Additional & Separate Physics ISA 2014-15
Thermistors

PART 2

QUESTION 1 FROM THE PHYSICS ISA SUMMER 2013

1 (a) (i) Do your results support the hypothesis that you investigated?

You should use any pattern that you can see in your results to support your answer.

You should include examples from your results.

Q. No.
1 (a) (i)

EXAMPLE ANSWER

VALID STATEMENT: THE _ AFFECTS THE RESISTANCE OF THE THERMISTOR.

PATTERN: AS INCREASES; THE RESISTANCE OF THE THERMISTOR DECREASES, RESISTANCE IS INVERSELY PROPORTIONAL TO .

IDENTIFYING RESULTS: GIVE TWO EXAMPLES, ONE HIGH AND ONE LOW E.G., WHEN TEMPERATURE AT 20°C THE RESISTANCE WAS 100Ω; WHEN TEMPERATURE AT 80°C THE RESISTANCE WAS 20Ω– BUT USE YOUR DATA.

QUESTION 1 FROM THE PHYSICS ISA SUMMER 2013

1 (a) (ii) Did you get any anomalous results?

Q. No. 1 (a) (ii)	0 marks	1 mark	2 marks	3 marks
	No creditworthy response.	There is a correct statement as to whether or not there are any anomalous results.	There is a correct statement as to whether or not there are any anomalous results	There is a correct statement as to whether or not there are any anomalous results
Additiona Guidance				

EXAMPLE ANSWER:

THERE ARE NO ANOMALOUS RESULTS

<u>BECAUSE</u> ALL THE DATA IS CLOSE TO THE LINE OF BEST FIT (QUOTE AT LEAST TWO VALUES TO CONFIRM THIS)

OR: THERE WERE ANOMALOUS RESULTS, <u>BECAUSE</u> SOME OF THE DATA WAS <u>NOT</u> CLOSE TO THE LINE OF BEST FIT (QUOTE VALUES TO CONFIRM THIS)

that
at do not fit
ts are
very close
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marks)

QUESTION 1 FROM THE PHYSICS ISA SUMMER 2013

1 (c) What was the independent variable in the investigation that you did?

INDEPENDENT VARIABLE WRITTEN ON CRF

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What was the range of the independent variable?

The range was from ..... to ..... .

MIN VALUE with UNIT MAX VALUE with UNIT

Explain why this was or was not a suitable range.

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Q. 1	**EXAMPLE ANSWER:** **THIS WAS A SUITABLE RANGE BECAUSE I SAW A TREND.** **THIS IS CONFIRMED BY MY RESULTS (QUOTE AT LEAST TWO VALUES – ONE BIG, ONE SMALL)**
Additional Guidance	*Look at the candidate's table of results in order to confirm the suitability of the range. The explanation should convey that the candidate understands the term range. Accept lowest to highest, highest to lowest, or the difference. Correct units should appear at least once.* *If the dependent variable is given instead of the independent variable, a maximum of one mark may be given for the correct range of the dependent variable.*

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(3 marks)

Have you got enough readings that are close together?

The gap between the readings is known as the **interval**.

For example, you might alter the light intensity by moving a lamp to different distances from the solar cell. A set of 11 readings equally spaced over a distance of 1 metre would give an interval of 10 centimetres.

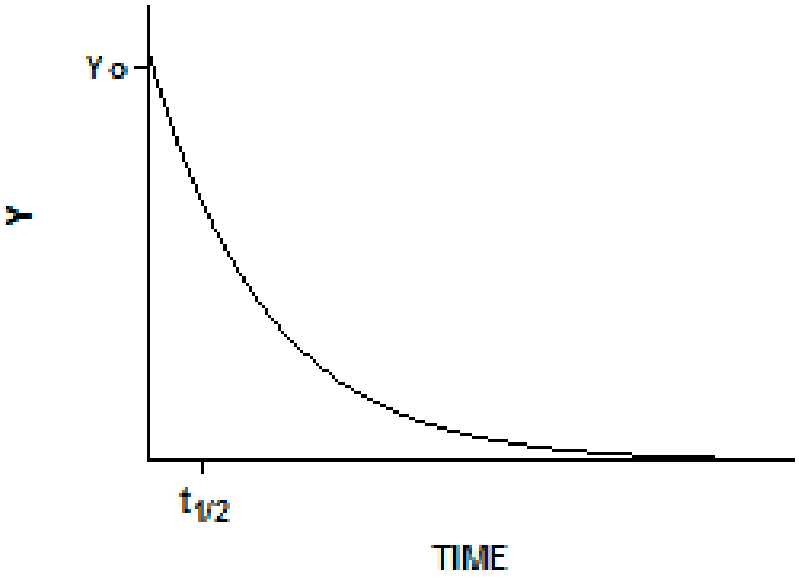
If the results are very different from each other, you might not see a pattern if you have large gaps between readings over the important part of the range.

For your experiment, what interval did you use and why?

