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**CO-ORDINATED SCIENCES**

**0654/63**

Paper 6 Alternative to Practical

**May/June 2016**

MARK SCHEME

Maximum Mark: 60

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**Published**

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- 1 (a) incisor (front) ;  
molar (back) ; [2]
- (b) (i) dissolve sample of plaque in distilled water ;  
use of full range indicator/pH meter ; [2]
- (ii) below 7 ; [1]
- (iii) acid produced by bacteria/sugar forms acid ; [1]
- (c) 2 groups – brushing twice and brushing three times ;  
over several days/weeks ;  
compare/measure amount of staining ;  
less staining means less plaque ;  
swap groups over as a control ; [max 4]

**[Total: 10]**

- 2 (a) (i) salt **C** label pointing to residue in filter paper  
**AND**  
salt **B** label pointing to filtrate in beaker ; [1]
- (ii) correct residue label  
**AND**  
correct filtrate label ; [1]

(b) (i)

	conclusion
<i>(add HCl)</i>	not carbonate/ not $\text{CO}_3^{2-}$ ;
<i>(add HCl + BaCl)</i>	sulfate/ $\text{SO}_4^{2-}$ ;
<i>(add NaOH)</i>	copper(II)/ $\text{Cu}^{2+}$ ;

[3]

- (ii) copper(II) sulfate ; [1]

- (c) (i) limewater goes milky/ white ppt. ; [1]
- (ii) white ppt. ;  
ppt. dissolves ; [2]
- (iii)  $\text{ZnCO}_3$  ; [1]

**[Total: 10]**

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- 3 (a) 0.19 (V) ; [1]
- (b) *R* values correct (should be: 0.79, 2.42, 4.00) ;  
consistent significant figures ; [2]
- (c) axes labelled with units ;  
suitable choice of scales ( $\geq \frac{1}{2}$  the grid used) ;  
plots correct to  $\frac{1}{2}$  small square ;  
good best-fit line judgement ; [4]
- (d) directly proportional ;  
straight line through the origin ; [2]
- (e) switch off between readings / fan the wire / resistor in series with the wire ; [max 1]
- [Total: 10]**
- 4 (a) good size drawing with clear lines ;  
correct shape ; [2]
- (b) (i) correct measurement (34 mm) ; [1]
- (ii) correct measurement (from their drawing) ; [1]
- (iii) correct calculation ; [1]
- (c) (i) 3 correct labels ;;; [3]
- (ii) (agree)  
cell wall and nucleus = 1 mark ;  
*any one from:* starch grain / vacuole / chloroplast ; [max 2]
- [Total: 10]**
- 5 (a) (i) 71.8 ;  
79.6 ; [2]
- (ii) 20.3 ;  
28.1 ; [2]
- (iii) 48 ; [1]
- (iv) not all iron reacted / not hot enough ; etc. [1]
- (b) chlorine / gas is toxic ; [1]

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- (c) use of sodium hydroxide ;  
 mention of dissolving, water, solution or aqueous ;  
 iron(II) green ppt. **AND** iron(III) brown ppt.; [3]

**[Total: 10]**

- 6 (a) (i) 118 ; [1]

- (ii) 83 (only) ; [1]

- (iii) max use of paper e.g. vertical axis starts at 30 ;  
 correct plotting ;  
 smooth curves ;  
 (at least) one curve labelled ; [4]

- (iv) (*similar*) both start at same temp/ both go down, etc. ;  
 (*different*) go down at different rates/ end at different temps, etc. ; [2]

- (b) result at 8 mins is wrong/ anomalous ; [1]

- (c) e.g. pour same volume of water into each container ;  
**or** record initial temperatures in the beakers ; [max 1]

**[Total: 10]**