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

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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]

(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 ;
less copper sulfate to react with zinc and produce heat ; [2]

(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 ;
H = 1.5 ± 0.1 cm ; [2]

(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 ± 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]