Candidate 1 – LDR

Marks Awarded and Commentary

Section	Expected Response	Maximum mark	Mark awarded	Commentary
1. Aim	An aim that clearly describes the purpose of the investigation.	1	1	The candidate's aim clearly described the purpose of the investigation.
2. Underlying Physics	An account of the physics relevant to the aim.	3	3	The candidate has shown a good understanding of the physics relevant to the aim, showing an awareness of both basic band theory and the variation in the gap between valence and conduction bands in semiconductors.
3a. Brief description	A brief description of the approach used to collect experimental data.	1	1	The candidate's description of their experiment is given in sufficient detail for the marker to be able to visualise the nature of the experiment. The inclusion of a circuit diagram is not essential, given the basic structure of the circuit.
3b. Sufficient raw data	Sufficient raw data from the candidate's experiment.	1	1	The range of independent variable (light level) is limited by the constraints of the lab lighting. In this experiment, it is appropriate to make repeated measurements and, although limited, this has been done.
3c. Data table	Data from the candidate's experiment is presented in a suitable table.	1	1	The candidate has presented their data in a table with correct headings and units of measurement.
3d. Mean/ derived values	Mean and/or derived values are calculated correctly.	1	0	The candidate has calculated a value of resistance for each setting of the room lighting. A sample of a resistance calculation is shown, which is good practice.

Section	Expected Response	Maximum mark	Mark awarded	Commentary
				The candidate has also calculated a mean value for each of the variables. The average value of the current in the third row of the table, however, is incorrect, and so the mark for this section is not awarded.
3e. Internet/ literature data	Data relevant to the experiment from an internet/ literature source.	1	1	The internet data that the candidate has included is relevant to their experiment.
3f. Reference	A reference for the source of the internet/ literature data.	1	1	The candidate has given a full URL for the website page containing the data given in the report.
4a. Appropriate format	A graph of the appropriate format.	1	1	The candidate has drawn a scatter graph, which is an appropriate format for their experimental data.
4b. Suitable scales	The axes have suitable scales.	1	1	The axes of the candidate's graph have suitable linear scales. The labelling of the origin would have been good practice, but its position can be implied from the candidate's scales.
4c. Suitable labels and units.	The axes have suitable labels and units.	1	1	The axes of the graph have suitable labels and units.
4d. Accurately plotted data points	Accurately plotted data points and, where appropriate, a line of best fit.	1	1	The candidate has accurately plotted all three data points. The candidate has attempted to draw a curve line of best fit which is not perfect, but is acceptable at this level.
5. Analysis	A valid comparison of the experimental data with data from the internet/ literature.	1	1	The candidate has stated *'the shape of the graph is quite like mine and shows the resistance of an LDR going down when it gets brighter*', which is acceptable as a comparison of the experimental and internet data.

Section	Expected Response	Maximum mark	Mark awarded	Commentary
6. Conclusion	A valid conclusion that relates to the aim and is supported by data.	1	1	The candidate has made a conclusion of the variation of resistance with brightness based on data from both their experiment and the internet.
7. Evaluation	An evaluation of the experimental procedure.	2	0	The candidate has stated that the accuracy of the experiment would be improved by a greater number of repeated measurements. Given the insignificant variation in repeated data values, however, this is unlikely to have a significant effect, the marks for this section are not awarded.
8a. Title	The report has an informative title.	1	1	The candidate has included an informative title.
8b. Structure	A clear and concise report.	1	1	The candidate's report is clear and concise.
TOTAL		20	17	

Candidate 2 – Cooling Curve

Marks Awarded and Commentary

Section	Expected Response	Maximum mark	Mark awarded	Commentary
1. Aim	An aim that clearly describes the purpose of the investigation.	1	1	Although not specifying the substance in question, or its state, the candidate's aim describes the purpose of the investigation with *just* sufficient clarity.
2. Underlying Physics	An account of the physics relevant to the aim.	3	0	The candidate has not included an account of the physics underlying the aim.
3a. Brief description	A brief description of the approach used to collect experimental data.	1	0	The candidate's description of their experiment is given with an excessive level of detail. The candidate has not attempted to summarise the method, and so the mark for this section is not awarded.
3b. Sufficient raw data	Sufficient raw data from the candidate's experiment.	1	1	The candidate has included sufficient experimental data, with a suitable time interval and some repeated measurements.
3c. Data table	Data from the candidate's experiment is presented in a suitable table.	1	0	Each column in the candidate's table has clear headings but the unit of time and an acceptable unit of temperature is not included in either table. The mark for this section is not awarded.
3d. Mean/ derived values	Mean and/or derived values are calculated correctly.	1	0	The candidate has not attempted to calculate a mean value for temperature. Even if the candidate done so, the average values would not have been valid due to different starting temperatures.

