MARK SCHEME for the October/November 2011 question paper

for the guidance of teachers

0654 CO-ORDINATED SCIENCES

0654/52   Paper 5 (Practical), maximum raw mark 45

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.

Cambridge is publishing the mark schemes for the October/November 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 (a) (i) 1 reading of time in seconds <u>only</u> ;
            all 3 readings of time ;
            the 3 readings become shorter in time ;

       (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 to volume ratio ;
            faster diffusion ;
            shorter diffusion distance ;   [max 2]

   (b) large surface area to volume ratio / larger surface area gives better absorption ;
        short diffusion path / blood capillaries close to surface ;
        circulating blood ;
        diffusion gradient / blood capillaries carry away absorbed food ;   [max 3]

   (c) range of concentrations ;
        same surface area of block ;
        time taken for block to clear / temperature controlled / repeats / rate = 1 / time ;   [3]

                                                                                 [Total: 15]

2 (a) *observation:* (red) litmus goes blue ;   [1]
        conclusion: ammonia gas / alkaline gas (tied to observation) ;
                     ammonium / NH_4^+ (tied to observation) ;   [2]

   (b) (i) *observation:* white ppt. ;
                          ppt dissolves in excess ;   [2]
             conclusion: zinc / Zn^{2+} (tied to white ppt) do **not** allow **Zn only** ;   [1]

       (ii) *observation:* white ppt. (which re-dissolves) ;   [1]

       (iii) *observation:* no reaction ;   [1]
              conclusion: not carbonate / not CO_3^{2-} (tied to observation) ;   [1]

       (iv) *observation:* white ppt. ;   [1]
             conclusion: sulfate / SO_4^{2-} (tied to observation) ;   [1]

       (v) *observation:* white ppt. ;   [1]
            conclusion: chloride / Cl^- (tied to observation) ;   [1]

(c) zinc chloride / $ZnCl_2$;
ammonium sulfate / $(NH_4)_2SO_4$;
OR
zinc sulfate / $ZnSO_4$;
ammonium chloride / NH_4Cl ; [max 2]

(allow a **correct cation AND correct anion** for 1 mark e.g. zinc / Zn^{2+} and chloride / Cl^-)

[Total: 15]

3 (a) *d* in mm ;
d for 20° ;
d for 20° and one other angle ;
all readings of *d* ;
d increasing as *i* increases (allow only if 4 or 5 readings) ; [5]

(b) (i) axes labelled with physical quantity and units ; (*i* must be horizontal, no mark if vertical)
4 points plotted to within ½ a square ;
appropriate curve (probably curve at start and straight line at higher values of *i*) ; [3]
(allow double curve if spread of points is great enough)

(ii) curve / not a straight line ; [1]

(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]

(iv) width of block (see Supervisor's Report value as guide) ; [1]

(v) correct calculation (ignore decimal point, allow e.c.f. from above and allow answers >100 %) ; [1]

(c) (i) visual lining up of pins (not parallax error) ;
error in extrapolation of graph ;
placing block accurately within lines on paper ;
80° hard to see / owtte ; [max 1]

(ii) use 3 pins instead of 2 / use a ray box ;
do more high values of angle *i* / reduce 80° reading to 75° ;
using pins to keep block within lines on paper ; [max 1]

[Total: 15]