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9702 PHYSICS

9702/31 Paper 31 (Advanced Practical Skills 1), maximum raw mark 40

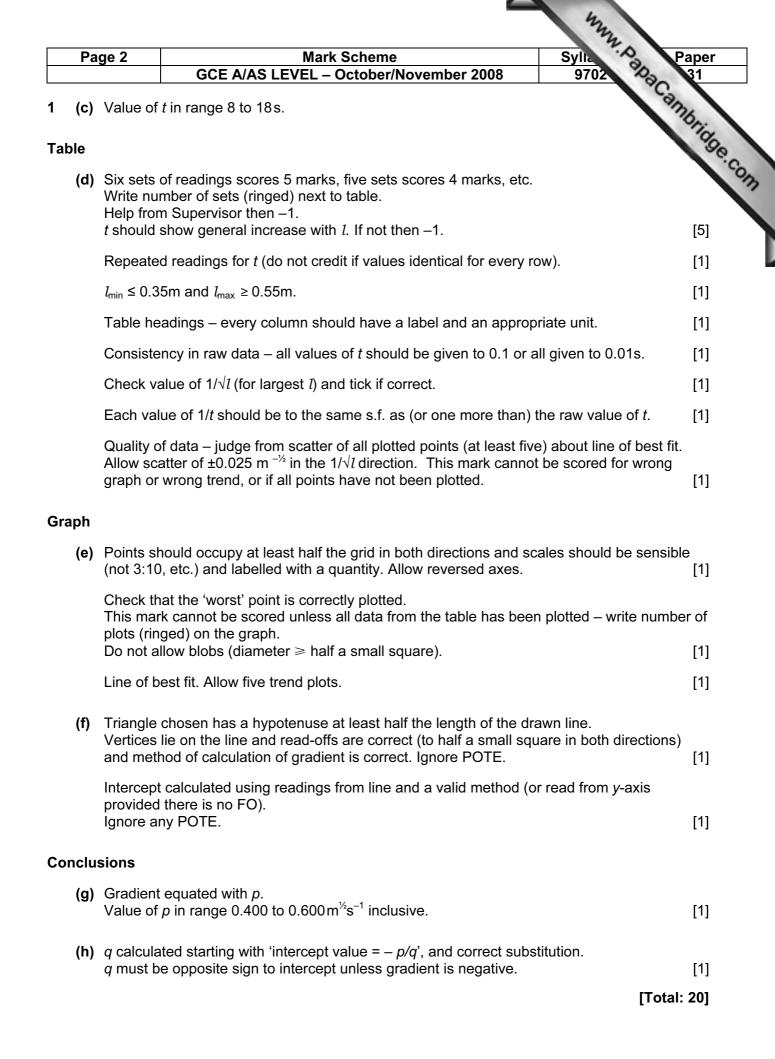
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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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

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Page 3			Mark Scheme Syla	
			GCE A/AS LEVEL – October/November 2008	9702 22 31
(a)	(i)	Raw	v value(s) of <i>d</i> recorded to the nearest mm.	Sylia 9702 9702 Paper 31 31 correct percentage
		Rep	eated readings for <i>d</i> .	1140
	(ii)		olute uncertainty of 1 or 2 mm (or half the range) used in a c ertainty calculation.	correct percentage [1]
	(iii)	Calo	culated value of <i>x</i> correct.	[1]
(c)	(i)	Firs Firs	t value for <i>n.</i> t value for <i>V</i> in range $0.5 \le V \le 2.0$. t value for <i>I</i> with <i>I</i> < 1.0A (unit required). gnificant help from Supervisor then –1.	[3]
(d)	Sec	ond	set of measurements (with different <i>n</i>).	[1]
	Correct calculation of second <i>R</i> .			[1]
	Calculated value of second μ correct (allow e.c.f.).			[1]
			- the two values of μ are within 20% of each other. I require a check calculation of first value of μ).	[1]

Drawing conclusions

(e) Valid comment on whether *R* proportional to *n*, based on comparison of two calculated ratios (e.g. two values of µ or two values of *R/n*).
Validity can be based on the candidate's own stated criterion (e.g. 'values within 10%') or, if not stated, on 20% difference.
Accept reversed trend as evidence for *R* not proportional to *n*. [1]

	(f) (i) Problems [4]	(f) (ii) Improvements [4]
А	Two sets of readings are not enough (to draw a conclusion)/only two readings.	Take more readings and plot graph.
В	Tube not circular/tube not rigid.	<u>Repeated</u> measurements of <i>d</i> in <u>different</u> <u>directions</u> .
С	Coils not circular (helix inferred)/different turns have different lengths/wire kinked or loosely wound/x different to πd /turns unevenly spaced.	Measure the length in one turn by wrapping string, then unwrapping and measuring/workable method of getting even spacing of turns.
D	Difficult to judge whole number of turns when positioning contacts/large contact area.	Mark lateral line on tube to give positions for contacts/use knife edge contact or smaller plug.
E	Contact resistance/lead resistance/circuit resistance/fluctuating or changing readings.	Measure lead resistance and subtract from <i>R</i> /reposition voltmeter connections closer to contacts/clean the contacts/use shorter leads.
F		Use vernier calipers <u>to measure <i>d</i></u> .