## **CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Subsidiary and Advanced Level

## MARK SCHEME for the October/November 2014 series

## 9702 PHYSICS

9702/34

Paper 3 (Advanced Practical Skills 2), maximum raw mark 40

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 2014 series for most Cambridge IGCSE<sup>®</sup>, Cambridge International A and AS Level components and some Cambridge O Level components.



age z	wark Scheme	Syllabus	Paper
	Cambridge International AS/A Level – October/November 2014	9702	34
(b) (	ii) Value for <i>p</i> in range 4.0 to 5.0 cm.		[1]
(c) (i	ii) Value for $q$ greater than $p$ .		[1]
	Six sets of values for $p$ and $q$ scores 5 marks, five sets scores 4 marks incorrect trend $-1$ . Help from Supervisor $-1$ .	etc.	[5]
	Range: b values must include 3.0 cm or less and 5.0 cm or more.		[1]
	Column headings: Each column heading must contain a quantity and a unit where approprunits should be shown using accepted scientific convention e.g. $1/p/cr$ $1/p$ (1/cm), and $q/p$ must have no unit.		[1]
	Consistency: All values of $\it p$ and $\it q$ must be given to the nearest mm.		[1]
	Significant figures: Every value of $1/p$ must be given to the same s.f. as (or one more than in the corresponding $p$ .	) the s.f.	[1]
	Calculation: 1 <i>/p</i> calculated correctly.		[1]
(e)	(i) Axes: Sensible scales must be used, no awkward scales (e.g. 3:10). Scales must be chosen so that the plotted points occupy at least ha graph grid in both <i>x</i> and <i>y</i> directions. Scales must be labelled with the quantity that is being plotted. Scale markings must be no more than three large squares apart.	alf the	[1]
	Plotting: All observations in the table must be plotted on the grid. Diameter of plotted points must be $\leq$ half a small square (no "blobs Plotted points must be accurate to within half a small square.	").	[1]
	<ul> <li>Line of best fit:         Judge by the balance of all points on the grid about the candidate's least 5 points).     </li> <li>There must be an even distribution of points either side of the line a full length.         Allow one anomalous plot only if clearly indicated by the candidate circled or labelled).         Line must not be kinked or thicker than half a small square.     </li> </ul>	along the	[1]

Mark Scheme

**Syllabus** 

**Paper** 

Page 2

1

Pa	age :	3	Mark Scheme Syl	labus	Paper
		(	Cambridge International AS/A Level – October/November 2014 9	702	34
	(iii) Gradient: The hypotenuse must be greater than half the length of the drawn line. Both read-offs must be accurate to half a small square in both x and y directions.			[1]	
			y-intercept: Either: Read-off from a point on the line substituted into $y = mx + c$ . Read-off not be accurate to half a small square in both $x$ and $y$ directions. Or: Correct read-off of the intercept directly from the graph.	nust	[1]
	(f)	a =	gradient/(1 – intercept) and $b = intercept$ .		[1]
		Cor	rrect and consistent units for a (e.g. cm) and no unit for b.		[1]
		Qua	ality: Value for <i>b</i> in range 1.40 to 1.55.		[1]
					[Total: 20]
2	(a)	(i)	Raw value(s) for <i>d</i> to nearest 0.01 cm or 0.001 cm and in range 0.5 to 1	.5 cm.	[1]
		(ii)	Value for x in range 2.2 to 2.8 cm.		[1]
		(iii)	Raw value(s) of <i>l</i> to nearest mm or better.		[1]
	(b)	2 to	imate of percentage uncertainty based on an absolute uncertainty of 5 mm and method of calculation correct. epeated readings have been taken, then uncertainty can be half the rang zero) if the working is clearly shown.	e (but	[1]
	(c)	Cor	rect calculation of A with consistent unit.		[1]
	(d)	(v)	Value for <i>n</i> . Evidence of repeat measurements of <i>n</i> .		[1] [1]
	(e)	Sec	cond values of <i>x</i> and <i>l</i> .		[1]
		Qua	ality: <i>n</i> increases as <i>l</i> increases.		[1]
	(f)	(i)	Correct calculation of two values of <i>k</i> .		[1]
		(ii)	Justification based on the s.f. in $x$ , $d$ and $l$ . Ignore any reference to $n$ or	А.	[1]
		(iii)	Valid comment consistent with the calculated values of $k$ , testing agains stated criterion e.g. "The calculated percentage difference between $k$ valid is less than the percentage uncertainty in <b>(b)</b> , so the relationship is valid	alues	[1]

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge International AS/A Level – October/November 2014	9702	34

(g)	Limitations (4 max.)	Improvements (4 max.)	Do not credit
A	Two readings are not enough to draw a valid <u>conclusion</u>	Take many A values and plot a graph/take more readings and compare k values/repeat readings and plot graph	Repeat/too few readings
В	Difficult to measure because hard to judge where parallel section of pencil starts/to judge where to measure from	Use a flat-ended rod	
С	Pencil not vertical	Use guides	
D	Difficult to keep drop height constant/drop height not constant	Use a stop with detail/use a fixed ruler behind strip/use pointer with detail e.g. pointer mounted in a stand	Difficult to release strip without a force/use fiducial marker
Е	Difficult to judge when mark reaches surface because rice surface uneven	Use ring of card resting on rice around pencil/measure change in height of pencil	Rice spills out of container during experiment
F	Difficult to judge if strip is horizontal/strip may not be horizontal/strip is not horizontal	Measure (or compare) height at each end/use spirit level	
G	Conical section of pencil not taken into account		

[Total: 20]