UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

9702 PHYSICS

9702/34

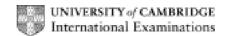
Paper 34 (Advanced Practical Skills 2), maximum raw mark 40

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 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 October/November 2009 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



	Page 2				Syllabus	Paper
			GCE A/AS LEVEL – October/November 2009 9702			
1	(b)	Valı	ue foi	V_0 in range 1.3 to 1.7V, with unit		[1]
	(c)	(ii)	First	value of V less than V_0		[1]
	(d)	No	help	from Supervisor (-1 for minor help, -2 for major help)		[2]
	(d)	Six	sets	ments table of readings of R and V scores 3 marks, five sets score end in table then -1 .	s 2 marks etc.	[3]
	(d)		ole - ra ues o	ange f R must include one of 100/220 Ω and one of 3300/4	700Ω.	[1]
	(d)	Eac The	ch col ere m	column headings umn heading must contain a quantity and a unit where ust be some distinguishing mark between the quantity nits in the body of the table. R/(1000+R) has no unit.		[1]
	(d)			onsistency of presentation of raw readings. s of raw <i>V</i> must be given to the same number of decim	nal places.	[1]
	(d)	Che	eck th	calculated values see specified value of <i>R/(1000+R)</i> is calculated correctly ct, write in the correct value. Ignore rounding errors.		[1]
	(d)	Table - significant figures S.f. for 1/V must be the same as, or one more than, s.f. for raw V. Check each row in the table.				[1]
	(e)	(i)	Sensallov the g	sible scales must be used. Awkward scales (e.g. 3:10) wed. Scales must be chosen so that the plotted points graph grid in both <i>x</i> and <i>y</i> directions. Scales must be lated. Ignore units. Allow inverted axes, –1 wrong quantiting squares between scale markings.	occupy at least habelled with the q	uantity
			All o	ph) Plotting – bservations must be plotted. Ring and check a suspect if correct. Re-plot if incorrect. Plots should be no more ect position in x or y direction. Diameter must be less thare.	than 1/2 a small s	
	(e)	(ii)	At le	ph) Line of best fit – east 5 trend plots are needed. ge by scatter of points about the candidate's line. There ter of points either side of the line. Indicate best line if o t the best line. If trend curved allow a smooth drawn o	candidate's line	[1] line.
			All ta	ph) Quality of results – able points must be plotted (minimum of 5 needed). Julots which must be within \pm 0.02 V $^{-1}$ of assessors line		[1]

		GCE A/AS LEVEL – October/November 2009	9702	34
(e	e) (iii)	Gradient – The hypotenuse of the Δ must be at least half the length of Both read-offs must be accurate to half a small square. Ch Check sign is consistent with trend.	[1]	
(e	e) (iii)	Intercept – Correctly read-off from graph (indicate a false origin) or the method of calculation is correct (check substitution of point on line).		
(f)) M	lethod of calculation of <i>P</i> is correct with gradient and intercept	t values used.	[1]
(f)		alue for P in range 630 to 730Ω, with unit. ubstitution loses both marks.		[1]
				[Total: 20]
2 (c	;) (i)	Value of $l < 25$ cm, with unit.		[1]
(c	;) (i)	l to nearest mm.		[1]
(c	;) (iii)	Evidence of repeated measurements of h_{final}		[1]
(c	;) (iii)	Value of h_{final} in range 5.0 to 50.0 cm.		[1]
(d	lf ab	Percentage uncertainty in h_{final} , repeated readings have been done then the uncertainty could bsolute uncertainty must be in range 2 mm to 20 mm. Forrect ratio idea required.	d be half the ranલ	[1] ge, otherwise
(е	e) E	to no more than 3 s.f.		[1]
(e	e) Va	alue for E_p consistent with unit.		[1]
(f)) S	econd value of $\it l$ greater than first value.		[1]
(f)) Se	econd value of h_{final}		[1]
(f)) Se	econd value of h_{final} shows correct trend (i.e. $l\uparrow h\uparrow$ or $l\downarrow h$	· ↓).	[1]
(g	j) C	theck calculation of the two values of $E_{ m p}\!$		[1]
(g		alid conclusion based on the calculated values. Consistent witated criterion.	th 20% or with c	andidate's [1]

Mark Scheme: Teachers' version

Syllabus

Paper

Page 3

Page 4 Mark Scheme: Teachers' version		Syllabus	Paper
	GCE A/AS LEVEL – October/November 2009	9702	34

(h)

	Limitation (4 max)	Improvement (4 max)
Α	Two sets of readings are not enough / only two sets	Take more readings <u>and</u> plot a graph
В	Difficult to take measurements (h/l) because the ruler moves / is not vertical	Clamp rule / ensure rule is vertical using a set square on the bench
С	Change in properties / deterioration of the thread due to repeated drops	Use a new thread each time
D	Poor accuracy due to size of increment / only note measured $h_{\rm final}$ values not the values between.	Use smaller increments
E	Obtaining constant loop length for repeats at one value of loop length / variation in h_{final} values for repeats at one loop length	Sensible method to ensure constant loop length for repeats
F	Tangling cotton	

Do not allow 'repeated readings', centres of mass, or nail, knots, time ideas.

Do not allow use of video, 'use a computer to improve experiment', sensors.

Do not allow amount of tape/plasticine/glue, thinner/thicker thread, fans.

Do not allow 'eye level'.

[Total: 20]