

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2011 question paper  
for the guidance of teachers**

**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.

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- 1 (a) 2 readings for inhaled air ; [1]
- (b) 2 readings for exhaled air and average of 2 readings less than average of 2 readings in (a) ; [1]
- (c) (i) average for inhaled air ;  
average for exhaled air ;  
inhaled air = higher reading than exhaled air ; [3]
- (ii) time for atmospheric/ inhaled air longer ;  
more oxygen ;  
(accept reverse argument for 2 marks) (ignore references to carbon dioxide) [2]
- (iii) exhaled – cloudy and atmospheric/ inhaled – clear ;  
CO<sub>2</sub> linked to cloudiness or to **B** ;  
respiration / breathe out CO<sub>2</sub>/ no CO<sub>2</sub> in **A** ; [3]
- (d) (variable) – different exercise levels ;  
(control) – same person / same food / same temperature ;  
(reliability) – repeats ;  
(measurements) – breaths per minute ;  
(equipment) – stopwatch / other equipment related to measurement of breathing rate ;  
measurement of breathing rate ; [max 5]
- [Total: 15]**
- 2 (a) measurement clearly in mm ; [1]
- (b) *table*  
5 sets of results ;  
force correct (2.0, 3.0, 4.0, 5.0) ;  
increase in length greater as goes down ;  
increase in length is correct ; [4]
- (c) *graph*  
axes labelled correctly ;  
suitable scale ;  
plotting correct for at least 4 points ; [3]
- (d) yes, with suitable explanation ; [1]
- (e) suitable straight line or curve drawn related to answer in (d) ; [1]
- (f) read correctly ; [1]

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(g) proportional (if straight line is drawn) / not proportional (if a curve is drawn) ; [1]

(h) measure length after removing weights ; [2]

(i)  ; [1]

(accept if elastic limit shown on graph)

**[Total: 15]**

3 (a) violet / lilac / purple ; [1]

(b) litmus goes red / litmus bleached (ignore litmus goes blue) ;  
steam / water vapour / smoke / goes brown / goes yellow ; [2]

(c) (i) dissolves in cold water ;  
solution pale brown / orange / yellow ; [2]

(ii) brown ppt. / orange ppt. ;  
litmus red to blue ; [2]

(iii) red brown ppt. / orange ppt. ; [1]

(d) *test for chloride ion*  
added silver nitrate ;  
no ppt. ;  
  
*test for sulfate ion*  
added barium chloride ;  
white ppt. ; [4]

(e) (any order)  
iron(III) /  $\text{Fe}^{3+}$  / Fe (III) and valid reason ;  
sulfate /  $\text{SO}_4^{2-}$  and valid reason ;  
ammonium /  $\text{NH}_4^+$  and valid reason ; [3]

**[Total: 15]**