CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0654 CO-ORDINATED SCIENCES

0654/51 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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CAMBRIDGE
International Examinations

1 **(a)** both temperatures recorded to nearest °C and within range for each water-bath ; [1]

(b) at least 4 pairs of results recorded ; (do not allow $h = 0$)
all pairs of results recorded in mm and not greater than 200 ;
height generally higher in **B** than **A** ; [3]

(c) linear vertical axis labelled with height and units ;
at least 5 correct plots to ± ½ small square for **B** (for **A** if **B** not plotted) ;
points plotted for **A** and **B** and both labelled ;
best fit curve or straight lines for **A <u>and</u> B** ; [4]

(d) carbon dioxide ; [1]

(e) count bubbles in water / measure volume of gas produced / use gas syringe / uses taller and narrower tube / use set square for top of bubbles ; [1]

(f) **(i)** higher yeast activity with higher temperature / it increases with temperature / it is faster at higher temperature ;
(mark may only be awarded if there are results in the table)
[1]

(ii) range of different temperature water baths ;
named condition constant / all other conditions constant ;
record minimum temperature (above 40 °C) that gives no foam ;
investigate intermediate values / tubes differ by 1 °C ; [4]

(one tube method allow:
one tube gradually heated ; until no bubbles produced ; 2 marks max)

[Total: 15]

2 **(a)** *filtrate:* colourless ;
residue: brown / black / grey ;
(if colours reversed 1 mark max) [2]

(b) **(i)** white ppt. ;
ppt. disappears to form colourless solution / ppt. soluble in excess (NaOH) ; [2]

(ii) white ppt. ;
ppt. disappears to form colourless solution / ppt. soluble in excess (ammonia solution) ; [2]

(iii) Zn^{2+} / zinc ; (**not** Zn)
(mark is linked to a correct observation in **(b)(i)** *or* **(b)(ii)***)* [1]

(c) (i) bubbles / effervescence ; *(ignore colours)* [1]

(ii) *filtrate:* green / turquoise / blue ;
residue: brown / black / grey ;
(if colours reversed 1 mark max) [2]

(d) (i) (pale) blue ppt. ; [1]

(ii) (pale) blue ppt. ;
dark(er) blue solution / deep blue solution / purple solution ; [2]

(iii) Cu^{2+} / copper ; *(independent mark)* (**not** Cu) [1]

(e) add dilute sodium hydroxide / ammonia solution **AND** brown / orange ppt ; [1]

[Total: 15]

3 (a) (i) all three values present with l = 10 cm and I less than 1 ; [1]

(ii) R value correct for l = 10 cm and minimum of two significant figures ; [1]

(iii) all units present and correct (A, V, Ω **OR** amps, volts, ohms) ; [1]

(iv) all I approximately the same ;
all V to at least one decimal place ;
V values increasing (for increasing length);
R values correct for l = 25 cm onwards ;
consistent use of either two or three significant figures for R ; [5]

(v) so that the wire does not become hot / because resistance of wire may increase / as battery or cell may run down ; [1]

(b) axes labelled with units (allow ecf from **(a)(iii)**) ;
suitable choice of linear scales and use of at least 50% of each axis ;
(no marks may be awarded beyond this point in **(b)** *for a non-linear scale)*
at least four plots correct to ± ½ small square ;
good best fit straight line judgement ; [4]

(c) *relationship*: proportional ;
justification: straight line ; [2]

[Total: 15]