



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

0653/61

Paper 6 Alternative to Practical

May/June 2016

MARK SCHEME

Maximum Mark: 60

Published

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- 1 (a) time/minutes ;
volume/cm³ ; [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 \pm 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 / AgNO₃ AND white ppt. ; [1]
- (d) too long for magnesium to disappear / reaction too slow ; [1]

[Total: 10]

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3 (a) $p = 29.5 \text{ cm}$; [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 $\geq \frac{1}{2}$ the grid (can plot the 5 points) used AND linear ;
minimum 4 plots correct to $\frac{1}{2}$ 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]

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- 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) $112 \text{ (ecf)} \times 33 \text{ (ecf)} \times 4.2 / 1000 = 15.5 / 16$; [1]
- (b) air / surroundings ;
wires / leads / (heater) casing / circuit ;
AVP e.g. heat transferred to: beaker / used in evaporation ; [max 2]
- [Total: 10]**