

**MARK SCHEME for the October/November 2011 question paper  
for the guidance of teachers**

**0653 COMBINED SCIENCE**

**0653/52**

Paper 5 (Practical), maximum raw mark 30

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 must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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- 1 (a) (i) 1 reading of time in seconds only ;  
all 3 readings of time ;  
the 3 readings become shorter in time ; [3]
- (ii) 1000, 500, 250 ; [1]
- (iii) 0.6, 0.8, 1.0 **OR** 0.6:1, 0.8:1, 1.0:1 ; [1]
- (iv) diffusion ;  
(acid) neutralising (the alkali) ; [2]
- (v) time decreases with decrease in volume/rate increases with decrease in volume **OR** reverse argument ;  
due to larger surface area : volume ratio ;  
faster diffusion ;  
shorter diffusion distance ; [max 2]
- (b) judgment of end point ;  
inaccuracy of cutting ;  
temperature not controlled ;  
soft agar splitting and so increasing surface area ; [max 1]

[Total: 10]

- 2 (a) *observation*: (red) litmus goes blue ; [1]  
*conclusion*: ammonia gas/alkaline gas/NH<sub>3</sub>/ammonium/NH<sub>4</sub><sup>+</sup> (tied to observation) ; [1]
- (b) (i) *observation*: white ppt./ppt. dissolves in excess ; [1]  
*conclusion*: zinc/Zn<sup>2+</sup> (tied to white ppt.) do **not** allow **Zn only** ; [1]
- (ii) *observation*: white ppt. ; [1]  
*conclusion*: sulfate/SO<sub>4</sub><sup>2-</sup> (tied to observation) ; [1]
- (iii) *observation*: white ppt. ; [1]  
*conclusion*: chloride/Cl<sup>-</sup> (tied to observation) ; [1]
- (c) zinc chloride/ZnCl<sub>2</sub> ;  
ammonium sulfate / (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> ;  
**OR**  
zinc sulfate/ZnSO<sub>4</sub> ;  
ammonium chloride/NH<sub>4</sub>Cl ; [max 2]  
(allow a **correct cation AND correct anion** for 1 mark e.g. zinc/Zn<sup>2+</sup> and chloride/Cl<sup>-</sup>)

[Total: 10]

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
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- 3 (a)  $d$  in mm ;  
 $d$  for  $20^\circ$  ;  
 $d$  for  $20^\circ$  and one other angle ;  
all readings of  $d$  ;  
 $d$  increasing as  $i$  increases (allow only if 4 or 5 readings) ; [5]
- (b) (i) 4 points plotted to within  $\frac{1}{2}$  a square ;  
appropriate curve (probably curve at start and straight line at higher values of  $i$ ) ; (allow double curve if spread of points is great enough) [2]
- (iii) appropriate extrapolation (do not allow extrapolation of a straight line or zig zag line) ;  
correct reading of  $d_{90}$  from attempted extrapolation of graph (allow reading of an extrapolation off the grid if done accurately) ; [2]
- (c) visual lining up of pins (not parallax error) ;  
error in extrapolation of graph ;  
placing block accurately within lines on paper ;  
 $80^\circ$  hard to see/owtte ; [max 1]

[Total: 10]