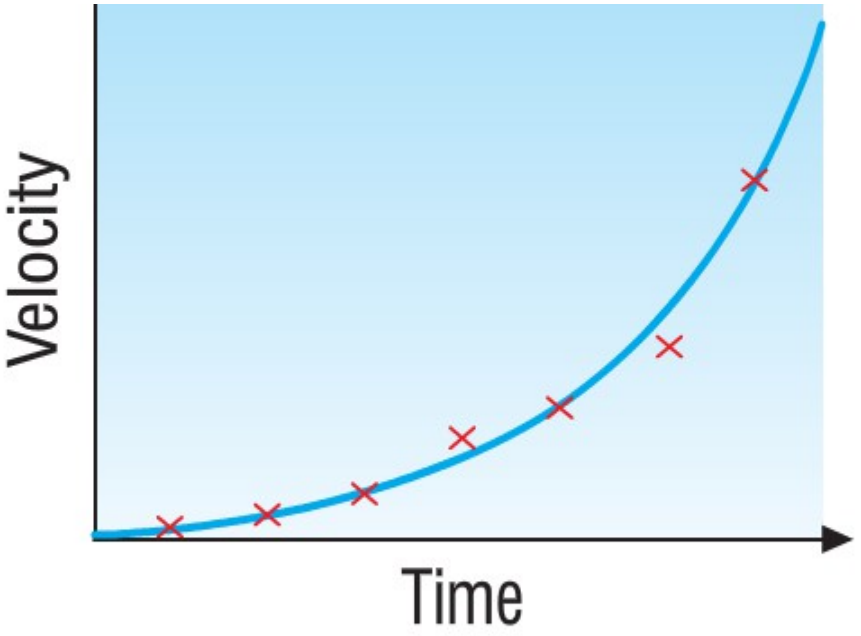
E.g., 10℃ and it was used to get a suitable pattern, allowing for noticeable changes which were not too great, following the pattern.

What is meant by a *"sketch"* graph?

- What do you notice about the two graphs below?



SKETCH GRAPH – JUST A "SKETCH"



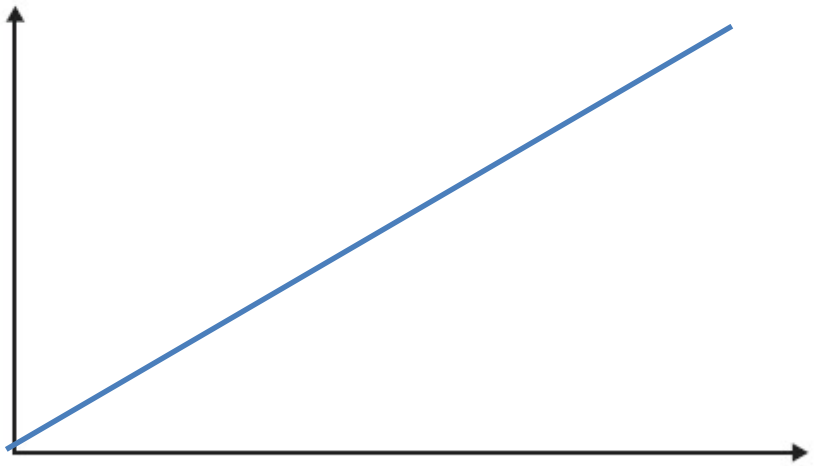
A question from Physics ISA 2011

2 You have been given a Secondary Data Sheet that provides results from similar investigations.

2 (a) Draw a sketch graph of the results in Case study **1**.

The graph should show how the mean output voltage varies with the area of the solar cell exposed to light.

DEPENDENT VARIABLE



(2 marks)

INDEPENDENT VARIABLE

QUESTION 2 FROM THE PHYSICS ISA SUMMER 2013

A manufacturer of bungee ropes makes this hypothesis:

'The extension of the bungee rope is directly proportional to the force applied.'

Look at Case Studies **1**, **2** and **3**.

Explain whether or not the results in Case Studies **1**, **2** and **3** support this hypothesis.

To gain full marks, your explanation should include appropriate examples from the results in Case Studies **1**, **2** and **3**.

1 mark	2 marks	3 marks
A simple correct statement is made about **at least two** of the Case Studies **1**, **2** and **3,** as to whether or not they support the hypothesis.	Correct statements are made about Case Studies **1**, **2** and **3,** supported by a more detailed explanation of **one** of them.	Correct statements are made about Case Studies **1**, **2** and **3**, supported by a more detailed explanation of **both** Case Studies **2** and **3**.

