii) colourless / like water / clear ; [1]
(ignore: stayed the same)
- (b) turns white / pink **AND** indicates water is produced / present ; [1]
- (i) turns milky / cloudy / white ppt. ; [1]
- (ii) (indicates) carbon dioxide / CO₂ ; [1]
- (d) heat produced / temperature increase ; [2]
light produced / glows / fire / flame / smoke ;
- (e) a control / show that water not already present / show that carbon dioxide not already present ; [1]
- (f) respiration ; [1]
- (g) goggles / hair tied back / Bunsen at safe distance / keep maximum distance from burning food / accept other sensible suggestions ; [1]
(ignore: test-tube holders as in diagram)

[Total: 10]

- 2 (a) (i) value of time greater than or equal to 10 s ; [1]
(allow: answers in minutes and seconds)
- (ii) value within 10% of first value ; [2]
both values to nearest second ;
- (b) (i) Fe²⁺ value less than both values in (a) ; [1]
- (ii) Fe³⁺ value less than both values in (a) **AND** to nearest second ; [1]
- (c) they are catalysts ; [1]
time decreased (with addition of metal ion) / rate increased ;
- (d) reliable as within 10% (or other suitable percentage or comment) **OR**
not reliable as greater than 10% difference (or other suitable percentage or comment) ; [1]
(answer must demonstrate an understanding of reliability)
(ignore: references to accuracy)

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- (e) add 1 cm³ water / add 5 drops + 1 cm³ starch ;
 (do NOT allow: 0.5 cm³ more of **A** and 0.5 cm³ more of **B**)
 total volume should be same as in (b) / equivalent volume to metal ion / to keep concentrations the same ; [2]
 (mark independently)

[Total: 10]

- 3 (a) ***h AND D AND d*** recorded ;
h > D > d ;
 all values to the nearest 0.1 cm ;
d_A calculation correct ;
V calculation correct ;
V given as whole number ; [6]
- (b) (i) *V_w* correctly calculated with working shown, e.g. subtraction of two values ;
V_w is supervisor's value $\pm 20 \text{ cm}^3$ (can get this accuracy mark without calculation) ; [2]
- (ii) cup not completely full / measuring cylinder not read at eye level / measuring cylinder not read perpendicularly / measuring cylinder not read from bottom of meniscus / water spilled on transfer / *R₂* off scale of measuring cylinder ; [1]
- (iii) *V_w* since difficult to measure *h* / *V_w* since *d* (or *D*) not inside diameters / *V_w* since it is a direct measurement / *V_w* since *V* is an approximation / *V_w* is actual measurement whereas *V* uses a formula ; [1]

[Total: 10]

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1 (a)

<i>reagent</i>	<i>Benedict's</i>	<i>iodine solution</i>
<i>food group tested for</i>	(reducing) sugar ;	starch ;

[2]

(b)

<i>reagent</i>	<i>Benedict's</i>	<i>iodine solution</i>
<i>colour with milk</i>	yellow / red / orange	orange
<i>colour with rice</i>	blue	blue-black / black

full set of results recorded for milk **and** rice ;
all correct for milk ;
all correct for rice ;

[3]

(c)

	<i>food group(s) present</i>
<i>colour with milk</i>	(reducing) sugar ;
<i>colour with rice</i>	starch ;

(mark independently to observations)
(allow: ecf from (a) if groups muddled)

[2]

(d) (i) dissolve in / mix with ethanol ;
add water ;

[2]

(ii) cloudy / milky / emulsion (this mark linked to (e)(i) being at least partly correct) ;

[1]

[Total: 10]

2 (a) vapour burns / blue flame / flammable gas / splint remained lit ;
solid goes grey / black / darkens / condensation ;

[2]

(b) no effervescence / no fizzing / no bubbles ;
pungent smell / blue litmus turns red ;
(do **NOT** allow this mark if has **red litmus to blue**)
(conclusion) acidic gas / not a carbonate ;

[3]

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(c) effervescence / fizzing / bubbles ;
acid ; [2]

(d) (i) effervescence / fizzing / bubbles ;
(limewater becomes) milky / white ppt. ; [2]

(ii) calcium carbonate / CaCO_3 / calcium hydrogen carbonate / $\text{Ca}(\text{HCO}_3)_2$; [1]

[Total: 10]

3 (a) (i) realistic I value recorded for 15 cm ;
realistic V value recorded for 15 cm ; [2]

(ii) all I values < 1.5 A **and** to at least 2 d.p. ;
all V values < 2.5 V **and** to at least 1 d.p. ; [2]

(b) suitable choice of scales ($\geq$ half the grid used) ;
at least 5 plots correct to half a small square ;
good best-fit line judgement ; [3]

(c) indication **on graph** of how data obtained **and** at least half of line used ;
correct calculation for triangle method using data from graph ; [2]

(d) answer equals (c) recorded to 2 or 3 significant figures ;
(ecf from (c)) [1]

[Total: 10]