

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0654 CO-ORDINATED SCIENCES

0654/51

Paper 5 (Practical), maximum raw mark 45

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- 1 (a) (i) (any) blue/no change ; [1]
- (ii) colourless/like water/clear ; [1]
(ignore: stayed the same)
- (b) (i) turns white/pink **AND** indicates water is produced/present ; [1]
- (ii) turns milky/cloudy/white ppt. ; (allow: murky) [2]
(indicates) carbon dioxide/CO₂ ;
- (c) heat produced/temperature increase ; [2]
light produced/glows/fire/flame/smoke ;
- (d) a control/show that water not already present/show that carbon dioxide not already present ; [1]
- (e) (i) respiration ; [1]
- (ii) glucose/food/cheese + oxygen (**not** air) → carbon dioxide + water [2]
LHS correct = 1 ; RHS correct = 1 ;
- (f) goggles/hair tied back/Bunsen at safe distance/keep maximum distance from [1]
burning food/accept other sensible suggestions ;
(ignore: test-tube holders as in diagram)
- (g) (i) same mass of water/same volume of water/same amount of water ; [max 2]
same distance to test-tube ;
same volume of water ;
same **start** temperature of water ;
same mass of food ;
(ignore: same time of burning)
- (ii) heat loss/incomplete burning ; [1]

[Total: 15]

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- 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) Fe^{2+} value less than both values in (a) ; [1]
- (ii) Fe^{3+} value less than both values in (a), **AND** to nearest second ; [1]
- (iii) X^{2+} value less than or equal to 5 s / X^{2+} value is 'instant' ; [1]
- (c) (i) at least **four** $\frac{1}{t}$ values calculated correctly (*ignore s.f.*) ; [1]
*(if $t = 0$ allow $\frac{1}{t}$ to be left blank or infinity but do **not** allow zero)*
- (ii) they are catalysts ;
 $\frac{1}{t}$ (rate) increased (with addition of metal ion) / time decreased (with addition of metal ion) ; [2]
- (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)
- (e) (i) 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)
- (ii) ppt. / white ppt. / cream ppt. / instant blue-black / instant reaction / more brown ; [1]
- (f) blue ppt. / dark blue solution ;
X is copper / Cu (*depends on blue in first marking point*) ; [2]
(allow: Cu^{2+} or copper(II) for second marking point)

[Total: 15]

Page 4	Mark Scheme	Syllabus	Paper
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- 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 ± 20 cm³ (*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 / *R*₂ off scale of measuring cylinder ; [max 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 ; [max 1]
- (c) (i) evidence of at least 2 loops of string around cup ;
(*this could be in words or from diagram and could be in different positions or one position repeated*)
correct averaging of two or more measurements for value of *C* ;
answer to 0.1 cm (*independent mark*) ; [3]
- (ii) diagram showing correct positioning of one loop, e.g. half way up / at top / at bottom ; [1]
- (iii) calculation correct to 2 or 3 s.f. ; [1]

[Total: 15]