

**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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| Page 2 | Mark Scheme                             | Syllabus | Paper |
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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 /CO<sub>2</sub> ;
- (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]

| Page 3 | Mark Scheme                             | Syllabus | Paper |
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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)  $\text{Fe}^{2+}$  value less than both values in (a) ; [1]
- (ii)  $\text{Fe}^{3+}$  value less than both values in (a), **AND** to nearest second ; [1]
- (iii)  $\text{X}^{2+}$  value less than or equal to 5 s /  $\text{X}^{2+}$  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 cm<sup>3</sup> water / add 5 drops + 1 cm<sup>3</sup> starch ;  
(do **NOT** allow: 0.5 cm<sup>3</sup> more of **A** and 0.5 cm<sup>3</sup> 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:  $\text{Cu}^{2+}$  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*<sub>A</sub> calculation correct ;  
*V* calculation correct ;  
*V* given as whole number ; [6]
- (b) (i) *V*<sub>w</sub> correctly calculated with working shown, e.g. subtraction of two values ;  
*V*<sub>w</sub> is supervisor's value ± 20 cm<sup>3</sup> (*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*<sub>2</sub> off scale of measuring cylinder ; [max 1]
- (iii) *V*<sub>w</sub> since difficult to measure *h* / *V*<sub>w</sub> since *d* (or *D*) not inside diameters / *V*<sub>w</sub> since it is a direct measurement / *V*<sub>w</sub> since *V* is an approximation / *V*<sub>w</sub> 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]