

GCSE Science – Investigative Skills Assignment – Marking Guidelines

Physics 2.1 – Resistance

For use until May 2009

Last date for submission for moderation May 2010

Please mark in red ink, and use one tick for one mark. Each part of each question must show some red ink to indicate that it has been seen.

Subtotals for each part of each question should be written in the right hand margin.

Please add annotations where necessary to explain why marks have or have not been awarded.

Enter the marks for **Section 1** and **Section 2** and the **total mark** on the front cover of the answer booklet.

The teacher must sign and date the front cover of the ISA.

The papers must be kept in a secure place and must **not** be returned to candidates.

The marking guidelines show examples of typical responses that candidates may make. However, teachers should use their professional judgement in deciding whether or not to award marks. If, in the judgement of the teacher, the candidate has provided a response which correctly answers the question, then a mark should be awarded even if this response is not shown in the mark guidance. If necessary, the teacher should annotate the script and/or mark guidance to justify the decision.

In the mark guidance:

- the use of a solidus (/) indicates an alternative answer
- the use of brackets () indicates wording that is not essential in the candidate's answer, but makes the guidance clearer.

SECTION 1

	Answer	Additional Guidance	
1	Statement referring to change in the dependent variable eg see if current / resistance of the wire changes	Dependent variable must be identified Just resistance or current alone is not sufficient	1 mark
	Independent variable correctly identified and linked to dependent variable eg when I changed the p.d. across the wire / the length of wire / the type of wire		1 mark
2(a)	Correct choice eg resistance is most likely to be the dependent variable p.d. or current will be the independent variable if one of them is the factor that was deliberately changed p.d. or current will be the dependent variable if eg the length of the wire or the type of wire was changed	This will depend upon the particular investigation	1 mark

	Answer	Additional Guidance	
2(b)	Ammeter / ohm meter / voltmeter	Must link to answer to 2(a)	1 mark
(c)	They would have been more precise		1 mark
3	Correct independent variable identified eg length of wire / type of wire / cross-sectional area of wire / p.d. / current		1 mark
4(a)	Control variable correctly identified eg length of wire / type of wire / cross- sectional area of wire / p.d. / current	This will depend on the particular investigation, but must be a factor that was kept constant by the candidate	1 mark
(b)	Idea that any variation would affect the dependent variable	Do not allow the simple statement to make it a fair test Allow to make the results valid	1 mark
5	Correct reason given Yes – because eg the wire got hot / the meter kept fluctuating or No – because eg all values matched prediction / results formed a clear pattern with no anomalous results	No mark for Yes or No . Mark is for the reason	1 mark
6	Sensible reason consistent with the candidate's results Yes – because some results did not fit the pattern / some were anomalous / to make it more reliable or No – because all results fitted a pattern / no anomalous results	No mark for Yes or No . Mark is for the reason No – not enough time can be allowed at the discretion of teacher	1 mark

	Answer	Additional Guidance	
7	<p>Amplified statement for 2 marks</p> <p>eg the length of wire affects the resistance for 1 mark</p> <p style="text-align: center;">plus</p> <p>eg the longer the wire, the greater the resistance for 2 marks</p> <p style="text-align: center;">or</p> <p>eg the current through the bulb changed as the voltage changed for 1 mark</p> <p style="text-align: center;">plus</p> <p>eg the bigger the current, the brighter the bulb for 2 marks</p> <p style="text-align: center;">or</p> <p>there was no effect on the resistance for 1 mark</p> <p style="text-align: center;">plus</p> <p>eg because there was no pattern / the results were random for 2 marks</p>	<p>Simple correct statement for 1 mark only</p> <p>NB statement must relate to the candidate's own results</p>	2 marks
8	<p>Table:</p> <p>Correct headings AND units all correct for all measured variables</p> <p>Graph/chart:</p> <p>X axis: suitable scales chosen and labelled with quantity and units</p> <p>Y axis: suitable scales chosen and labelled with quantity and units</p> <p>Points or bars plotted correctly to within ± 1mm</p> <p>Suitable line drawn on graph or bars correctly labelled on bar chart</p> <p>If wrong type of graph / chart, maximum 3 marks</p> <p>If the independent variable is: <i>continuous</i> <i>categoric</i> <i>discrete</i></p>	<p>Table with incomplete headings or units for the measured variables gains 1 mark</p> <p>eg all headings present = 1</p> <p>eg all units present = 1</p> <p>Accept axes reversed</p> <p>Allow one plotting error out of every 5 points plotted.</p> <p>Allow error carried forward from incorrect plots</p> <p>should draw a <i>best fit line graph</i></p> <p>should draw a <i>bar chart</i></p> <p>may draw either a <i>best fit line graph</i> or a <i>bar chart</i> (but allow dot-to-dot joining of points in this case)</p>	<p>2 marks</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p>
			Max 18 marks

SECTION 2

	Answer	Additional Guidance	
9	Units (of resistance or light intensity)	Allow ohms or Ω Allow candela or cd	1 mark
10(a)	The one tested might not be typical/ the company might have made an error	Allow - to improve the reliability	1 mark
(b)	Between 10 and 200		1 mark
(c)	The results would have been more reliable		1 mark
(d)(i)	Idea that two is too few		1 mark
	No idea what is going on between the two extremes		1 mark
(ii)	At least three (more) different values	Values stated should be approximately evenly spaced between the two extremes	1 mark
	A statement explaining this eg usually need at least 5 values to determine trend / values need to be evenly spaced		1 mark
11	Idea of increased reliability		1 mark
	Original company manufactured the LDRs, so may be biased / second company is independent		1 mark
	Quality of written communication		1 mark
	Candidates should use at least two technical terms from: eg <ul style="list-style-type: none"> • reliable • bias • independent • valid 	The mark is to be awarded for the correct use of technical terms. The marker should circle these terms Annotate below candidate answer with <i>Q✓ for mark given or Q× for mark not given</i> NB Ensure that candidates are not just copying part of the question	

	Answer	Additional Guidance	
(b)(i)	(Opinion) Suitable reason given eg insufficient data / haven't tested all of them	No mark for choosing opinion. Mark is for the reason	1 mark
(ii)	Measuring instruments have had a scale marked on them		1 mark
	Between fixed, known points	Allow measuring instruments have been checked Allow against another instrument	1 mark
(iii)	Record the value of the zero error		1 mark
	Subtract this value from all readings		1 mark
			Max 16 marks

ISA Total 34 Marks