CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2013 series

9702 PHYSICS

9702/35

Paper 3 (Advanced Practical Skills 1), 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 May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.



Page	2	Mark Scheme	Syllabus	Paper
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(a) (ii	,	e of T in range $0.4 \le T \le 1.4$ s. ence of repeats.		[1] [1]
		of readings of m and t (or T) scores 5 marks, four sets so Supervisor -1 .	cores 4 marks	etc. [5]
R	Range of	$m:\Delta m \ge 0.600\mathrm{kg}$		[1]
E T c	ach col he pres onvention	neadings: umn heading must contain a quantity and a unit. entation of quantity and unit must conform to accepted son e.g. $1/T^2/s^{-2}$. low $1/T^2(s)^2$	scientific	[1]
	Consiste III values	ncy: s of raw <i>t</i> must all be given to the nearest 0.1s or 0.01s		[1]
S	Significa	Int figures: Interpreted that the state of $1/T^2$ same as or one secorded in table.	greater than	[1]
	Calculation Calues o	on: f 1/ <i>T</i> ² calculated correctly		[1]
(c) (i	Scal both Scal	s: sible scales must be used, no awkward scales (e.g. 3:10 es must be chosen so that the plotted points occupy at l x and y directions. es must be labelled with the quantity that is being plotte e markings should be no more than three large squares	least half the g	[1] raph grid in
	All o Dian	ing of points: bservations in the table must be plotted. neter of points must be ≤ half a small square (no "blobs" ఁ to an accuracy of half a small square.	').	[1]
	Qual All p point	lity: oints in the table must be plotted (at least 5) for this mast $\frac{1}{T^2}$ from a straight line.	ark to be awar	[1] ded. Scatter of
(ii	Judg Ther Allov	of best fit: ye by balance of all points on the grid about the candidate must be an even distribution of points either side of the one anomalous point only if clearly indicated (i.e. circle lidate. Line must not be kinked or thicker than half a sm	e line along th ed or labelled)	e full length.
(iii	The	lient: hypotenuse of the triangle must be at least half the leng read-offs must be accurate to half a small square in bo		

Mark Scheme

Syllabus

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	rage 3		Wark Scheme	Syllabus	гарег
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		Eithe Corr Read Or:	ercept: er: ect-read off from a point on the line and substituted into d-off must be accurate to half a small square in both x a ect read-off of the intercept directly from the graph.	•	[1]
	(d) Val	ue of	P = candidate's gradient. Value of Q = candidate's inter	cept.	[1]
	Uni	t for F	$^{ m Q}$ (kg $^{-1}$ s $^{-2}$) correct and consistent with value and Q (s $^{-2}$)		[1]
					[Total: 20]
2	(a) (i)	Valu	e of L in range $8.0 \le L \le 12.0$ cm with consistent unit to	the nearest mm	. [1]
	(ii)	If rep	plute uncertainty $1 \le \Delta L \le 3$ mm. Deated readings have been taken, then the uncertainty coect method of calculation to get percentage uncertainty.		ange. [1]
	(b) (iii)	Valu	e of raw <i>N</i> ₁ an integer.		[1]
	(c) (iii)	Valu	e of $N_2 \ge N_1$.		[1]
		Evid	ence of repeats for N_1 or N_2 either here or in (b)(iii) .		[1]
	(d) Co	rrect o	calculation of <i>F</i> .		[1]
	Sec	cond v	value of L . values of N_2 and N_1 . (average) value of N_1 > first (average) value of N_1 .		[1] [1] [1]
	(f) (i)	Two	values of <i>k</i> calculated correctly.		[1]
	(ii)	Justi	ification of s.f. in k linked to significant figures in L and (l	$V_1 - N_2$) and m .	[1]
	(iii)		sible comment relating to the calculated values of k sified by the candidate.	r, testing again	st a criterion [1]

Mark Scheme

Syllabus

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(g)

	(i) Limitations 4 max.	(ii) Improvements 4 max.	Do not credit
A	two readings not enough (to draw a conclusion)	take more readings <u>and plot a</u> <u>graph</u> /calculate more <i>k</i> values and compare	repeat readings/few readings/only one reading/take more readings and average k
В	friction at pulley	method of reducing friction of pulley with location	
С	wet string added to force/ mass of string not accounted for	waterproof/nylon/wire	
D	can only measure to nearest 0.4g/paperclip	use smaller masses e.g. half paperclips, riders, graph paper	newton meter
E	change in <i>N</i> are very small	reasoned explanation for changing length of wire	helpers parallax errors
F	copper wire is not flat/straight/exit not parallel to water level	circular wire shape	change liquid/wire

[Total: 20]