Oxford Cambridge and RSA

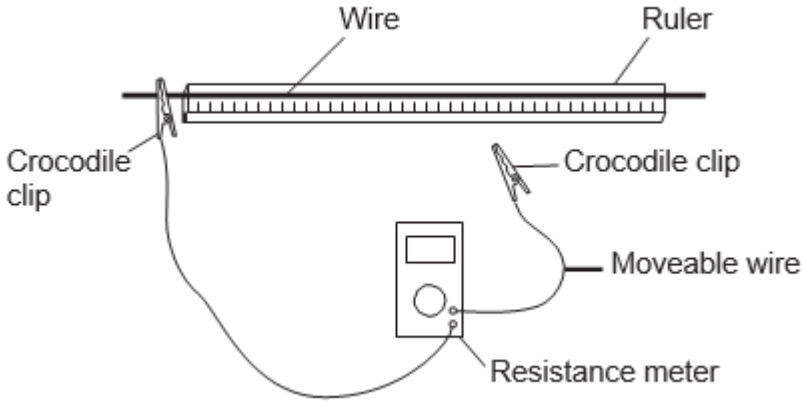
GCSE Physics A (Gateway)

J249/03 Physics A P1-P4 and P9 (Higher Tier)

Question Set 4

1 Two students investigate the resistance of a wire.

They tape a length of wire to a metre ruler and connect it to a resistance meter using crocodile clips.



Look at their results.

Length of wire (cm)	Resistance (Ω)			
	Attempt 1	Attempt 2	Attempt 3	Mean
25	8.8	8.3	8.5	8.533
50	16.2	16.1	16.4	16.4
75	23.5	23.8	18.7	23.7
100	30.8	31.1	31.0	31.0

(a) (i) Describe the pattern shown by these results.

Use data in your answer. as length of wire increases so does resistance - therefore length is directly proportional to resistance **[2]**

(ii) The students made **two** mistakes when they recorded their results and completed the table.

Identify the mistakes **and** explain what they should have done.

1. mean for 25cm should be to 1dp **[2]**
2. mean for 50 cm should be 16.2 not 16.4

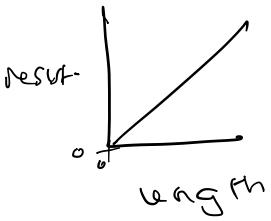
(iii) The students have correctly handled an anomaly in their results.

Identify the anomaly and explain how it was correctly handled.

The anomaly is for 75cm and is 18.7, they handled it by removing it to calculate the mean. **[2]**

(iv) The students plan to plot a graph of mean resistance against length.

What would you expect a graph of these results to look like?



A straight line through the origin that shows length is directly proportional to resistance. **[2]**

(b) **(i)** The actual mean resistance values are more than expected.

Suggest **two** possible errors with the experiment.

1. crocodile clip does not start at 0 cm so the wire is longer than measured
2. The wires will get hot causing losses

[2]

(ii) For **one** of the errors, suggest how the experimental procedure could be improved.

move the crocodile clip to 0cm

[1]

Total Marks for Question Set 4: 11