MARK SCHEME for the October/November 2011 question paper

for the guidance of teachers

0653 COMBINED SCIENCES

0653/51 Paper 5 (Practical Test), maximum raw mark 30

1 (a) (i) splint relights / splint glows brighter ;
oxygen / O_2 ;
(the second mark is tied to a correct observation being given)   [2]

(ii) 3 reasonably similar readings for fresh yeast **B**, **C** and **D** ;
clearly in seconds ;   [2]

(iii) correct value for (**B** + **C** + **D**) ÷ 3 to a minimum of 1 decimal place unless it is
exactly a whole number ;   [1]

(b) (i) 'no reaction' recorded for **E** in Table 1.1 ;   [1]

(ii) fresh yeast faster reaction / fresh yeast worked (or reverse statement) ;
enzymes (or yeast) denatured (killed / destroyed / made inactive) by boiling ;   [2]

(c) (i) *yes*: similar readings ;
OR
no: different values / too few repeats / difficult to time end point (if this
response is seen here it cannot be credited in **(c) (ii)** as well) / loss of yeast
down side of tube ;
[max 1]

(ii) uneven concentration of yeast ;
timing error ;
judgement of foam reaching the line ;
not all yeast reaches the peroxide ;
detergent not controlled ;
concentration of hydrogen peroxide ;
accuracy of measuring (must be accompanied by reference to scale) ;   [max 1]

[Total: 10]

2 (a)

compound changes	name and formula	time / s	colour
A	zinc carbonate, $ZnCO_3$	e.g. 31	yellow (when hot)
B	magnesium carbonate, $MgCO_3$	e.g. 21	(remains) white
C	unknown metal carbonate, **X**CO_3	e.g. 28	(green to) black

(ii) **A**: a value of time (in seconds) **AND** yellow / yellow when hot (ignore
references to the limewater) ;   [1]

(iii) **B**: a value of time **AND** white / no change / same (ignore references to the
limewater) ;
C: a value of time **AND** black (ignore references to the limewater) ;   [2]

    (iv) 1 (fastest)   = one with shortest time
            2   = one with intermediate time
            3 (slowest)   = one with longest time ;   [1]
            (note: this must be consistent with candidates' results)

    (v) carbon dioxide/CO_2 ;   [1]

(b) (i) blue ppt./grey-blue ppt./green-blue ppt. ;   [1]

    (ii) brown/black solid **OR** zinc turns brown/black ;
            bubbles/effervescence/colourless solution/solution less blue/gets hot ;   [2]

    (iii) **X** = copper/Cu ; (note: do **not** allow copper(II)/Cu^{2+})   [1]

            evidence 1 and **evidence 2:**
            <u>any two for one mark</u>
                blue ppt. with NaOH (in **(c)(ii)**) **and**/**or** blue solution in **(c)** ;
                copper carbonate is green ;
                copper oxide is black ;
                brown solid (in **(c)(ii)**) ;
                displacement by zinc gives brown solid ;
                X is brown ;
                X does not react with acid ;   [max 1]

                                              [Total: 10]

3 (a) any five readings (allow full reading from clock) ;
      any complete column of readings (allow full reading from clock) ;
      all 15 readings entered (allow full reading from clock) ;
      average of readings increasing from θ = 10° to 30° ;
      all readings recorded to 0.1 s ;   [5]

  (b) (i) all 3 averages correctly calculated to at least 1 decimal place ;   [1]

    (ii) all 3 **T** values calculated correctly to at least 1 decimal place (average ÷ 10) ;   [1]

  (c) use of **l** = 0.30 m ;
      correct calculation of **g** to at least 1 decimal place using correct **T** from table
      which must be squared ;   [2]

  (d) any errors are reduced (divided by ten)/reduced effect of timing error ;   [1]

                                              [Total: 10]