Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/51**

Paper 5 Practical Test **May/June 2016**

MARK SCHEME

Maximum Mark: 45

Published

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

1 **(a)** time (in) minutes ;
volume (in) cm^3 ; [2]

time with no units and volume with no units = 1 mark

(b) full set of results for **A** ;
full set of results for **B** ;
more juice produced in **B** for at least 4 readings ; [3]

(c) axes labelled with units (ecf from **(a)** but IGNORE ecf if correct) ;
suitable linear scale using at least half the grid ;
at least 4 plots correct ± half small square ;
best-fit line ; [4]

IF plot **A** and **B** IGNORE **A**
IF plot **A** only then cannot score M3 but can score M1, M2 and M4
IF all points are zeros then can only score M1

(d) increases amount of juice produced per unit time / more juice / speeds extraction process ; [1]

(e) wore goggles / tied hair back / gloves **AND** reason e.g. due to enzyme ; [1]

(f) show that the water of enzyme solution does not have an effect / no effect without enzyme / shows effect of just water ; [1]

(g) at least 3 different temperatures ;
same volume of enzyme / same volume of fruit pulp / same incubation time ;
measure volume of fruit juice for each temperature / one producing most juice in a fixed time is optimum ; [3]

[Total: 15]

2 **(a)** **(i)** reading for **C** (not zero) ;
readings for **D** and **E** (not zero) ;
all readings in s ;
D>E>C; [4]

(ii) **C** is ..... 2.00 mol / dm^3

D is ..... 0.50 mol / dm^3

E is ..... 1.00 mol / dm^3

one correct ;
all three correct ; [2]

(b) apparatus
stopwatch **AND** one of: test-tube, measuring cylinder, delivery tube as appropriate / apparatus for measuring volume of acid **AND** apparatus for adding drops of alkali ;

fair test
add same amounts or size of Mg / marble chip / UI (to acid solutions) / same volume of acid (if doing neutralisation) same temperature ;

measurement
count bubbles (in a certain time) / time for marble chip to disappear / time for limewater to go milky / volume of gas (in a certain time) / volume of NaOH to change UI ;

conclusion
more bubbles is more concentrated / more volume of gas is more concentrated / shorter time is more concentrated / greater volume of NaOH is more concentrated ; [4]

(c) (i) use of barium chloride and silver nitrate separately ;
barium chloride no ppt. ;
silver nitrate white ppt. ; [3]

(ii) hydrochloric
AND
chloride (identified) / white ppt. with silver nitrate ; [1]

(d) time too long for Mg to disappear / reaction too slow / metal in (vast) excess / not enough acid present / Mg would not react ; [1]

[Total: 15]

3 (a) (i) *p* value for d = 5.0 recorded ; [1]

(ii) all values of *p* recorded and at least one to 0.1 cm ;
values of *p* increasing ; [2]

(b) all recorded *x* values correct ;
all recorded *y* values correct ; [2]

(c) (i) axes labelled with units ;
suitable choice of scales (⩾ ½ the grid used) ;
at least 4 points plotted correctly to ½ small square ;
good best-fit straight line judgement ; [4]

IF plot d can only get M4

(ii) indication on graph of how data were obtained **AND** more than half the line used ;
calculation correct ; [2]

(d) *mass* present to 2 / 3 significant figures with correct rounding ; [1]

(e) m_1 present to the nearest gram [1]

(f) **any two from**:

difficulty in obtaining balance ;
centre of mass of rule not at the 50.0 cm mark ;
load **L** not uniform ;
difficulty in placing the centre of **L** over the mark on the rule ;
difficulty in taking reading above fulcrum ; max. [2]

[Total: 15]