

**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

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.

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- 1 (a) (i) splint relights/splint glows brighter ;
oxygen/O₂ ; [2]
(the second mark is tied to a correct observation being given)
- (ii) 3 reasonably similar readings for fresh yeast **B**, **C** and **D** ;
clearly in seconds ; [2]
- (iii) correct value for $(\mathbf{B} + \mathbf{C} + \mathbf{D}) \div 3$ 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, XCO 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]

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- (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/CO₂ ; [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)/Cu²⁺) [1]

evidence 1 and evidence 2:
any two for one mark

- 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 $\theta = 10^\circ$ 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 $\div 10$) ; [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]