CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2012 series

0654 CO-ORDINATED SCIENCES

0654/53 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) (i) all four spaces filled in with appropriate observations (i.e. referring to bubbles forming or appearing on leaf surfaces) ;
leaf **A** – more bubbles from lower surface than from upper surface ;
leaf **B** – no difference between surfaces / less difference between surfaces than with leaf **A** ; [3]

(ii) faster diffusion of CO_2 / CO_2 present inside leaf / CO_2 needed and is in air ; [1]

(iii) stoata / stoma / pores ; [1]

(iv) more stomata / pores on lower surface ; [1]

(v) lower surface less exposed to sun / heat ;
so less transpiration / evaporation (from this surface) ; [2]

(vi) (leaf **B** shows less difference between the two leaf surfaces / less bubbling overall / any valid difference as recorded in the table – **NO MARK**)
because equal numbers of stomata on upper and lower surfaces / fewer stomata / any valid explanation of the difference described ; [1]

(b) (i) neat pencil drawing of a suitable size ;
drawing clearly shows veins and leaf stalk ; [2]

(ii) correct measurement of drawing ; [1]

(iii) magnification correctly shown (as indicated from answer to **(ii)**) ; [1]

(iv) green colour, to absorb light / shows chlorophyll present ;
broad flat shape, for large surface area / to absorb light / to absorb CO_2 ;
thin, for short diffusion distance of CO_2 / O_2 ;
veins, to support leaf in sunlight / transport water in / transport sugar out ; [max 2]

[Total: 15]

2 (a) (i) angle for 10 g ; (could be $180 - \theta$) [1]

(ii) angle for 3 masses ; (could be $180 - \theta$)
angles for all masses ; (could be $180 - \theta$)
angles for all masses less than 90^o ;
angles increase with increasing mass ;
angle change 60 to 80 g > or = 40 to 60 g > 20 to 40 g ; (accuracy) [5]

(iii) sine values (accept 4 values if only 4 results in table) ; [1]

(b) (i) axes: correct orientation and labelled ;
scale: linear and good use of grid and goes to 1 and 120 g as requested ;
(allow different mass scale to allow extension of line)
points: 4 points other than origin plotted to within ½ square ;
best straight line ;
line passes through origin ; [5]

(ii) appropriate extension ;
(*allow extension off the grid or from a curve but not from a zig-zag line*)
correct reading of ***m*** ;
(*only allow off grid if grid has been extended and measured accurately*) [2]

(iii) friction / weight of thread / gravity acting on thread / weight of hanger / gravity acting on hanger ;
(not mass and not gravity) [1]

[Total: 15]

3 (a) (i) bubbles / colourless solution ;
pop / explosion ; [2]

(ii) hydrogen / H_2 ; (do not accept H)
*[dependant on pop / explosion in **(a)(i)**]* [1]

(iii) **A** is magnesium / aluminium / zinc / iron ; [1]

(b) (i) brown ppt. / orange ppt. [1]

(ii) iron(III) / Fe^{3+} / Fe(III) ; (do not accept Fe)
*[dependant on brown / orange in **(b)(i)**]* [1]

(c) (i) liquid goes pale yellow / green / grey / colourless / lighter ;
(can see a little brown solid so allow this) [1]

(ii) green ppt. ; (accept grey / black) [1]

(iii) iron(II) / Fe^{2+} / Fe(II) ; (do not accept Fe)
*[dependant on green / grey / black in **(c)(ii)**]* [1]

(d) mixture darkens / dark green / orange at top ; [1]

(e) Fe^{3+} to Fe^{2+} / iron(III) to iron(II) / **A** has reduced **B** / reduction / addition of electron to **B** ; [1]

(f) (i) no change ; [1]

(ii) not sulfate / not SO_4^{2-} ;
*[dependant on no change in **(f)(i)**]* [1]

(g) (i) white ppt. ; [1]

(ii) chloride / Cl^- ;
*[dependant on white ppt. in **(g)(i)**]* [1]

[Total: 15]