CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0654 CO-ORDINATED SCIENCES

0654/52 Paper 5 (Practical), maximum raw mark 45

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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International Examinations

1 (a) purple / pink **AND** due to pH above 8 / alkaline conditions ; [1]

(b) (i) row or column for **A** and **B** ;
row or column for recording time with suitable units (in heading or with each reading) ; [2]

(ii) results recorded for both blocks (neither greater than 5400 s / 90 min) ;
block **B** has shorter time ; [2]

(c) acid diffuses (into agar) ;
pH is reduced / acid neutralizes alkali / it becomes neutral ; [2]

(d) different volumes of acid ;
use the same volume / amount ;
OR
difficult to judge the end point (do not allow just 'timing') ;
(so) repeat and calculate a mean / time to whole block colourless ;
OR
difficult to cut blocks evenly / dimensions not accurate ;
(so) have a guide to help cutting / use moulds for **A** and **B** ;
(to award second mark the improvement must match a stated inaccuracy)
any two pairs [max 4]

(e) (i) reduction in distance for diffusion / **B** is a smaller block / increase in surface area to volume ratio ; [1]

(ii) thin alveoli wall / one cell thick ; [1]

(f) (i) different sized blocks / greater range of block sizes / another size of block ; [1]

(ii) time on one axis and volume / block size / length of side / surface area to volume ratio on other axis ; [1]

[Total: 15]

2 (a) (i) blue / blue-green / green ; [1]

(ii) *observation :* no reaction ;
conclusion : not carbonate / not CO_3^{2-} ; [2]

(iii) *observation :* no reaction (allow grey ppt) ;
conclusion : not chloride / not Cl^- ;
(*conclusion must follow an observation other than white ppt for second mark)* [2]

(iv) *observation :* white ppt ;
conclusion : sulfate / SO_4^{2-} ;
(*conclusion must follow white ppt / white solid / milky for second mark)* [2]

(b) (i) brown ppt / brown solid / brown suspension / insoluble brown ;
(allow red-brown ppt) [1]

(ii) *colour of filtrate :* (dark) blue ;
colour of residue : brown / red-brown / black / green ; [2]

(iii) *cation in filtrate :* Cu^{2+} / copper (not Cu) ;
cation in residue : Fe^{3+} / iron(III)
OR
cation in residue : Fe^{2+} / iron(II) if residue in **(b) (ii)** is green ;
*(**ecf** from **(b) (ii)** if filtrate and residue transposed)* [2]

(c) *salt 1 :* copper sulfate **AND** *salt 2 :* iron(III) sulfate ;
OR
salt 1 : copper sulfate **AND** *salt 2* : iron(II) sulfate if residue in **(b) (ii)** is green ;

note: salt 1 and salt 2 may be transposed
no ecf for wrong anion [1]

(d) steam / white fumes / white gas / condensation at top of test-tube ;
solid goes brown ; [2]

[Total: 15]

3 (a) (i) I value recorded ;
V value recorded ; [2]

(ii) A / amp(ere) ; [1]

(iii) I values all recorded ;
I values < 1 A and to at least two decimal places ;
V values all < 2.5 V and to at least one decimal place ;
V values decreasing down table ; [4]

(b) (i) all P values correct ;
values decreasing down Table 3.1 ; [2]

(ii) the lamp gets dimmer (as l increases) ; [1]

(c) (i) four $\frac{V}{l}$ values correct ;
five $\frac{V}{l}$ values correct ;
two values to two / three significant figures ; [3]

(ii) no / disagree / wrong ;
justification matches comment and refers to results e.g. $\frac{V}{l}$ not constant,
V decreases as l increases ; [2]

[Total: 15]