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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2010 question paper for the guidance of teachers

9702 PHYSICS

9702/32

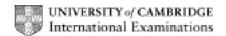
Paper 32 (Advanced Practical Skills), maximum raw mark 40

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 must be read in conjunction with the question papers and the report on the examination.

• CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



Page 2		Mark Scheme: Teachers' versi GCE AS/A LEVEL – May/June 2		Syllabus 9702	Paper 32
(b)	Six	ets of values for N and I scores 5 marks, five		1	[5]
(2)		Incorrect trend –1.			[0]
		Apparatus set up correctly without help from supervisor. Minor help -1 , major help -2			[2]
		Range – To include $N = 1$ or 2 and $N = 11$ or 12.			[1]
	Column headings – Each column heading must contain a quantity and a unit where appropriate. Ignore units in the body of the table. There must be some distinguishing mark between the quantity and the unit				[1]
	`	dus is expected, but accept, for example, I (A))		
		Consistency of presentation of raw readings of I – All raw values of I must be given to the same number of decimal places.			[1]
	Significant figures – S.f. for $1/I$ must be the same as, or one more than, the s.f. for I . Check each row.			[1]	
	Values of $1/I$ correct – Underline and check the specified value of $1/I$. If incorrect, write in the correct value.				[1]
(c)		Graph			[4]
		Axes – Sensible scales must be used. Awkward scale Scales must be chosen so that the plotted po both x and y directions. Indicate false origin wi Scales must be labelled with the quantity that Allow inverted axes but do not allow the wrong Scale markings should be no more than three	oints occupy at ith FO. is being plotted. g graph.	least half the	graph grid in
		Plots – All observations must be plotted. Write a ringe Do not accept blobs (points > half a small squa Ring and check a suspect plot. Tick if correct. Work to an accuracy of half a small square.	are).	•	[1]
	` ,	Line of best fit – Judge by the balance of at least 5 trend plots a There must be an even distribution of point ength. Indicate best line if candidate's line is r Line must not be kinked or thicker than 1 mm.	s either side on the best line.	f the line alo	[1] ng the whole
		Quality – Judge by scatter of all points about a straight I All plots in the table must be within 10 Ω of a solon or award if wrong graph or wrong trend.			[1]

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Page 3				Syllabus	Paper			
			GCE A	S/A LEVEL	May/June	2010	9702	32
	(iii)	Both revalue. Check to y-intercent Either for the second s	potenuse of the potential	t be accurate do not allov by substitut	e to half a so $\Delta x/\Delta y$).	mall square.	ength of the drawn of the draw	
(0	Check for and label false origin.(d) G = gradient value and H = intercept value.Do not credit if a substitution method is used.					[1]		
				$\leq H \leq -30 \Omega$ ution method		≤ G ≤ 5.5 V)	with appropriate	units. [1]
								[Total: 20]
2 (l	b) (i)			force to 1 d.p ed measurem		•	than 0 N.	[1] [1]
	(ii)	Reache	es maximum	force sudder	nly (short tim	e); no notice	given when relea	ases. [1]
	(iii)	0.1N ≤	$\Delta F \leq 0.4 \text{ N}$	inty in maxin . If repeated ect ratio idea	readings ha		e then the uncer 00%).	[1] tainty could be
(0	c) (i)	Measur	rement of rav	v t to the nea	rest 0.01 mr	n.		[1]
	(ii)	Take re	epeats <u>in diff</u> e	erent places	/ (account fo	r) zero errors	S.	[1]
	(iii)	Maximu	um force with	three slides	. Unit require	ed.		[1]
(0	́Ме	asureme		ss of one slic um force with				[1] [1] [1]
(6	e) Cal	culation	of two values	s of <i>k</i> .				[1]
				on the calcul				[1]

Page 4 Mark Scheme: Teachers' version		Syllabus	Paper
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(f)(i),(ii) Identify limitations and improvements

	Limitations (4)	Improvements (4)	Do not credit
Α	Two readings are not enough (to support conclusion	Take more (sets of) readings <u>and</u> <u>plot a graph</u>	Repeat readings.
В	Maximum force reached without warning (if not already credited in (b)(ii))	B _s Practical method of recording maximum value e.g. video with playback in slow motion / max-min newton metre / force sensor with data logger / masses with pulley.	Parallax error. Solution for parallax error. 'Use of computer' to measure maximum force.
С	t changes due to compression force of magnets / slide thickness non uniform (if not already credited) / thread thickness adds to separation.	Method of attaching newton meter without thread / measure and add thread thickness.	
D	Zero error on newton meter when used horizontally.	Adjust zero / practical vertical arrangement.	Condition of newton meter.
E	Glass may affect magnetic force / effect of surrounding magnetic materials (e.g. G clamp).	Use a variety of materials to separate magnets and test if material affects results / use a non magnetic clamp / glue first magnet to bench.	Reference to Earth's field.
F	Friction with bench.	Method of reducing friction.	
G	Difficulties with alignment of force with magnets.	Method of raising magnets / longer loop.	
X	Difficult to measure force due to weak magnets / small force (if validated by SR)	More sensitive newton meter.	

[Total: 20]