Section	Expected Response	Maximum mark	Mark awarded	Commentary
3e. Internet/ literature data	Data relevant to the experiment from an internet/ literature source.	1	0	The candidate has not included comparative data.
3f. Reference	A reference for the source of the internet/ literature data.	1	0	This mark is not accessible due to the lack of comparative internet/literature data.
4a. Appropriate format	A graph of the appropriate format.	1	0	The candidate has attempted to draw a scatter graph and a line graph on the same axes. The mark for this section is not awarded.
4b. Suitable scales	The axes have suitable scales.	1	1	The candidate has used suitable linear scales for the axes of the graph. The scale-break on the y-axis is appropriate to better display the data.
4c. Suitable labels and units.	The axes have suitable labels and units.	1	1	The axes in the candidate's graph have clear labels. The candidate has been penalised for incorrect/missing units in the table in 3c, and has transferred the same incorrect/missing units to the axes of the graph, and so is not penalised for the same error in this section.
4d. Accurately plotted data points	Accurately plotted data points and, where appropriate, a line of best fit.	1	1	The candidate has plotted all the data points accurately.
5. Analysis	A valid comparison of the experimental data with data from the internet/ literature	1	0	This mark is not accessible due to the lack of comparative internet/literature data.

Section	Expected Response	Maximum mark	Mark awarded	Commentary
6. Conclusion	A valid conclusion that relates to the aim and is supported by data.	1	0	The candidate has run out of time and not stated a conclusion.
7. Evaluation	An evaluation of the experimental procedure.	2	0	The candidate has run out of time and not provided an evaluation.
8a. Title	The report has an informative title.	1	1	The candidate has included an informative title.
8b. Structure	A clear and concise report.	1	0	The candidate's report is neither sufficiently clear nor concise. The mark for this section is not awarded.
TOTAL		20	6	

Candidate 3 – Thermistor

Marks Awarded and Commentary

Section	Expected Response	Maximum mark	Mark awarded	Commentary
1. Aim	An aim that clearly describes the purpose of the investigation.	1	1	The candidate's aim describes clearly the purpose of the investigation.
2. Underlying Physics	An account of the physics relevant to the aim.	3	1	The candidate has described the change of resistance of the thermistor with temperature, but has not attempted an explanation for the variation in resistance. This *just* shows a limited understanding of the physics relevant to the aim at a depth appropriate to National 5.
3a. Brief description	A brief description of the approach used to collect experimental data.	1	1	The candidate's description of their experimental approach is given in sufficient detail for the marker to be able to visualise the nature of the experiment.
3b. Sufficient raw data	Sufficient raw data from the candidate's experiment.	1	1	The candidate has given an acceptable number of values and has included repeated measurements. The range of the independent variable could have been wider, but is acceptable.

Section	Expected Response	Maximum mark	Mark awarded	Commentary
3c. Data table	Data from the candidate's experiment is presented in a suitable table.	1	0	The candidate has presented their data in a table with correct headings. The unit of current in the third column of the table, however, is incorrect and so the mark for this section is not awarded.
3d. Mean/ derived values	Mean and/or derived values are calculated correctly.	1	1	The candidate has calculated all of the mean values correctly.
3e. Internet/ literature data	Data relevant to the experiment from an internet/ literature source.	1	1	The internet data the candidate has included is relevant to their experiment.
3f. Reference	A reference for the source of the internet/ literature data.	1	1	The candidate has given a full URL for the website page containing the data given in the report.
4a. Appropriate format	A graph of the appropriate format.	1	1	The candidate has produced a scatter graph, which is an appropriate format for their data.
4b. Suitable scales	The axes have suitable scales.	1	1	The axes of the candidate's graph have suitable linear scales. The scale on the x-axis does not begin at 0, which is acceptable for this investigation.
4c. Suitable labels and units	The axes have suitable labels and units.	1	1	The axes of the graph have suitable labels and units.
4d. Accurately plotted data points	Accurately plotted data points and , where appropriate, a line of best fit	1	0	The candidate's graph is of a size that allows the accuracy of plotting to be checked, although a larger graph would have been clearer. The scale chosen by the candidate has made accurate plotting more challenging than it could have been, and most points have

Section	Expected Response	Maximum mark	Mark awarded	Commentary
				not been plotted correctly within acceptable tolerance, and so the mark for this section is not awarded.
5. Analysis	A valid comparison of the experimental data with data from the internet/ literature.	1	1	The candidate's statement *'The graph from the internet… like my graph curves upwards with the higher temperatures'* is a valid comparison between their experimental data and the data from the internet source, even though the internet graph does not have an origin or arrows on the axes.
6. Conclusion	A valid conclusion that relates to the aim and is supported by data.	1	1	The candidate's statement *'the graphs show …that for this type of thermistor the current increases as the temperature increases'* is a conclusion that relates to the aim and is supported by the data in the report.
7. Evaluation	An evaluation of the experimental procedure.	2	0	The candidate has not identified a factor which had a significant effect on the experiment.
8a. Title	The report has an informative title.	1	1	The candidate has included an informative title.
8b. Structure	A clear and concise report.	1	1	The candidate's report is clear and concise.
TOTAL		20	14	