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**COMBINED SCIENCE**

**0653/61**

Paper 6 Alternative to Practical

**May/June 2016**

MARK SCHEME

Maximum Mark: 60

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**Published**

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- 1 (a) time/minutes ;  
volume/cm<sup>3</sup> ; [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<sup>-3</sup>  
D is 0.50 mol dm<sup>-3</sup>  
E is 1.00 mol dm<sup>-3</sup>;; [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<sub>3</sub> 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  $\text{CO}_2$  ; [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]**

Page 4	Mark Scheme	Syllabus	Paper
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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 /  $\text{CuCO}_3$  ; [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]**