CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0654 CO-ORDINATED SCIENCES

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

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1 **(a)** **(i)** 'thickness or size / mm' **and** 'time taken / s or seconds' ; [1]

(ii) full set of results recorded for experiment **1** ;
all to the nearest second ; [2]

(iii) full set of results recorded for experiment **2** ;
correct trend in both experiments (time taken decreases down column) ; [2]
(**ALLOW** trend mark if only 4 results in column or if 5 results with two consecutive ones the same)

(b) averages calculated correctly ; [1]

(c) labelled axes with units ;
suitable choice of scale using at least half of each axis (**IGNORE** (0,0)) ;
at least 4 points plotted correctly ± half small square ;
best-fit straight line **through the origin** (± half small square) ; [4]

(d) at least one line on graph **and** correct reading from graph ; [1]

(e) **(i)** fewer bubbles (comparison required) [1]

(ii) no bubbles / very few bubbles ; [1]

(f) **(i)** same concentration of hydrogen peroxide each time / hydrogen peroxide used up in experiment **1** ; [1]

(ii) experiment **2** has similar results so not necessary / experiment **2** has greater times so it is necessary / experiment **2** greater time but similar trend so not necessary ; [1]

(Answer should match candidate's results)

2 (a) (i) (test) add dilute hydrochloric acid (to solid) ;
2 test-tubes (or suitable containers) connected via delivery tube ;
bubble any gas through limewater ;
(marks could be obtained from fully labelled correct diagram) [3]

(ii) Table 2.1

	A	B	C	D
observations	no change	(limewater) white ppt. / milky / cloudy white	no change	no change
carbonate present? (yes / no)	no	yes	no	no

(limewater) white ppt. / milky / cloudy white for **B** ;
no change for **A**, **C** and **D** ;
carbonate present row all correct (**allow ecf** from incorrect results) ;

(**note**: all results present but interchange of letters = max 2) [3]

(b) Table 2.2

Note: (i), (ii) and (iii) will not necessarily be in order A, C and D.

	(i)	(ii)	(iii)
test	**A**	**C**	**D**
barium chloride solution	no reaction	white ppt.	white ppt. (allow pale blue ppt.)
silver nitrate solution	white ppt.	no or slight ppt.	no or slight ppt.
ammonia solution	no reaction	white ppt. (dissolves to form colourless solution)	blue ppt. dissolves to form dark blue solution

ALLOW nothing / – / no visible reaction for no ppt.

(i) (for A) white ppt. with silver nitrate and nothing with others ; [1]

(ii) (for C) white ppt. with barium chloride ;
white ppt. with ammonia solution
(**note**: do not award this mark if white ppt. with silver nitrate although allow slight ppt. with silver nitrate) [2]

(iii) **(for D)** white ppt. with barium chloride ;
blue ppt. with ammonia solution
(**note**: do not award this mark if white ppt. with silver nitrate although allow slight ppt. with silver nitrate) ;
dark blue solution with ammonia ; [3]

[note: If **B** appears in Table 2.2 then mark **B** results as follows depending on which substance **B** has replaced

B instead of **A**: white ppt. with barium chloride ;

B instead of **C**: white ppt. with barium chloride ;
brown ppt. with silver nitrate ;

B instead of **D**: white ppt. with barium chloride ;
brown ppt. with silver nitrate ;
nothing with ammonia ; **]**

(c) **(i)** **A** ; [1]
(**note**: **A** must be present and correct in Table 2.2)

(ii) zinc sulfate ;
(**note**: **C** must be present and correct in Table 2.2)

copper sulfate ; [2]
(**note**: **D** must be present and correct in Table 2.2)

3 **(a)** *H* recorded to the nearest millimetre (15–19 or SV±2) ; [1]

(b) **(i)** value of *v* recorded for *u* = 25 ; [1]

(ii) value of *h* recorded for *u* = 25 ; [1]

(iii) table complete for v and *h* ; [2]
values of *v* decreasing down table ;

(iv) all ratios calculated correctly to at least 2 sig. fig. ; [1]

(c) **(i)** suitable choice of scales using at least half of each axis ;
at least 4 points plotted correctly ± half small square ;
good best-fit straight line judgment ; [3]

(ii) indication on graph of how data obtained **AND** use of at least half of line drawn ;
correct calculation to at least 2 sig fig using data from the graph ; [2]

(iii) focal length correctly calculated to 2 / 3 sig. fig. from candidate's gradient value ;
focal length = 14–16 cm (adjust to SV±1 as necessary) ; [2]

(d) **any two** from:

use of darkened room / use a brighter lamp ;
mark position of centre of lens in holder ;
place metre rule on bench / clamp in position ;
ensure the centre of lens and object are the same height above bench / object and screen vertical ;
repeat **and** average ;
(**DO NOT ALLOW** place zero of ruler on illuminated object) [max 2]