

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2013 series**

**0653 COMBINED SCIENCE**

**0653/62**

Paper 6 (Alternative to Practical), maximum raw mark 60

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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- 1 (a) plant **A** shown as brown (red-brown-orange) middle and at least one other (not yellow or brick-red alone) ;  
 plant **B** shown as brown in covered regions ;  
 blue / black elsewhere (either or both regions) ; [3]
- (b) (i) to kill / soften the leaf ; [1]
- (ii) to remove chlorophyll / (green) colour / allow iodine colour to be seen ; (**do not** accept chloroplast) [1]
- (c) (i) cover other areas / whole leaf with glass / transparent material ; [1]
- (ii) removes the variable of different plants (e.g. genes) ORA (e.g. no other factors affecting plant) / more reliable / one plant may react or behave or photosynthesise differently / more / less ; [1]
- (d) use a plant with variegated leaves (or description) ;  
 destarch / keep in dark before starting, (then leave in the light) ;  
 test leaf for starch / use iodine test ;  
 description of the two results ;  
 (if two leaves used 2 marks max) [max 3]

**[Total: 10]**

- 2 (a) (i) 21 ;  
 15 ; [2]
- (ii)

height, <i>h</i> / cm	time for 20 swings / s	time, <i>T</i> for one swing / s	$T^2 / s^2$
10.0			
20.0			
25.0	<b>(21)</b>	<b>1.05</b>	<b>1.10</b>
30.0			
40.0	<b>(15)</b>	<b>0.75</b>	<b>0.56</b>

column 3 both correct (ecf) (2 decimal places) ; [1]

- (iii) column 4 both correct (ecf) (2 decimal places) BUT only penalise once in (ii) or (iii) ; [1]

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- (b) (i) 5 points correct (by eye) ;  
straight line of best fit ; [2]
- (ii) evidence on graph ;  
gradient = 0.035 to 0.04 ; (ignore any sign) [2]
- (iii) allow 2 to 2.15 (ecf) ; [1]
- (iv)  $2.05 / 0.04 = 51.25$  cm (allow 50.00 to 53.75) (ecf) ; [1]

[Total: 10]

3

	aqueous sodium hydroxide	aqueous ammonia	dilute hydrochloric acid	dilute sulfuric acid	
(a) 3 drops of universal indicator are added	<b>purple</b> (allow blue)	<b>purple</b> (allow blue) both ; [1]	<b>red / pink</b> (not orange)	<b>red / pink</b> both ; [1]	[max 2]
(b) an equal volume of silver nitrate solution is added	brown ppt	no change	<b>white ; ppt/solid ; [2]</b>	no change	[max 2]
(c) an equal volume of barium chloride solution is added	no change	no change	<b>no change ; [1]</b>	white ppt	[max 1]
(d) copper sulfate solution is added slowly until the test-tube is half full	<b>blue ppt / solid ; [1]</b>	<b>blue ppt / solid ; [1]</b> <b>(dark) blue soln ; [1]</b> (allow ppt soluble in excess)	no change	no change	[max 3]
(e) a 2 cm length of magnesium ribbon is added and any gas evolved tested with a lighted splint.	no change	no change	<b>bubbles / fizzing / effervescence</b>	<b>bubbles etc.</b> all 4 ; [1]	[max 2]
			<b>pops</b>	<b>pops</b> both ; [1]	

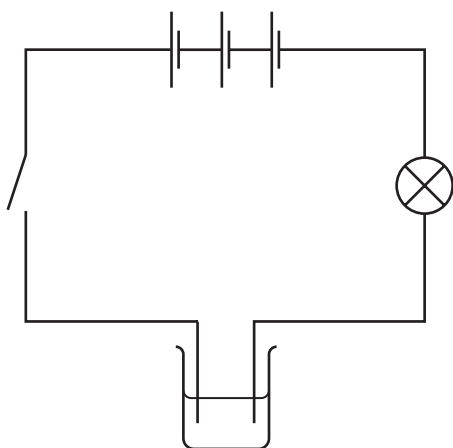
[Total: 10]

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- 4 (a) (i) 0.2 mol/dm<sup>3</sup>      10 mm ;  
0.8 mol/dm<sup>3</sup>      -11 mm ;      [2]
- (ii) scale and label (allow 'concentration') and units entered on horizontal axis or bottom of graph ;  
correct plotting by eye (allow ecf) ;  
smooth curve drawn ;      [3]
- (iii) 6 mm ;      [1]
- (iv) evidence on graph ;  
correct value read from students graph (approximately 0.35 mol / dm<sup>3</sup>) ;      [2]
- (b) water has left dandelion / cell(s) / stalk (by osmosis) / cells go flaccid / plasmolysed ;  
from (a region of) high (water) concentration (cortex cells) to (region of) low (water) concentration (sucrose solution) / from a higher concentration (of water) / to a lower concentration (of water) ORA ;  
(do not allow references to sucrose moving)      [2]

[Total: 10]

5 (a) (i)



- electric symbols correct ;  
their circuit diagram, no gaps or short circuits, but ignore key (or lack of) ;      [2]
- (ii) 14.35 ;  
11.27 ;      [2]
- (iii) points by eye (first point **MUST** be correct) ;  
line of best fit straight ;      [2]
- (iv) from graph ecf (6.7 hours / 6 hours 42 mins) ± a square ;  
(do not award mark if no line extension or over 7)      [1]

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(b) copper ions leave solution (and not replaced) (allow losing copper ions) ;  
(reject if key mentioned but ignore references to chlorine / chloride) [1]

(c) ions ;  
move (in aqueous) ; (ignore electrons but allow electrons move for max 1) [2]

**[Total: 10]**

6 (a) table e.g. (answers can be in any 'correct order')

<b>(gas)</b>	<b>test</b>	<b>result</b>
carbon dioxide	limewater	white ppt
hydrogen	lighted splint	pops
oxygen	glowing splint	relights

table format (any) drawn with a ruler ;  
headings must have 3 columns (or rows if table drawn the other way) ;  
all three gasses correct (max 1 for one gas correct) ; [4]

(b) any named (acid) and any named (carbonate) (**but not** sulfuric/ calcium) – both ;  
(allow e.g. hydrochloric and calcium (as acid and carbonate in question)) [1]

(c) reaction vessel ;  
any workable collection with gradations e.g. syringe / measuring cylinder etc. ;  
at least two valid labels (ignore reagents) ;  
would it work / airtight etc. ; [4]

(d) named metal Mg to Fe ; [1]

**[Total: 10]**