

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0654 CO-ORDINATED SCIENCES

0654/53

Paper 5 (Practical), maximum raw mark 45

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- 1 (a) (first column heading is) time (in) minutes ;
(subsequent column headings are) beaker **A** temperature °C **and** beaker **B** temperature °C, can be in any order ; [2]
- (b) two temperature recorded for time = 0 to 0.5 °C ;
time = 0 readings within 5 °C of each other ;
full set of results for beaker **A and** beaker **B** ;
both sets decrease in temperature ;
temperature at time = 10 is lower in beaker **B** ; [5]
- (c) linear scale for temperature axis such that plotting uses half of grid ;
at least 5 points plotted correctly for either **A or B** ;
two smooth best-fit curves ; [3]
- (d) test-tubes **A** cooled more slowly / retained heat / ORA ;
prevents penguins getting too cold / helps body temperature to be maintained /
less heat loss / less surface area exposed / ORA ; [2]
- (e) (i) different start temperatures / can't read both thermometers at the same
time / stirring water to ensure same temperature throughout / different
thickness of test-tube / temperature recorded from only one of three in **A** ; [max 1]
(*any reasonable inaccuracy*)
- (ii) do each set separately / record temperature of all three test-tubes in **A** ; [1]
- (f) repeat the experiment **AND** some explanation ; [1]
- [Total: 15]**
- 2 (a) T_1 recorded in correct box for experiment **1** ;
 T_2 recorded in correct box for experiment **1** ;
solution less blue / grey / colourless ;
solid brown / darker grey / black ; [4]
- (b) (i) blue ppt. ; [1]
- (ii) T_1 and T_2 recorded in correct boxes for experiment **2 AND** T_2 lower than
value in experiment **1** ; [1]
- (c) T_1 and T_2 recorded in correct box for experiment **3 AND** T_2 lower than value in
experiment **2** ;
all temperatures in table recorded to same accuracy ; [2]

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- (d) (i) ΔT values correct ;
 ΔT values decrease down the table ; [2]
*(second mark may be awarded if ΔT values have **not** been entered in Table 2.1)*
- (ii) ΔT decreases with increasing volume of solution **X** ; [1]
- (iii) sodium hydroxide/NaOH/other reasonable hydroxide ; [1]
(not ammonia solution)
- (iv) **X** reacts with copper sulfate solution ; [2]
less copper sulfate to react with zinc and produce heat ;
- (e) to keep the volume of liquid constant/for fair comparison of ΔT /because a larger volume would reduce the temperature ; [1]

[Total: 15]

- 3 (a) (i) H recorded to nearest 0.1 cm ; [2]
 $H = 1.5 \pm 0.1$ cm ;
- (ii) for $d = 55$ cm, value of h recorded ; [1]
- (iii) all values of h recorded ;
values of h increasing ;
when $d = 35$ cm, h between 2.1 cm and 3.1 cm ; [3]
- (iv) edges of shadow not distinct/ h varies ; [1]
- (b) axes labelled with units ;
at least four plots correct to half a small square ;
good best-fit curve judgement ; [3]
- (c) (i) value correctly read from candidate's graph to half a small square ; [1]
- (ii) H calculation correct ; *(ecf from (c)(i))*
 $H = 1.5 \pm 0.2$ cm ; [2]
(accuracy mark so corrected as necessary)
- (iii) correct value from sensible extrapolation to half a small square ; [1]
- (d) shadow would become too big to fit on the screen/shadow becomes more blurred/hard to see shadow ; [max 1]

[Total: 15]