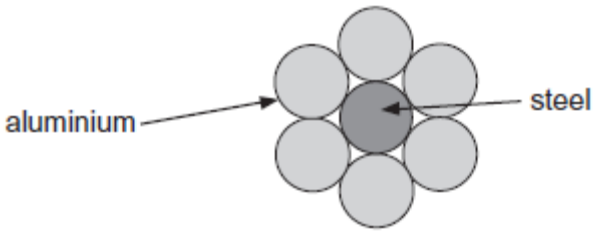
Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic: Electricity

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Name of the Student:_____
Max. Marks : 24 Marks **Time :** 24 **Minutes**

Q1.

A cable used in high-voltage power transmission consists of six aluminium wires surrounding a steel wire. A cross-section is shown below.



The resistance of a length of 1.0 km of the steel wire is 3.3 Ω. The resistance of a length of 1.0 km of **one** of the aluminium wires is 1.1 Ω.

(a) The steel wire has a diameter of 7.4 mm.
Calculate the resistivity of steel. State an appropriate unit.

resistivity = _____ unit _____

(4)

(b) Explain why only a small percentage of the total current in the cable passes through the steel wire.

_____

_____

_____

_____

_____

_____

_____

(3)

(c) The potential difference across a length of 1.0 km of the cable is 75 V.

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Calculate the total power loss for a 1.0 km length of cable.

Total power loss _____ W

(3)

(Total 10 marks)

Q2.

(a) The power P dissipated in a resistor of resistance R is measured for a range of values of the potential difference V across it. The results are shown in the table below.

V / V	V^2 / V^2	P / W
1.00	1.0	0.21
1.71	2.9	0.58
2.25		1.01
2.67		1.43
3.00	9.0	1.80
3.27	10.7	2.18
3.50	12.3	2.43

(i) Complete the table above.

(1)

(ii) Complete the graph below by plotting the two remaining points and draw a best fit straight line.

(2)

(iii) Determine the gradient of the graph.

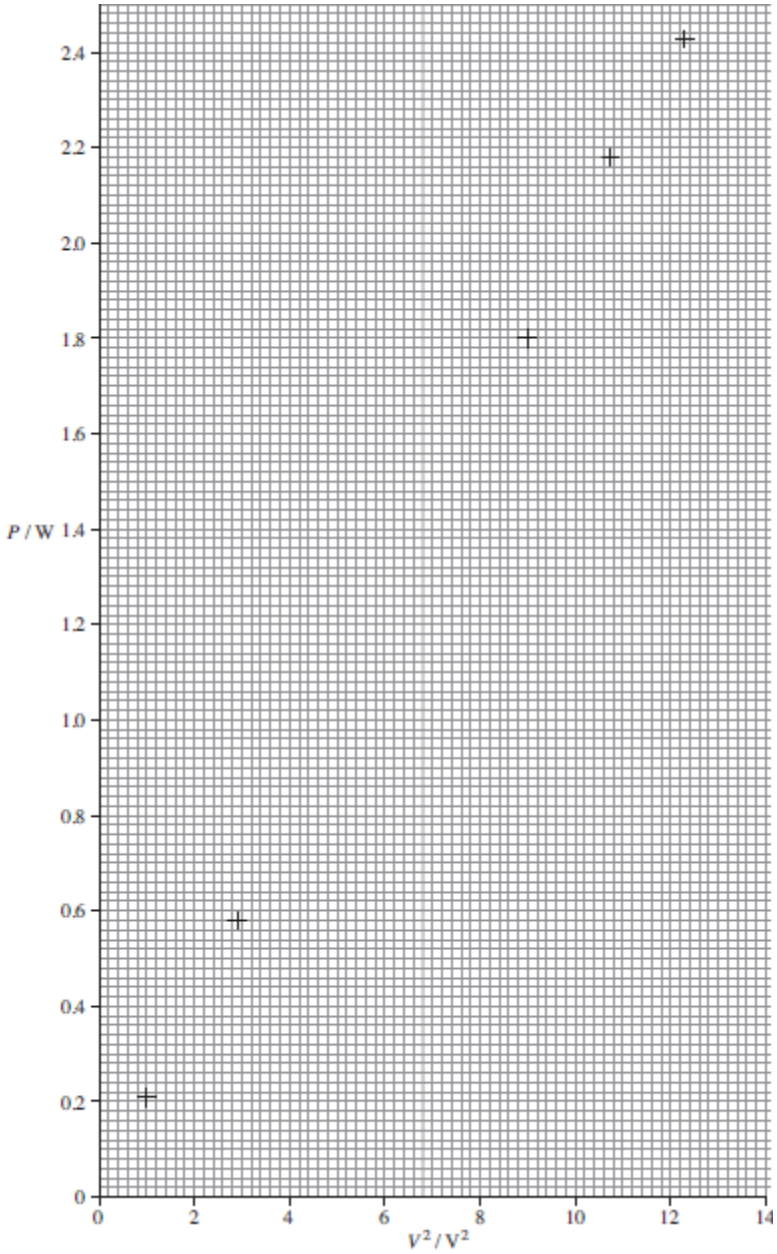
gradient = _____

(3)

(iv) Use the gradient of the graph to obtain a value for R.

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R = _____



(1)

(b) The following questions are based on the data in the table above.

(i) Determine the value of R when V = 3.50 V.

R = _____ Ω

(1)

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(ii) The uncertainty in V is ± 0.01 V. The uncertainty in P is ± 0.05 W.

Calculate the percentage uncertainty in the value of R calculated in part (1).

percentage uncertainty = _____ %

(3)

(iii) Hence calculate the uncertainty in the value of R.

uncertainty = _____

(1)

(iv) State and explain whether the value of R you calculated in part (1) is consistent with the value of R you determined from the gradient in part (a)(iv).

(2)

_____

_____

_____

_____

_____

_____

(Total 14 marks)

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