

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2011 question paper
for the guidance of teachers**

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.

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- 1 (a) (i) bubbles appearing ;
expanding gas ;
from pores/stomata ;
reduced pressure/pressure change/suction (when plunger pulled down) ; [max 3]
- (ii) correct value for complete squares, **C** ; [1]
correct value for half or more squares, **P** ; [1]
- (iii) surface area (candidates values of **C + P**) $\times 100$ for mm^2 ;
then $\times 100$ for total number of stomata (e.c.f. from above mark) ; [2]
- (iv) upper surface could be in direct sun ;
cooler underneath/hotter on top ;
less water loss ;
less wilting ; [max 3]
- (b) (i) drawing quality ;
xylem shown in bundles ;
xylem labelled ; [3]
- (ii) place in red dye ;
measure height dye rises in set time ;
rate = height divided by time ;
repeats (for reliability) ; [max 2]
- [Total: 15]**
- 2 (a) (i) *observation*: no change ;
conclusion: not acidic/neutral ; [2]
- (ii) *observation*: (green) to yellow/orange/red (depending on Universal
Indicator – see Supervisor's Report) ;
conclusion: acidic ; [2]
- (iii) weak acid ; [1]
- (b) (i) *observation*: white ppt./milky/cloudy white/white solid/white suspension ; [1]
- (ii) *observation*: ppt. dissolves/clears/clear solution/colourless ; [1]
- (iii) *observation*: white ppt./milky/cloudy white (allow cloudy if used cloudy
white in **(b)(i)**)/white solid/white suspension (on boiling) ; [1]

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- (c) (i) *observations:* (purple) to green ;
to yellow / orange / red (depending on Universal Indicator – see Supervisor's Report) ;
conclusions: (limewater) neutralised ;
(solution) becomes acidic ; [4]
- (ii) $\text{Ca}(\text{OH})_2$ box: purple/blue **AND** CaCO_3 box: green ;
 $\text{Ca}(\text{HCO}_3)_2$ box: yellow / orange / red (depending on Universal Indicator – see Supervisor's Report) ; [2]
- (d) *observation:* flame goes out / extinguished ; [1]

[Total: 15]

- 3 (a) (i) value of voltage and current for reading 1 ; [1]
- (ii)/(iii) readings 2 to 5 completed for voltage and current (allow 0V and 0A as reading 5) ;
current drops as voltage drops ; [2]
- (iv) resistance values calculated correctly, entered in Table 3.1 ; (allow 1 decimal point or more) (allow one error) [1]
- (v) average resistance calculated correctly, not including 0V, 0A, entered in Table 3.2 ; (allow 1 decimal point or more) [1]
- (b)(i)/(ii) readings of voltage and current entered in Table 3.2 for 2 wires ; [1]
- (iii) readings of voltage and current entered in Table 3.2 for 3 and 4 wires ;
current increases with number of wires (for same voltage) ; [2]
- (iv) resistances of 2, 3 and 4 parallel wires calculated and entered in Table 3.2 ;
(allow 1 decimal point or more) (allow one error) [1]
- (c) (i) axes labelled with units for resistance (resistance vertical) ;
scales linear and making good use (50% or more) of grid provided ;
points plotted correctly (3 within $\pm \frac{1}{2}$ square) ;
best curve drawn through 4 points ; (allow double curve if appropriate) [4]
- (ii) reasonable extrapolation and reading of resistance for 5 wires $\pm \frac{1}{2}$ square ; [1]
- (d) if resistances in Table 3.1 are similar then no need to repeat with parallel wires ;
OR
if resistances in Table 3.1 vary significantly then experiments with 2, 3 and 4 parallel wires should have been repeated ; [max 1]

[Total: 15]