Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/61**

Paper 6 Alternative to Practical **May/June 2016**

MARK SCHEME

Maximum Mark: 60

Published

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

(b) 6.8 ; 0.5 ; [2]

(c) both axes labelled at least one with units ;
linear scale covering >1 / 2 paper ;
at least 4 plots correct ± half square ;
best fit line ; [4]

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

(e) keeps volume in each beaker constant / show that the water of enzyme solution does not have an effect / no effect without enzyme ; [1]

[Total: 10]

2 **(a)** **(i)** 124 ; [1]

(ii) C is 2.00 mol dm^{-3}
D is 0.50 mol dm^{-3}
E is 1.00 mol dm^{-3} ;; [2]

one correct = 1 mark, three correct = 2 marks

(b) add marble chip / add UI / add Mg ;

(marble chips or magnesium) count bubbles / collect gas / measure volume of gas ;
in a certain time ;
OR
(for marble chips) time ;
for limewater to go milky ;
OR
add NaOH from measuring cylinder / burette ;
until UI just green ;

the more bubbles or gas the more concentrated / the shorter the time (for limewater) the more concentrated / the more NaOH the more concentrated ;

equal volumes of the acids (in test–tubes) ; [5]

(c) (acidified) silver nitrate / $AgNO_3$ AND white ppt. ; [1]

(d) too long for magnesium to disappear / reaction too slow ; [1]

[Total: 10]

3 **(a)** p = 29.5 cm ; [1]

(b) x values correct (e.c.f. p)
24.5 ecf**,** (21.8), **19.1, 16.4, 13.6** ;

y values correct
20.5 ecf**,** (18.2), **15.9, 13.6, 11.4** ; [2]

(c) **(i)** suitable choice of scales ⩾ ½ the grid (can plot the 5 points) used AND linear ;
minimum 4 plots correct to ½ small square on easy to read scale ;
good best fit straight line judgement ; [3]

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

(d) m correct to 2 / 3 significant figures ; [1]

(e) **Any one from:**

difficulty in obtaining balance ;
centre of mass of rule not at the 50.0 cm mark ;
load not uniform ;
difficulty in placing the centre of load over the mark on the rule ; [1]

[Total: 10]

4 **(a)** placed in the dark ;
at least 24 hours ; [2]

(b) **(i)** potassium hydroxide / sodium hydroxide / soda lime ; [1]

(ii) any in the same state as **(i)** that does not absorb CO_2 ; [1]

(c) **(i)** iodine solution ;
boiling / hot water ;
hot alcohol / ethanol ;
rinse with water ;
(safety) water bath / not naked flame ; [max 4]

(ii) G is blue-black AND F is brown / orange ;
(because) G can photosynthesise and F cannot (photosynthesise) ;

OR

F is brown no photosynthesis ;
G is blue-black can photosynthesise ; [2]

[Total: 10]

5 **(a)** **(i)** limewater ;
white ppt. ; [2]

(ii) diagram showing filter funnel and paper ;
two relevant labels ; [2]

(iii) blue ppt. AND blue ppt. ;
(deep) blue solution ; blue ppt. ; [3]

(b) copper carbonate / $CuCO_3$; [1]

(c) use of (acidified aqueous) barium chloride / barium nitrate ;
white ppt. etc. ; [2]

[Total: 10]

6 **(a)** **(i)** 112 ; [1]

(ii) correct symbol for ammeter and voltmeter ;
ammeter in series and voltmeter in parallel ;
correct symbols for lamp and switch in series ;
workable circuit (no short circuits, no gaps) ; [4]

(iii) 54 and 21 ;
33 (ecf) ; [2]

(iv) 112 (ecf) × 33 (ecf) × 4.2 / 1000 = 15.5 / 16 ; [1]

(b) air / surroundings ;
wires / leads / (heater) casing / circuit ;
AVP e.g. heat transferred to: beaker / used in evaporation ; [max 2]

[Total: 10]