CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary Level

MARK SCHEME for the October/November 2015 series

8780 PHYSICAL SCIENCE

8780/04 Paper 4 (Advanced Practical Skills), 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.

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

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

CAMBRIDGE
International Examinations

1 (a) supervisor's result ± 1 mm **and** recorded to 1 decimal place [1] **[1]**

(b) (i) evidence that the sand level **and** the reading on metre rule of bottom of the ball are taken **and** h = 65.0 cm – depth of sand cm [1] **[1]**

(v) three total readings recorded **and** average calculated correctly [1] **[1]**

(c) *height:*
(*h)* between 25(cm) and 35 (cm) **and** *x average* is smaller than in **(b)(v)** (and > *d*) [1]

quality:
both sets of results within a range ± 0.5 cm [1] **[2]**

(d) (i) idea of use of set square / use of horizontal edge / use of a perpendicular edge [1] **[1]**

(ii) idea of use of splints or very close to sand

OR
idea of multiple measurements of diameter from a single drop **and** take average [1] **[1]**

(e) (i) *inclusive range:* [1] **[1]**
(±) 0.2 to 0.5 (cm)

(ii) (±) 0.3 (cm) [1] **[1]**

(iii) (±) value in **(e)(ii)** divided by value for either y_1 *or* $y_2 \times 100$ *or divided by average of* y_1 *and* $y_2 \times 100$ **and** correct calculation [1] **[1]**

(f) calculation of one value of K from values of y and h [1]

calculation of a second value of K [1]

sensible attempt to use absolute uncertainty in either K value [1]

suitable conclusion (comparing the two experiments) using (uncertainty) values i.e. two K values overlap [1] **[4]**

Alternative method:

calculation of one value of K from values of y and h (1)

substitution of K to find y_2 **OR** $[y_2]^2$ **OR** h_2 (1)

sensible attempt to use absolute uncertainty in either y or h (1)

suitable conclusion (comparing the two experiments) using (uncertainty) values i.e. two K values overlap (1)

(g) take more sets of readings **and** calculate or compare K (for each)

OR
plot a graph of y^2 against h [1] **[1]**

2 (a) (ii) suitable table with correct headings and units with headings [1]

12 sets of results with approximately even spacing between volumes [1]

appropriate precision and consistency in readings [1] **[3]**

(b) (i) sensible linear scales on BOTH axes **and** at least half grid used **and** axes labelled [1]

correct plotting [1]

two (intersecting) curves of best fit [1] **[3]**

(ii) reading of volume from graph intersection [1]

reading of temperature from graph intersection <u>minus</u> the starting temperature [1] **[2]**

(iii) (correct calculation of concentration of sulfuric acid) ratio of 25 cm^3 divided by volume of H_2SO_4 from graph [1] **[1]**

(c)	**(i)**	use of correct combined mass and correct temperature	[1]	
		correct calculation of q	[1]	**[2]**
	(ii)	number of moles of NaOH or sulfuric acid	[1]	
		correct calculation of energy change for 1 mol	[1]	**[2]**
(d)	**(i)**	inaccurate volume measurement of sodium hydroxide / energy transferred to the surroundings	[1]	**[1]**
(ii),(iii)		correct suggestion for effect on ΔT **OR** correct suggestion for effect on ΔH_N	[1]	**[1]**