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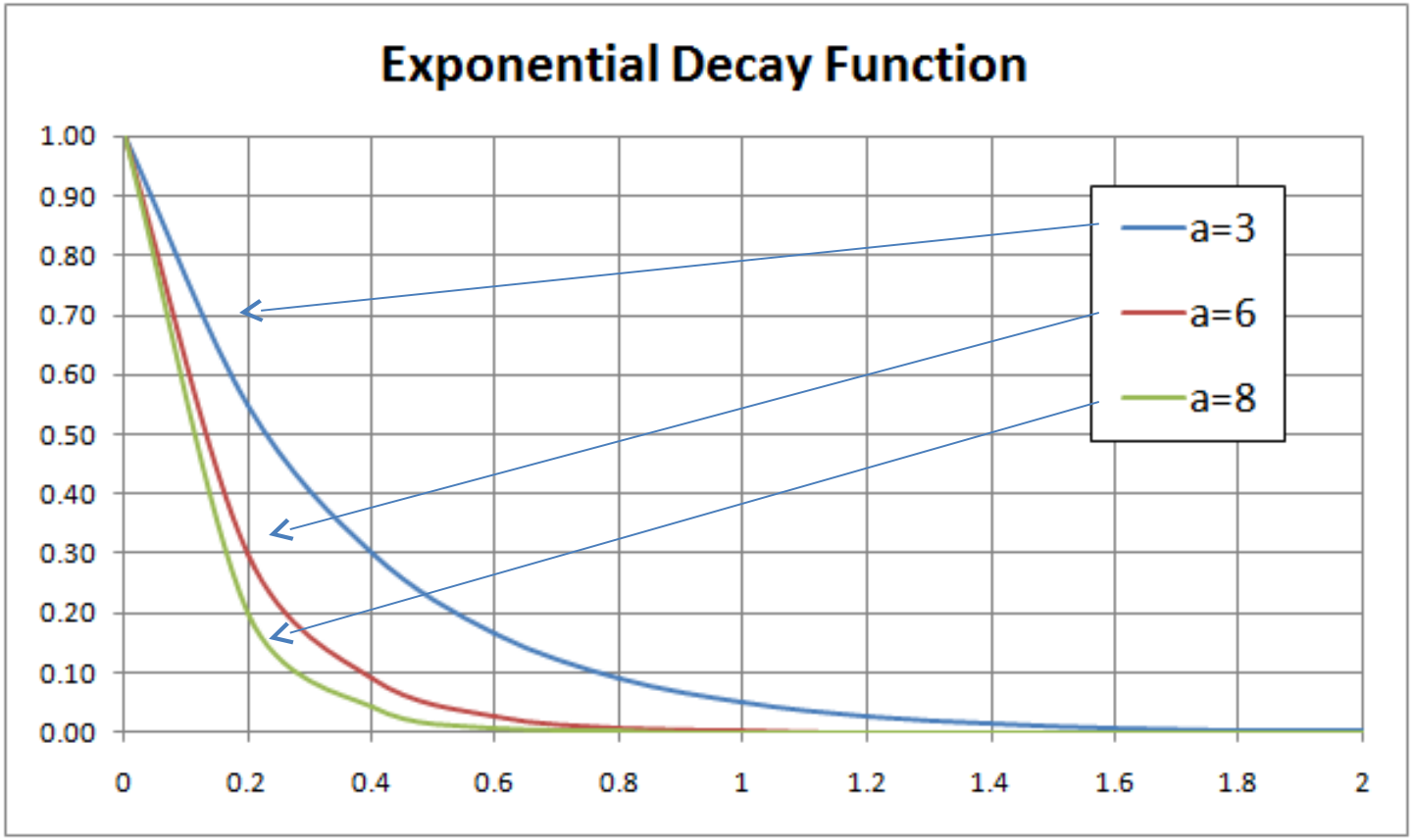
(3 marks)

Anomalies

Anomalous results are clearly out of line. They are not those that are due to the natural variation you get from any measurement. These should be looked at carefully. There might be a very interesting reason why they are so different. You should always look for anomalous results and discard them before you calculate a mean, if necessary.

- If anomalies can be identified while you are doing an investigation, it is best to repeat that part of the investigation.
- If you find anomalies after you have finished collecting data for an investigation, they must be discarded.



Which curve from the graph above has the greatest change from 0 to 0.2? How do you know?

- **The Green line (a=8) because it has the steepest gradient, or greatest drop from 0 to 0.2 (i.e. 1.00 to 0.20).**
- **This would be applied in a useful context to show sudden changes over a small range. Compare this with the blue line (a=3) the change is not so great and so this would be a "less sensitive" change.**

A question from Physics ISA 2011

Context: THERMOSTATS

3 How could the results from your investigation be useful in the context you have researched?

You may use information from your Candidate Research Notes to help you to answer this question.

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SECTION 2		
1 mark	**2 marks**	**3 marks**
Results from the investigation or an idea from the research has been related to the context.	Results from the investigation or an idea from the research has been related to the context. There is a **simple** explanation of how the results or idea can be applied and used in the context.	Results from the investigation or an idea from the research has been related to the context. There is a **detailed** explanation of how the results or idea can be applied and used in the context.

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(3 marks)

A question from Physics ISA 2011

Context: THERMOSTATS

3 How could the results from your investigation be useful in the context you have researched?

You may use information from your Candidate Research Notes to help you to answer this question.

(the results will show)as the temperature gets higher the resistance decreases. This would be useful as thermistors are a useful component that can be used in thermostat controls and this therefore could be wired up to a relay circuit allowing for automatic controls to work, controlling the heating and thus temperature in a house.

(3 marks)