

Commentary on candidate 3 evidence (Switch on Voltage)

The evidence for this candidate has achieved the following marks for each section of this course assessment component.

| Section | Expected response | Maximum mark | Mark awarded | Commentary |
|----------------------|--|--------------|--------------|---|
| 1 Aim | An aim that describes clearly the purpose of the investigation. | 1 | 0 | The candidate's aim is not appropriate for a Higher Physics assignment. At the outset of the investigation, the teacher/lecturer must agree the topic with the candidate and provide advice on the suitability of the candidate's aim. |
| 2 Underlying physics | An account of physics relevant to the aim of the investigation. | 3 | 1 | <p>The candidate shows a limited level of understanding. The diagram is taken from a source, and is not fully explained. The relationship $E=hf$ is stated in context. It would be good practice, however, to fully define the symbols for the relationship $v=f\lambda$, used by the candidate to calculate frequency.</p> <p>Overall, the candidate has shown a limited understanding of band gap energy and photon emission.</p> |
| 3a Brief summary | A brief summary of the approach(es) used to collect experimental data. | 1 | 1 | <p>The candidate has briefly summarised what they are measuring in the experiment and has indicated the measuring instrument used.</p> <p>Presumably the eye was used rather than a light meter to judge when the LEDs started to produce light.</p> |

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|---------|------------------------|---|--------------|--------------|--|
| | | | | | <p>The brief description of the experimental procedure is sufficient for the candidate to be awarded the mark.</p> <p>A circuit diagram would help the marker visualise the experiment.</p> |
| 3b | Sufficient raw data | Sufficient raw data from the candidate's experiment. | 1 | 0 | The range of the independent variable is acceptable, but repeated readings were not taken and so the raw data is not sufficient. |
| 3c | Data table | Data, including any mean and/or derived values, presented in correctly produced table(s). | 1 | 1 | The tables drawn by the candidate have correct headings with units in each data cell. The calculations of derived values are correct. Both tables are required for the mark to be awarded in this section. |
| 3d | Relevant data | Data relevant to the experiment from an internet/literature source or data relevant to the aim of the investigation from a second experiment. | 1 | 1 | The candidate has included data relevant to the experiment from an internet/literature source. |
| 3e | Citation and reference | A citation and reference for a source of internet/literature data or information. | 1 | 1 | The source is cited in the text of the report and referenced near the end of the report. |

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|---------|---|--|--------------|------------|---|
| 4a | Suitable scales | The axes of the graph have suitable scales. | 1 | 1 | The graph has suitable scales on both axes. |
| 4b | Suitable labels and units | The axes of the graph have suitable labels and units. | 1 | 1 | The graph has suitable labels and units on both axes. |
| 4c | Accurately plotted data points and line of best fit | Accurately plotted data points and, where appropriate, a line of best fit. | 1 | 0 | The size of this graph does not allow the marker to check accurate plotting. The line of best fit is not acceptable. The candidate has ignored the third data point but has not identified this as a 'rogue' point. |
| 5 | Uncertainties | Scale reading uncertainties and random uncertainties. | 2 | 1 | The candidate has included a scale reading uncertainty for the voltmeter used to measure the switch on voltage. The candidate has not included any random uncertainties. |
| 6 | Analysis | Analysis of experimental data. | 1 | 1 | The candidate has calculated the gradient. The subsequent correct calculation of Planck's constant is acceptable as a discussion of the experimental data. |
| 7 | Conclusion | A valid conclusion that relates to the aim and is supported by all the data in the report. | 1 | 0 | The conclusion is not at an appropriate level for Higher Physics. Had the candidate concluded that there was a linear relationship between the frequency and switch on voltage, the candidate could have been awarded the mark for the conclusion. The value of Planck's constant is not relevant to the stated aim. |

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|--------------|------------|---|--------------|--------------|--|
| 8 | Evaluation | Evaluation of the investigation. | 3 | 0 | <p>The candidate has attempted two statements.</p> <p>The candidate has not given an appropriate justification for the suggestion to repeat readings of switch on voltage.</p> <p>The second statement that it was difficult to judge when the LED began to light up, does not include a possible solution to the issue.</p> |
| 9 | Structure | A clear and concise report with an informative title. | 1 | 1 | The report is clear and concise with an informative title. |
| Total | | | 20 | 10 | |